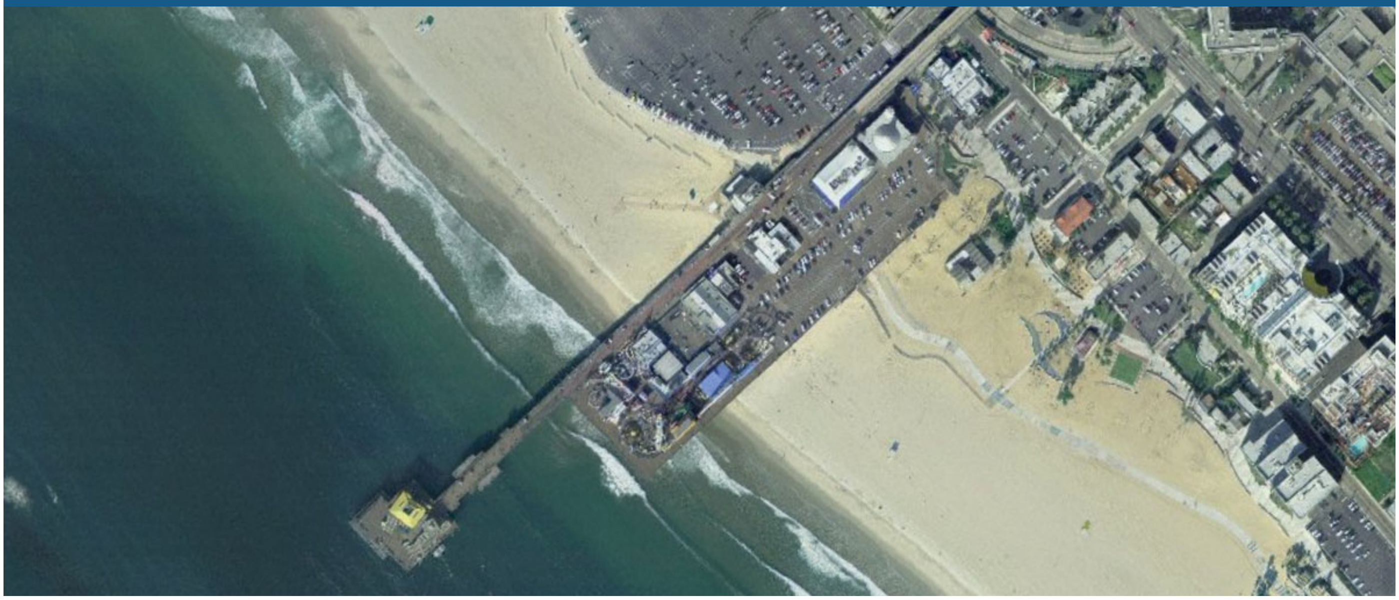
FINAL INITIAL STUDY/MITIGATED NEGATIVE DECLARATION



Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade

City of Santa Monica, California

August 2011

FINAL INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade

City of Santa Monica, California

Prepared for:

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August 2011

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CITY OF SANTA MONICA
INITIAL STUDY / NEGATIVE DECLARATION AND NEIGHBORHOOD IMPACT STATEMENT

1. Project title:

Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade

2. Lead agency name and address:

City of Santa Monica
1685 Main Street
Santa Monica, CA 90407

3. Contact person and phone number:

Eric Bailey, Civil Engineer, Public Works Civil Engineering Division
(310) 458-2201

4. Project location:

Portions of Santa Monica Municipal Pier

5. Project sponsor's name and address:

City of Santa Monica Public Works Department

6. General plan designation:

Beach and Oceanfront District

7. Zoning:

Residential-Visitor Commercial (RVC)

8. Description of project:

There are two distinct components of the proposed project: the emergency gangway and floating dock, and the Phase 4 structural upgrades.

The proposed emergency gangway and floating dock component consists of: 1) demolition and removal of one existing concrete piling and an 18-foot-long by 8-foot-wide section of the concrete decking of the southern fishing platform; 2) installation of a 2.5-ton capacity hydraulic crane lift on the pier; 3) construction, transportation, and anchoring of a 60-foot-long by 36-foot-wide floating barge (dock) on the south side of the pier (anchoring will be with 12 screw-type anchors or piles driven into the seafloor in approximately 16 feet of water [MLLW]); 4) installation of a 88-foot-long by 5-foot-wide aluminum gangway on the south side of the pier; 5) installation of various railings, utilities, and amenities at the project site; and 6) demobilization and removal of construction equipment and site cleanup.

The Phase 4 structural upgrade component of the proposed project consists of: 1) construction of a temporary pile-supported steel trestle on the north side of the existing pier; 2) demolition and replacement of a 363-foot-long by 36-foot-wide wooden section of the pier; 3) removal and disposal of 19 wooden pier bents and piles that support that Pier section; 4) replacement of the wooden piles and bents with pre-stressed concrete piles and concrete piling caps (one bent is a set of four 18-inch diameter round piles and a pre-stressed concrete piling cap connecting the tops of the four pilings); 5) installation of on- and under-pier utilities; 6) replacement of wood stringers and deck; and 7) removal of temporary trestle, demobilization and removal of construction equipment, and site cleanup.

A more detailed description of the proposed project is provided below under Expanded Project Description.

9. Surrounding land uses and setting:

The project site is located on the Santa Monica Municipal Pier at the western edge of the City of Santa Monica, at the western terminus of Colorado Avenue near the intersection of Colorado Avenue and Ocean Avenue. The site is bounded by Santa Monica State Beach, the beach bike path, and Pacific Coast Highway to the east and the Pacific Ocean to the south, west, and north. Also, a public parking lot is located at 1550 Pacific Coast Highway, which is located immediately adjacent to the eastern end of the Pier on the north side.

10. Public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

Approvals required for the proposed project include, but are not limited to, the following:

- Adoption of Mitigated Negative Declaration (City Council)
- Right to Pass Permit (Los Angeles County Department of Beaches and Harbors)
- Approval of Construction Activities on Santa Monica State Beach (California Department of Parks and Recreation)
- Section 10 Permit (United States Army Corps of Engineers)
- Regional Water Quality Control Board (NPDES permit)
- Certificate of Appropriateness (City of Santa Monica Landmarks Commission)

EXPANDED PROJECT DESCRIPTION

A. INTRODUCTION

The City of Santa Monica Department of Public Works (SMDPW) is proposing the Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade Project (proposed project). The proposed project involves structural improvements to one portion of the Santa Monica Municipal Pier (Pier), as well as construction of an access ramp (or "gangway") and floating barge to provide a means for evacuation from the western end of the pier during an emergency.

B. PROJECT LOCATION AND SURROUNDING USES

The project site is located on the Santa Monica Municipal Pier at the western edge of the City of Santa Monica, at the western terminus of Colorado Avenue near the intersection of Colorado Avenue and Ocean Avenue. The site is bounded by Santa Monica State Beach, the beach bike path, and Pacific Coast Highway to the east and the Pacific Ocean to the south, west, and north. Also, a public parking lot is located at 1550 Pacific Coast Highway, which is located immediately adjacent to the eastern end of the Pier on the north side. The location of the project site is illustrated in **Figure 1**, *Regional Location and Vicinity Map*, below, while an aerial photograph with surrounding land uses is provided below in **Figure 2**, *Aerial Photograph*.

C. ENVIRONMENTAL SETTING

1. Project Background and Existing Conditions

(a) Santa Monica Pier History

On September 9, 1909, the Santa Monica Municipal Pier opened to the public. Over the next several years, the Pier's continuing ability to attract large crowds impressed Charles Looff, a pioneer amusement entrepreneur who had built Coney Island's first carousel in Brooklyn, New York and then opened a carousel factory nearby. In 1916, after lengthy negotiations with the City of Santa Monica, he started construction alongside the Municipal Pier. Looff's Pier featured the landmark Hippodrome building, a California-Byzantine-Moorish-style fantasy that has housed a succession of vintage merry-go-rounds and Wurlitzer organs. More attractions followed and soon the Looff Pier was enlarged to its current size of 270 feet by 1,080 feet.

While the Municipal Pier continued to be owned and operated by the City of Santa Monica, the Looff Pleasure Pier had a succession of owners. In 1953, it was taken over by the City, which leased it to a private operator. Approximately twenty years later, in 1973, the Santa Monica City Council ordered the demolition of both deteriorating piers. Outraged by this move, residents fought back with a "Save Our Pier Forever" initiative, with one of its objectives being to establish the Pier as a Los Angeles County Historical Landmark. This effort was successful, and in 1975 the Pier was designated a Los Angeles County Historical Landmark, and in 1976 it was designated a City of Santa Monica Landmark.

Regional Location and Project Vicinity Map

0 0.25 Miles

Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrades Project

Source: ESRI Street Map, 2009; PCR Services Corporation, 2010.

FIGURE **1**

PCR

Aerial Photograph

Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrades Project

Source: ESRI Street Map, 2009; PCR Services Corporation, 2010.

PCR

FIGURE

2

In 1981 the City appointed the Pier Task Force (later named the Pier Restoration Corporation or PRC) to provide management and oversee restoration, including stripping the famed Hippodrome building back to its original framework and reconstructing it piece by piece. Although two fierce storms halted work in 1983, washing away 100,000 square feet of the ocean end of the Pier, the Hippodrome and its carousel were designated a National Historic Landmark in 1987.

In 1988, the Santa Monica Pier Development Program was adopted by Santa Monica's City Council. As part of the Development Program, a new concrete substructure was built for the western end of the pier in 1989, adding strength and stability to a pier that could now withstand violent storms. A variety of retail, food and entertainment outlets, as well as a police substation and a world class amusement park were constructed on the Pier to enhance the overall experience for a crowd that has grown to four million visitors a year.

In addition to the reconstruction of the western end of the Pier noted above, the Pier has undergone ongoing repairs to, and rehabilitation and replacement of, various sections of the structure. As previously indicated, following the Pier's near demise in the early 1970s, several phases of repairs were conducted between May 1976 and February 1986, the concrete substructure noted above in 1989, followed by lighting, rail, and end-of-Pier improvements in the early 1990s. Subsequently, portions of the Pier have undergone structural upgrades as part of the previously completed Phase 1, Phase 2, and Phase 3 Pier Replacement Projects. To date, the last remaining portion of the Pier still supported by submerged timber piles is the portion of the Pier that is the subject of the proposed Phase 4 structural upgrades. As such, completion of the proposed Phase 4 improvements would provide a consistent concrete pile design for the entire length of the submerged-pile portion of the Pier building on the earlier structural improvements.

In addition, the City recently installed bird exclusion nets around the structure of the western end of the Pier (i.e., below the Pier deck) to prevent birds from roosting or nesting in this area of the Pier. The bird exclusion nets are intended to improve water quality by reducing the amount of bird droppings being introduced into the seawater under the Pier.

(b) Existing Conditions

The portions of the Pier affected by the proposed Phase 4 upgrades and emergency gangway (i.e., the project site) are shown above in Figure 2. Across the Pier to the southeast from the project site are the Pier deck parking area and the Santa Monica Police sub-station, with the National Historic Landmark Looff Hippodrome (Carousel) building and restaurants slightly further east. There are no developments directly east of the project site aside from the Bubba Gump Shrimp Company restaurant (which is a three-story structure on the north side of the Pier with the first floor at beach-level), and as such the site is visible from a number of vantage points, including the Pier entrance along Ocean Avenue at Colorado Avenue and along Pacific Coast Highway. To the southeast are several restaurant, retail, and recreational uses, including the Playland Arcade and Pacific Park, which is an amusement park. To the west of the project site at the western end of the Pier are several food service and retail uses, including El Mariasol Restaurant, a fishing pier, and the Santa Monica Harbor Patrol office.

Parking for uses on the Pier is provided in public parking lots on the Pier deck and in adjacent areas north and south of the Pier at street level adjacent to the beach. While parking is provided in these on-Pier and adjacent parking lots, many Pier and beach visitors also park off-site and walk to their destination. Additionally, a dedicated off-street bike path runs beneath the Pier structure roughly parallel to the coastline, which also provides access to the project site.

D. LAND USE AND ZONING DESIGNATIONS

The project area is located within the Beach and Oceanfront District, as designated in the City of Santa Monica General Plan's Land Use and Circulation Element (LUCE). The Beach and Oceanfront District is located generally between the Civic Center and the Pacific Ocean, and reflects the City's unique location on the Pacific Ocean. This district with the ocean and beaches is complemented by Palisades Park and Ocean Avenue with views of the ocean and Santa Monica's distinct Pier. This district includes not only the recreational amenity of the beaches, the Pier, and Palisades Park, but it is also the center of Santa Monica's important tourist and visitor industry. As stated in the LUCE, the overall goals for this district are to (1) preserve the low-scale character and appearance of the Beach and Oceanfront District, and ensure its continued role as Santa Monica's character-defining open space, and (2) strengthen physical and visual connections between the City and Beach by overcoming physical barriers such as the bluffs and Pacific Coast Highway with improved pedestrian, bicycle, and open space linkages.

The project site is zoned Residential-Visitor Commercial (RVC). The RVC District is intended to protect the existing residential mix in the area while providing for the concentration and expansion of coastal-related, lodging, dining, recreation, and shopping needs of tourists and others in the oceanfront area. The RVC District is designed to preserve and enhance the unique scale, character, and uses on the Santa Monica Pier.

The project site is located within the boundaries of and is subject to provisions of the Local Coastal Program (LCP). Specifically, the Pier is located in Subarea 2 of the LCP; however, given the nature of the proposed improvements (i.e., structural pier improvements and emergency evacuation infrastructure for safety, with no change in use or intensity), no amendments to the LCP or Coastal Development Review Permit are required. In addition, the project is also subject to the Santa Monica Pier Design Guidelines adopted in 1987. The proposed safety-related improvements would not conflict with the requirements of the Guidelines, as the Guidelines serve as the basis for issuance of a Certificate of Appropriateness.

E. DESCRIPTION OF THE PROPOSED PROJECT

1. Project Components

There are two distinct components of the proposed project: the emergency gangway and floating dock, and the Phase 4 structural upgrades. Each of these project components is described in detail below.

(a) Emergency Gangway and Floating Dock

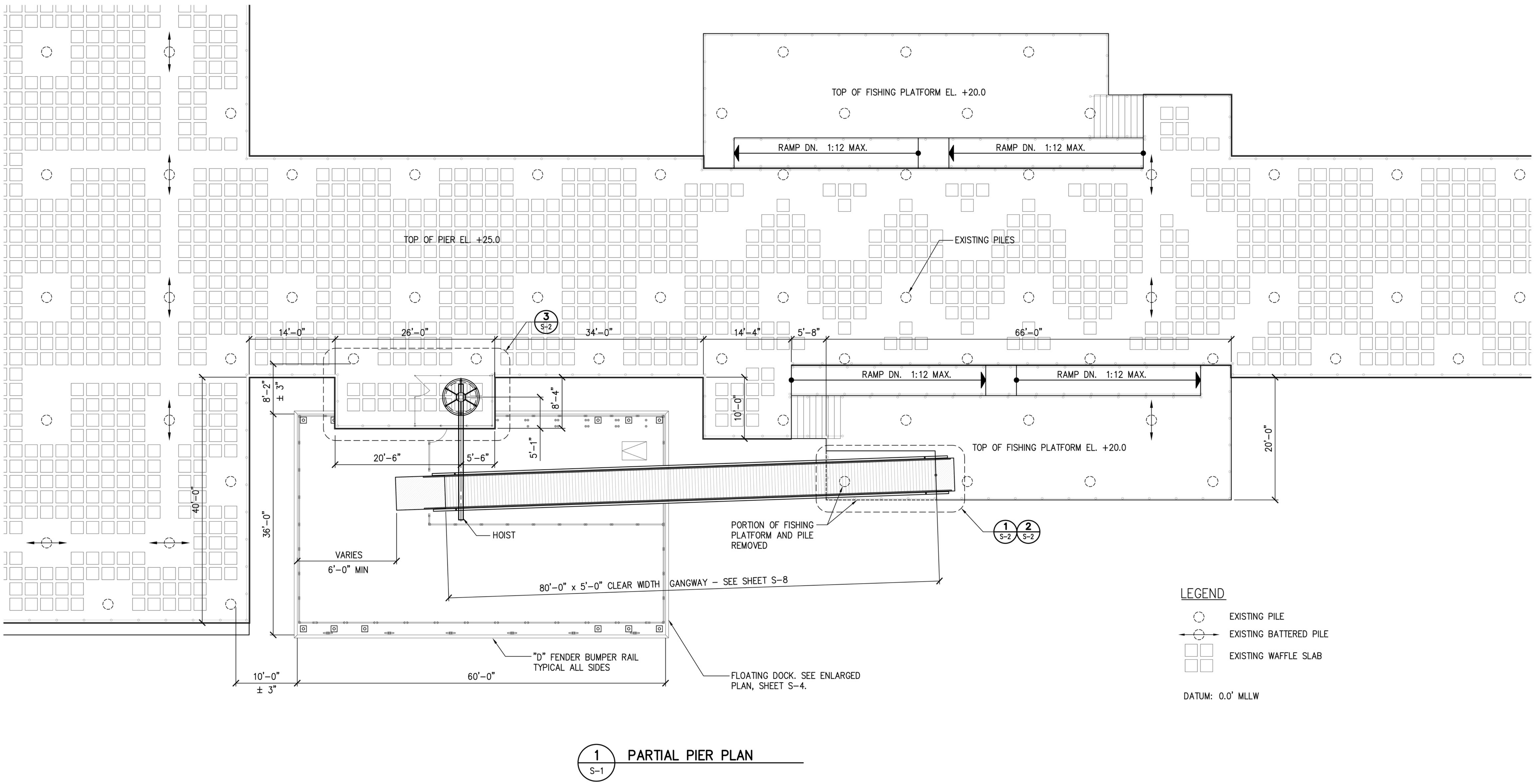
The proposed emergency gangway and floating dock component consists of: 1) demolition and removal of one existing concrete piling and an 18-foot-long by 8-foot-wide section of the concrete decking of the southern fishing platform; 2) installation of a 2.5-ton capacity hydraulic crane lift on the pier; 3) construction, transportation, and anchoring of a 60-foot-long by 36-foot-wide floating barge (dock) on the south side of the pier (anchoring will be with 12 helical anchors "screwed" into the seafloor in approximately 16 feet of water

[MLLW]); 4) installation of a 88-foot-long by 5-foot-wide aluminum gangway on the south side of the pier; 5) installation of various railings, utilities, and amenities at the project site; and 6) demobilization and removal of construction equipment and site cleanup. **Figure 3**, *Emergency Gangway and Floating Dock Plan*, and **Figure 4**, *Emergency Gangway and Floating Dock Elevation*, below, illustrate the emergency gangway and floating dock project components.

The emergency gangway (ramp) and floating dock (anchored barge) would be installed near the western end of the Pier on its south side, immediately east of the Pier-end restaurant and retail uses. Construction activities would begin with the closing of the southern fishing platform and a small area further west where the proposed crane would be installed (see Figure 3), followed by removal of an existing concrete pile and an approximately 8-foot by 18-foot portion of the fishing platform at the platform's southwest corner. The existing bench at this location would be relocated, and the existing fish cleaning counter, water line, and guardrail would be removed along with the concrete pier portion. Next, a 2.5-ton capacity hydraulic crane lift would be installed to the west of the fishing platform, and a pre-fabricated 88-foot by five-foot aluminum gangway ramp would be attached to the fishing platform where the platform section was previously removed, with the other end of the ramp suspended by the new crane lift. See Figure 4 for an illustration of the gangway ramp and crane configuration.

Following completion of the emergency gangway ramp, a 36-foot by 60-foot pre-fabricated barge would be towed into place (as shown in Figure 3), and anchored to the seabed using "Seaflex" mooring system, polyester connecting cables, and helical anchors "screwed" into the seafloor (see Figure 4). The barge, once anchored, would function as a floating dock and therefore would include fixed and removable 3.5-foot-high (minimum) stainless steel guardrails, twelve anchor wells, and six 15-inch cleats for docking boats to the structure. A three-foot by four-foot stainless steel access hatch would provide access for inspection and maintenance, and a stainless steel bumper would be installed at the point where the gangway contacts the floating dock once construction is completed.

- PRELIMINARY WORKING DRAFT -



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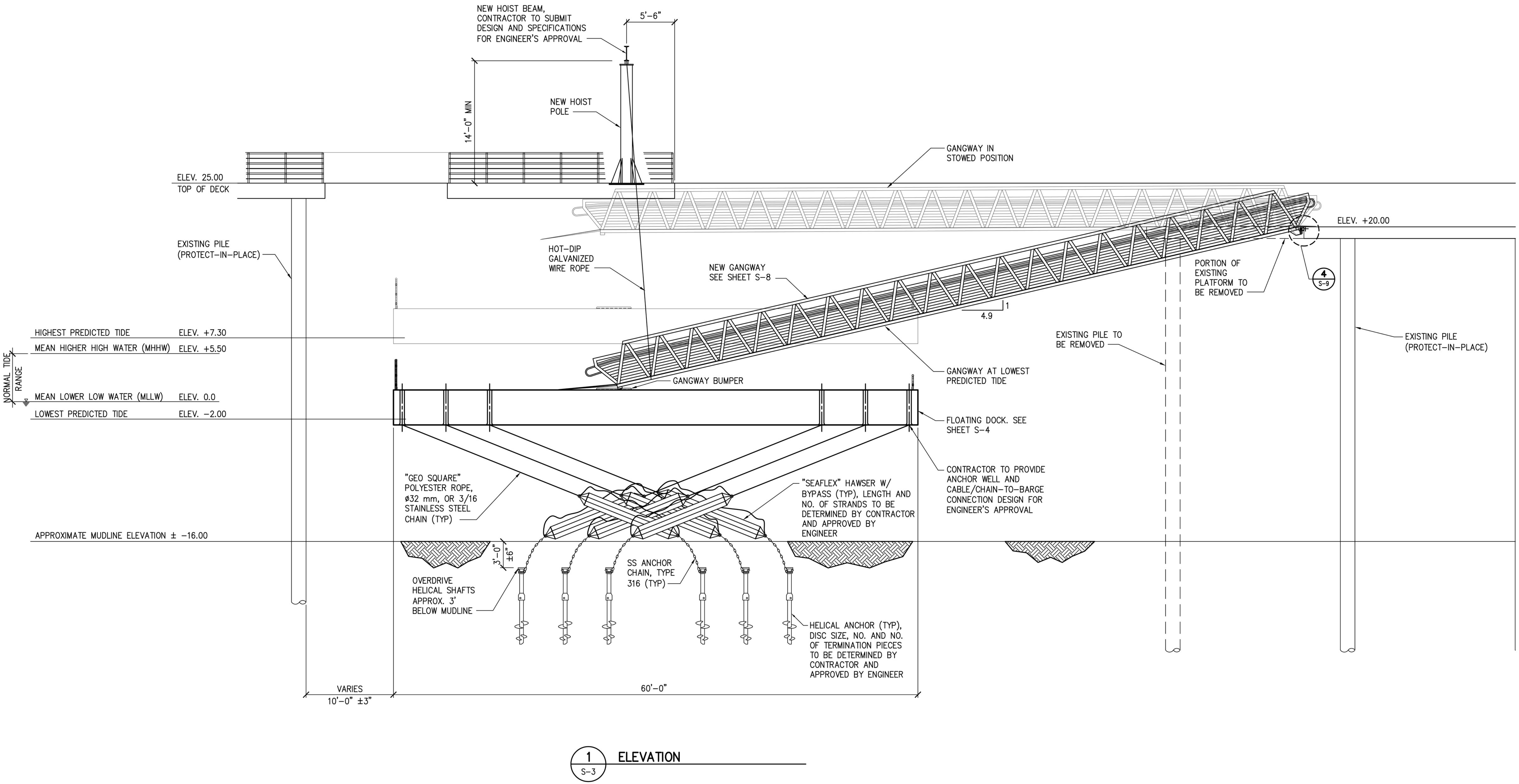
Emergency Gangway and Floating Dock Plan

Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrades Project

Source: City of Santa Monica, Department of Public Works, 2010.

FIGURE 3

- PRELIMINARY WORKING DRAFT -



PCR

0 16 Feet

Emergency Gangway and Floating Dock Elevation

FIGURE 4

Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrades Project

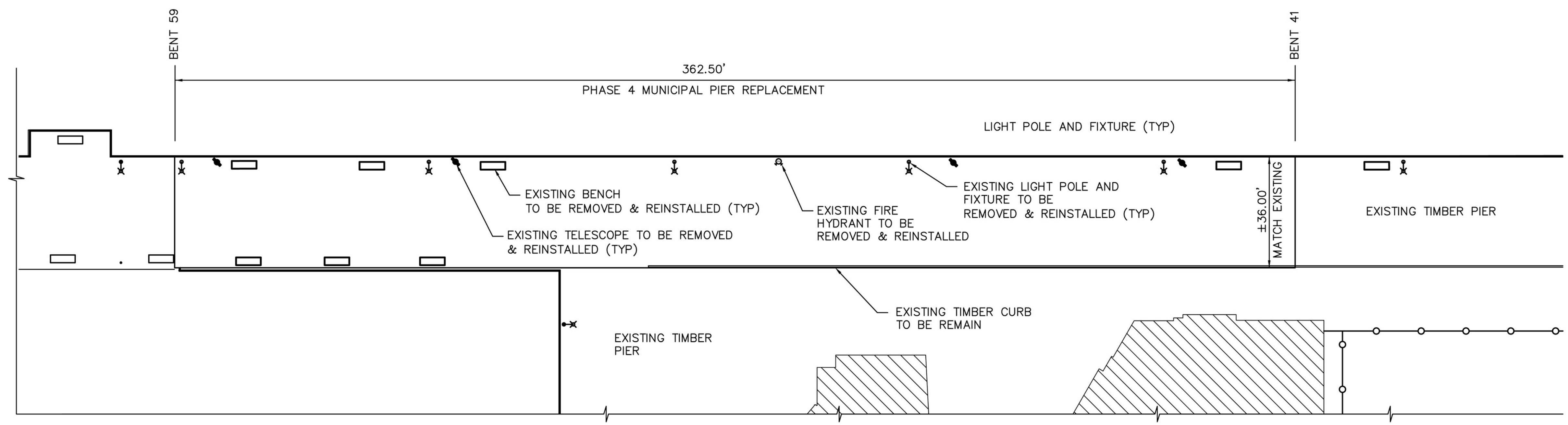
Source: City of Santa Monica, Department of Public Works, 2010.

(b) Phase 4 Structural Upgrades

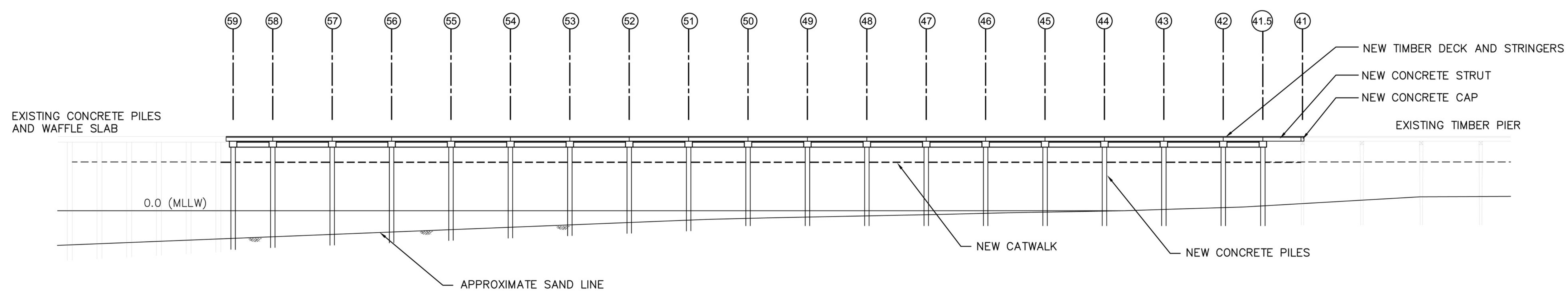
The Phase 4 structural upgrade component of the proposed project consists of: 1) construction of a temporary pile-supported steel trestle on the north side of the existing pier; 2) demolition and replacement of a 363-foot-long by 36-foot-wide wooden section of the pier; 3) removal and disposal of 19 wooden pier bents and piles that support that Pier section; 4) replacement of the wooden piles and bents with 18-inch diameter precast, pre-stressed concrete piles and concrete piling caps (one bent is a set of four 18-inch diameter round piles and a pre-stressed concrete piling cap connecting the tops of the four pilings); 5) installation of on- and under-pier utilities; 6) replacement of wood stringers and deck; and 7) removal of temporary trestle, demobilization and removal of construction equipment, and site cleanup. **Figure 5**, *Phase 4 Structural Improvements Deck Plan and Profile*, and **Figure 6**, *Phase 4 Structural Improvements Substructure Plan and Cross-Section*, below, illustrate the portions of the Pier structure to be replaced and the configuration of the new structure. Additionally, the proposed construction phases (or stages) for the proposed improvements are shown below in **Figure 7**, *Phase 4 Structural Improvements Staging Plan*, and **Figure 8**, *Phase 4 Structural Improvements Staging Cross-Sections*.

The structural upgrades to the affected section of the Pier would begin with the construction of a temporary trestle (pier) along the north side of the structure from bents 41 to 59 to allow for continued unimpeded access for pedestrian, emergency vehicle, and other vehicular traffic on the Pier throughout construction activities (refer to Figures 7 and 8 for the location of the temporary trestle). Once the temporary access trestle has been completed, the affected section of the pier would be closed to the public and access to the area (the construction site) would be restricted to construction workers/vehicles. It should be noted that along with access, utilities would also be maintained for Pier uses to the west of the affected section by temporarily relocating water, sewer, electricity, telecommunications, and natural gas lines around the portion of the Pier being reconstructed at that particular time. Once the construction site has been isolated from the rest of the Pier, the contractor would commence with removal of various Pier deck features, including light poles, railings, fire hydrants, benches, telescopes, bird exclusion nets (below the deck at the Pier's western end), and other incidental features. All of these items with the exception of the railings would be stored and reinstalled following completion of the new Pier section; the railings would be replaced with new railings of similar type and design as those removed. Similarly, utility infrastructure would be restored with permanent facilities under the newly constructed Pier section.

Demolition activities would begin on the northern half of the Pier section with the removal of the wooden decking and timber piles, as shown in Figures 7 and 8. Following demolition and removal of the northern Pier section, new 18-inch precast pre-stressed concrete piles would be installed for each bent starting just west of the existing Bent 41 (at the new Bent 41.5, specifically) and would continue westward to Bent 59, where concrete piles have already been installed. New concrete piling caps to connect the four piles on each bent would be installed, and four continuous concrete beams would be installed longitudinally connecting each bent to one another (see Figure 6), with new wooden decking and edge stringer installed above to complete the Pier structure. The southern portion of the affected Pier section would then be removed. Similar to the northern portion, demolition would commence at existing Bent 41 and would continue westward along the Pier section. Following demolition and removal of the southern Pier section, the new Pier construction would commence at new Bent 41 and end at Bent 59, in the same manner as the northern Pier section. The northern and southern portions of the new Pier section would be connected by a new construction joint, as illustrated in Figure 6.

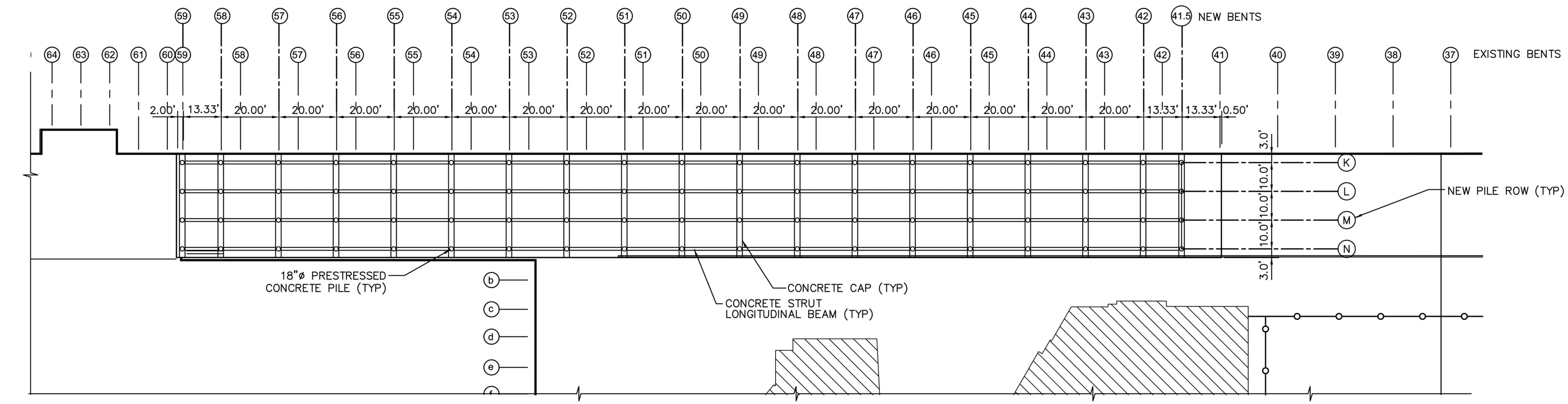


DECK PLAN



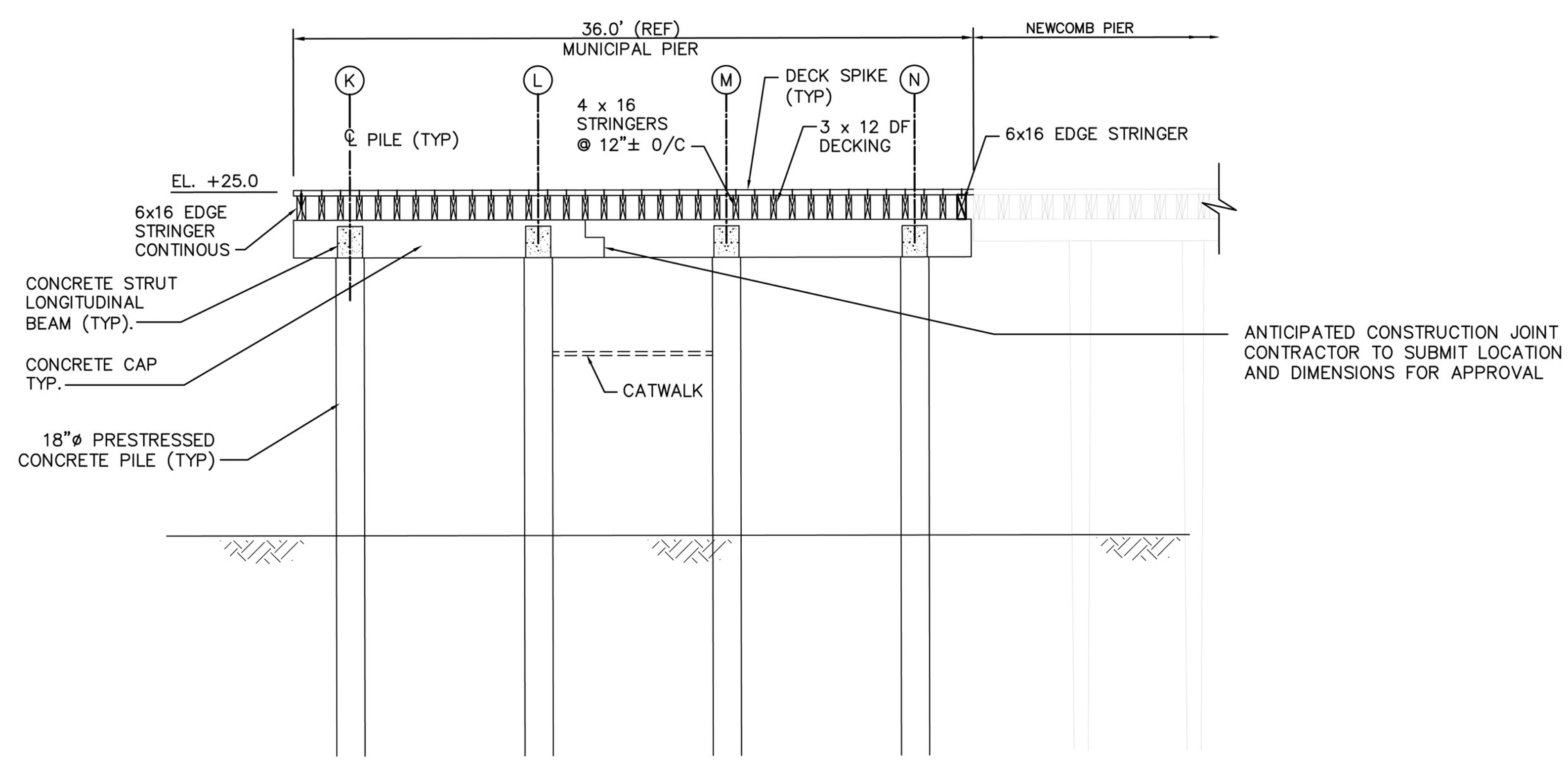
PROFILE

- PRELIMINARY WORKING DRAFT -

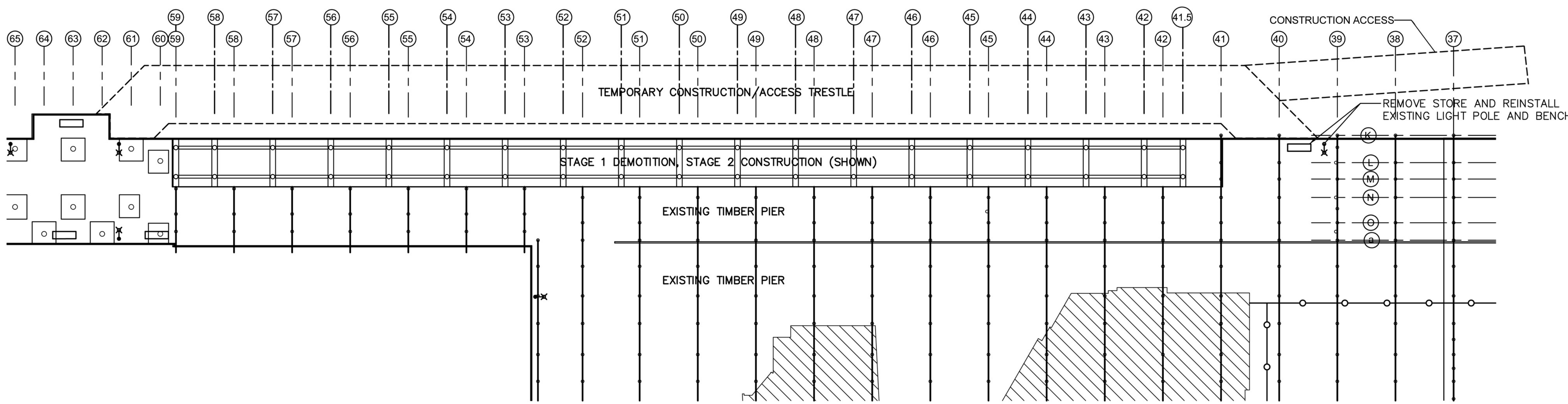


PILE LAYOUT PLAN

0 10 Feet

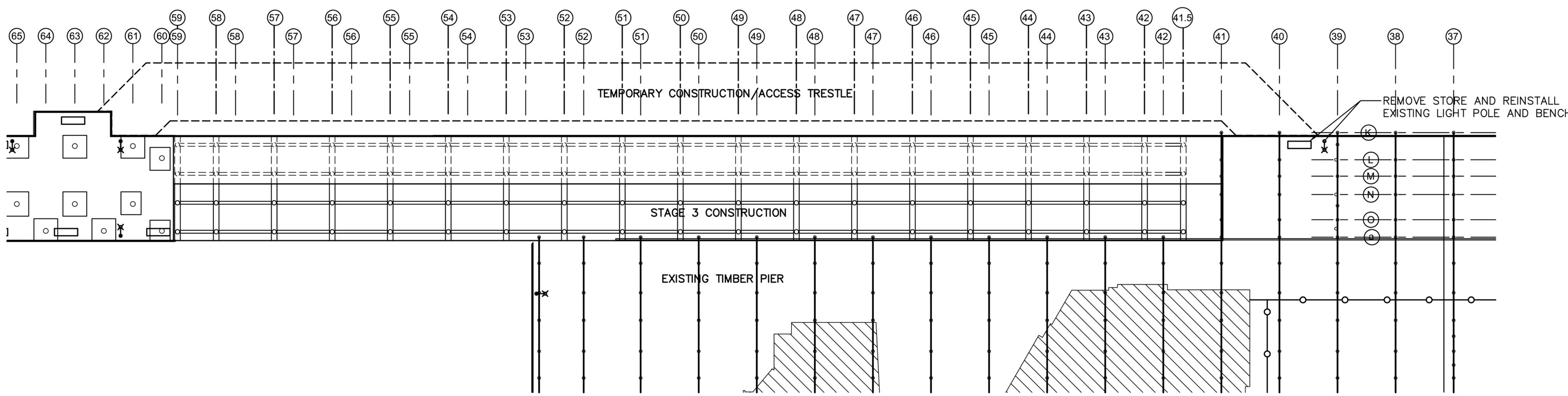


TYPICAL SECTION BENT 41.5–59



STAGE 1 & 2 PLAN

NOTE: THIS STAGING PLAN IS CONCEPTUAL, THE CONTRACTOR SHALL PREPARE HIS OWN PLAN TO CONSTRUCT NEW PIER SECTION WHILE MAINTAINING VEHICULAR, UTILITY, AND PUBLIC ACCESS TO THE WESTERN END OF THE MUNICIPAL PIER.



STAGE 3 PLAN

0 40 Feet

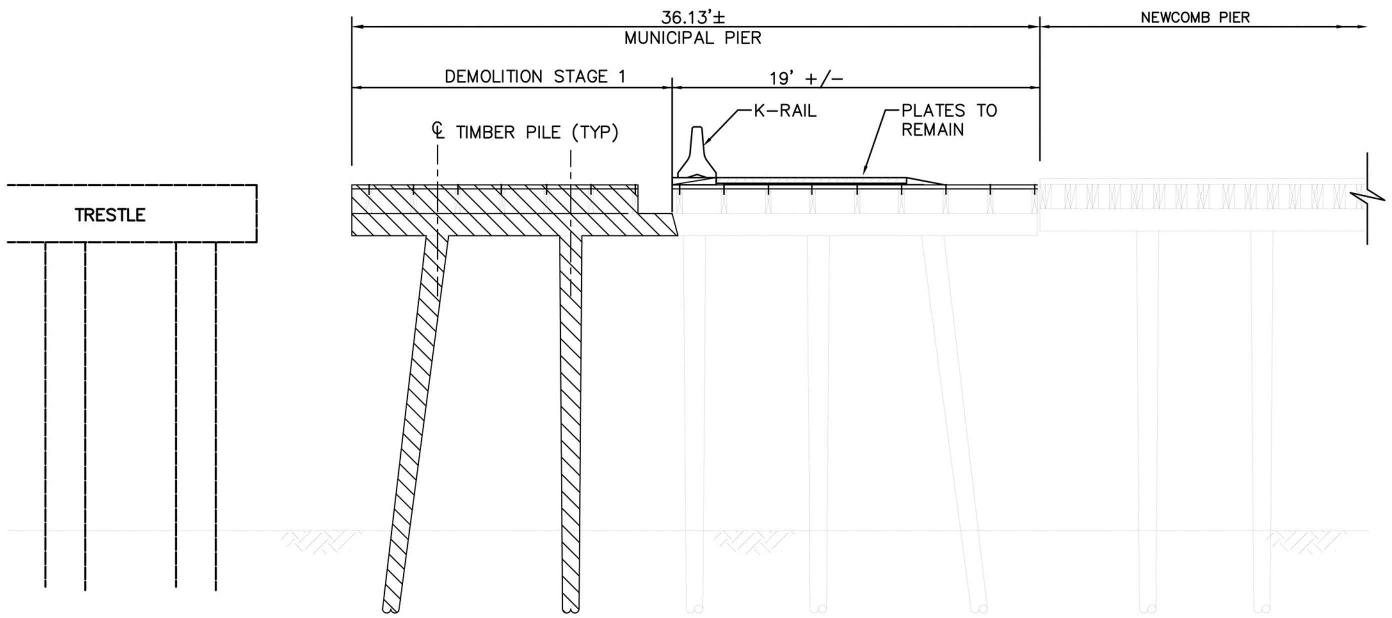
Phase 4 Structural Improvements Staging Plan

FIGURE **7**

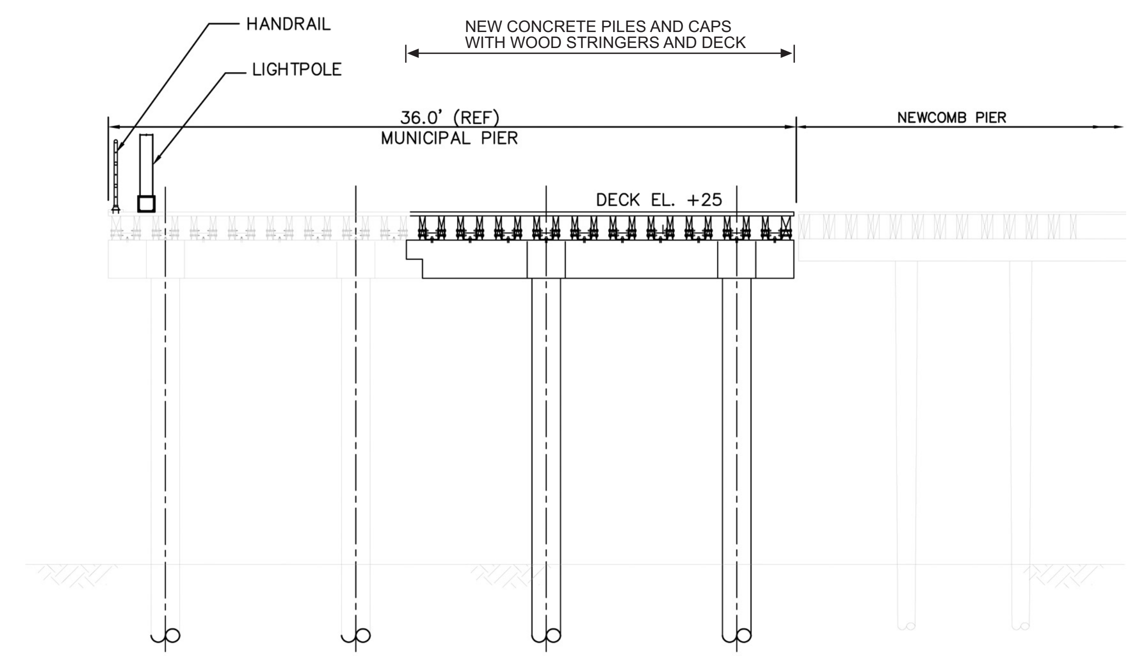
Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrades Project

Source: City of Santa Monica, Department of Public Works, 2010.

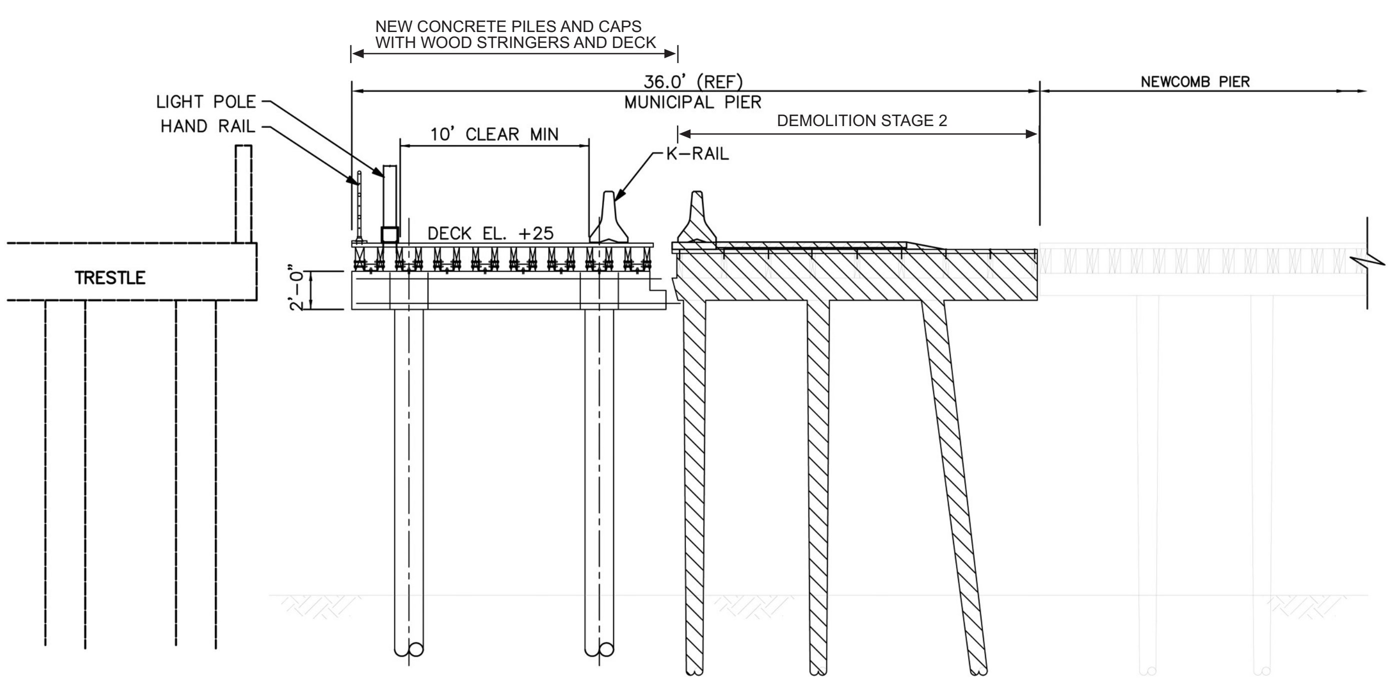
- PRELIMINARY WORKING DRAFT -



STAGE 1 – DEMOLITION BENT 41-59



STAGE 3 – CONSTRUCTION BENT 41-69



STAGE 2 – CONSTRUCTION BENT 41-59

NOTE: THIS STAGING PLAN IS CONCEPTUAL, THE CONTRACTOR SHALL PREPARE HIS OWN PLAN TO CONSTRUCT NEW PIER SECTION WHILE MAINTAINING VEHICULAR, UTILITY, AND PUBLIC ACCESS TO THE WESTERN END OF THE MUNICIPAL PIER.

0 10 Feet

Phase 4 Structural Improvements Staging Cross-Section

Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrades Project

Source: City of Santa Monica, Department of Public Works, 2010.

FIGURE 8

Once both the new northern and southern Pier sections are completed, stored light poles and new hand rails would be installed along the northern and southern edges of the new Pier section. A new service access "catwalk" would then be constructed beneath the construction joint along the length of the new section, and utility connections would be relocated to the permanent structure. Finally, construction equipment would be removed, benches, fire hydrants, telescopes and other Pier deck features would be re-installed and the temporary access trestle removed. The Pier would operate in the same manner as under current conditions, but would have increased longevity and added safety, and be able to better withstand major storm events.

2. Construction Staging and Material Stockpiling

Construction staging for equipment storage and material stockpiling for the Phase 4 structural improvements would occur within a designated portion of the Pier (as shown in Figure 2 above), as well as within the closed-off section of the Pier on which the construction activities are being performed at the time. Additionally, and only if necessary, staging/stockpiling could also occur on small portions of the beach on the north side of the Pier, but such temporary storage would not affect beach or Pier parking or access to coastal resources. Similarly, material storage and equipment staging for the emergency gangway and floating dock would be located on or adjacent to the Pier in the area where construction activities are occurring at the time; generally, this would be limited to the southern fishing platform, which would be closed throughout construction activities.

3. Construction Schedule and Phasing

Construction of the proposed project would occur in two distinct phases: (1) construction/installation of the emergency gangway and floating dock and (2) demolition and construction of the new Pier section. It is anticipated that the emergency gangway and floating dock would commence in early Fall 2011 and would last approximately three months. The Phase 4 structural improvements are therefore expected to follow the emergency gangway and floating dock improvements, beginning in Winter 2011 and continue for a total of nine months. Assuming this construction time frame, with a total duration of approximately twelve months, the proposed improvements would be completed in late Summer 2012 and the Pier would be fully opened for public use shortly thereafter (though temporary trestle removal would continue adjacent to the Pier for one month following completion of Phase 4 construction activities, as discussed below).

Based on standard pier construction techniques, it is assumed that construction of Phase 4 structural improvements would entail the use of a temporary steel trestle, which would be constructed adjacent to the north side of the pier, and from which construction equipment would operate throughout construction activities (although in reality it may only be used for construction on the north side of the pier, as discussed further below). The trestle would extend the entire length of the portion of the pier being replaced, and would be accessed by the contractor directly from Santa Monica State Beach (i.e., the ground-level parking lot on the north side of the pier). Construction of the trestle is assumed to take one month at the outset of the Phase 4 structural improvements component and removal would take one month following completion of the Phase 4 pier replacement.

F. PEDESTRIAN AND EMERGENCY VEHICLE ACCESS

Access will be maintained for pedestrians and emergency vehicles throughout construction activities (per a Santa Monica Fire Department-required minimum 15-foot-wide unobstructed access along the entire length of the Pier). Based on the nature of construction activities utilizing the temporary trestle (i.e., accessed directly from the beach/parking lot and lack of connection to the pier structure), pedestrian and emergency vehicle access would be maintained on the south side of the existing pier while the north side is being removed/constructed. Upon completion of the north side of the pier, access would be provided via the newly constructed northern section or temporary trestle while reconstruction of the southern portion is occurring. If crane operations or other construction activities associated with the construction of the south side of the pier are conducted from the temporary trestle, or any other activities that may interfere with access on the northern portion of the pier, construction personnel will control pedestrian traffic to avoid safety hazards to the public while maintaining public access, as necessary. Alternatively, as determined feasible by the construction contractor, demolition of old pier bents and construction of new bents within the southern portion of the affected pier section may also be carried out entirely within the construction footprint of the south side of the pier. This would require that all construction activities occur within the construction footprint (physically separated from the open northern section of the pier) such that it would not affect access or pier-related recreational activities. This is due to the fact that each pier bent would be removed and a new concrete bent installed as construction progresses bent-by-bent from one end of the southern pier section to the other, until all bents have been replaced. Construction of the southern pier section under this scenario would not require the use of the temporary trestle.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

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

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

DETERMINATION: (To be completed by the Lead Agency)

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.

☐ 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.

______________________________ ______________

Mark Cuneo, P.E. — Date

Principal Civil Engineer

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☒	☐	☐
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

a) **Less Than Significant Impact.** The characterization of existing visual resources and available scenic vistas at the Santa Monica Pier and the surrounding areas form the basis of this aesthetics and views analysis. The project involves structural improvements to two portions of the Santa Monica Pier, where views of the coastline, the Pacific Ocean, and the Santa Monica Mountains dominate the aesthetic and visual character of the area. The Pier, which is considered a scenic resource, is visible from Pacific Coast Highway (PCH), Palisades Bluff, Ocean Avenue, and Colorado Avenue. In addition to the importance of views to the Pier, scenic vistas encompassing the ocean, coastline and City are also available from the Pier itself.

Major scenic resources in the City are identified in the City's Scenic Corridor Element and Local Coastal Program. Both documents identify the Santa Monica Freeway, PCH, and Ocean Avenue in the project vicinity as scenic corridors. In addition, the Scenic Corridor Element identifies the Santa Monica Pier as a scenic resource.

Construction Impacts

The proposed project would involve temporary construction activities on and immediately adjacent to two portions of the existing Pier structure. The two portions where work would occur include the south side of the Pier where an existing platform is located and a segment of the Pier deck and submerged piles in the middle of the Pier. During construction, work would likely extend beyond these areas. For instance, during construction, a temporary, pile-supported, steel trestle would be constructed on the north side of the Pier. Additionally, various construction activities would occur throughout the project vicinity for the duration of construction. As an example, construction vehicles may be seen traveling on the Pier and Colorado Avenue to and from the work area, and only if necessary, staging/stockpiling could also occur on small portions of the beach on the north side of the Pier. Construction of the proposed project would occur in two distinct phases: (1) construction/installation of the emergency gangway and floating dock and (2) demolition and construction of the timber

Pier section. It is anticipated that the emergency gangway and floating dock would commence in early Fall 2011 and would last approximately three months. The Phase 4 structural improvements are therefore expected to follow the emergency gangway and floating dock improvements, beginning in Winter 2011 and continue for a total of 9 months. Assuming this construction time frame, with a total duration of approximately 12 months, the proposed improvements would be completed in early Fall 2012 and the Pier would be fully opened for public use shortly thereafter (though temporary trestle removal would continue adjacent to the Pier for one month following completion of Phase 4 construction activities).

During construction, temporary pedestrian fences would be constructed on the Pier deck to reroute and keep pedestrians from entering the construction area. These fences would likely be comprised of chain-link fence with fabric materials or painted, plywood panels. Also, during construction, one bent of piles under the Pier would be removed at a time to accommodate the replacement piles. Construction staging for equipment storage and material stockpiling for the Phase 4 structural improvements would occur within a designated portion of the Pier (as shown in Figure 2 in Attachment A, Project Description), as well as within the closed-off section of the Pier on which the construction activities are being performed at the time. Additionally, and only if necessary, staging/stockpiling could also occur on small portions of the beach on the north side of the Pier.

Although construction activities would result in a temporary change in the visual character of the Pier, scenic vistas would be negligibly impacted during construction. For instance, views of the Pacific Ocean from the beach, Pacific Coast Highway, or Palisades Park would only slightly change as areas under construction would constitute a small part of the visual field and would remain subordinate to the dominant visual features on the Pier, such as the ferris wheel and the roller coaster near the western end of the Pier and the Carousel Building on the eastern portion of the Pier. Views of the Pacific Ocean and coastline to the north and south of may be obstructed from portions of the Pier that are under construction by temporary fencing or construction equipment. Nevertheless, Pier visitors would still have visual access to these features from the majority of the Pier during construction, as construction would not occur on the majority of the Pier. Further, construction impacts would be temporary and would cease upon completion of the project. As a result, construction of the proposed project would not result in a significant impact with respect to scenic vistas.

Operation Impacts

The proposed project would result in permanent changes to the structure of the Santa Monica Pier. However, these structural changes would result in a negligible change to scenic vistas and views of the Pier. When considering views of the Pier, the structural changes would be consistent with the existing structure, in that structural alterations would be consistent in materials and design with previous Pier renovations. For instance, all of the submerged wood sections supporting the Pier, except the section affected by the proposed project, have been previously replaced with concrete bents and piles in an effort to make the Pier more resistant to strong storms. The proposed project would replace the final submerged portion of Pier containing wood piles with concrete bents and piles designed to be visually consistent with the previously upgraded sections of the Pier. The Pier's upper wooden deck would be replaced with new wood decking but would remain similar in appearance to current conditions. Additionally, new railings, which would be similar in appearance to the existing railings, would be installed and would be consistent with other sections of the Pier. Further, all benches, hydrants, light poles, and other incidental features removed and stored prior to construction activities would be reinstalled on the new Pier section and would be reflective of existing conditions. The only exception is the railing sections that would be removed prior to construction, which would be replaced by new railings. However, all removed railing segments would be replaced with railings of similar type and design as those removed. Therefore, the structural upgrades would not notably affect the appearance of the Pier of result in any long-term adverse effects on a scenic vista.

Regarding the addition of the floating dock and gangway, the addition of these features would result in only a minor change to the Pier's southern façade. For instance, the floating dock would be placed adjacent to a location currently occupied by the southern fishing deck. The proposed floating dock would be consistent in form, scale, and design as the existing fishing deck. The addition of the emergency gangway and hydraulic crane would result in a change to the visual character of the Pier's southern façade. However, it is important to note that the southern façade along this portion of the Pier currently contains similar features, such as the hydraulic cranes used to lower lifeguard boats into the water from the Pier. Additionally, these new features would comprise a small portion of the total visual field of the Pier and would not be prominent visual elements on the Pier like the ferris wheel, the roller coaster and the Carousel Building. As a result, the proposed project would result in a less than significant impact with respect to views of the Pier as a scenic resource.

Views of the Santa Monica Bay, beach, and coastline from view corridors such as the Ocean Avenue, Palisades Park, Pacific Coast Highway, the beach, and Colorado Boulevard would not be substantially impacted by the proposed project. Since the Pier occupies a small portion of the visual field from these view corridors and the project would not reduce scenic views and viewing opportunities from these view corridors, the proposed project would result in a less than significant impact to views of scenic resources in the area.

b) **Less Than Significant Impact.** There are no scenic highways officially designated by the State within the City of Santa Monica, and the project site is not visible from a designated state scenic highway; however, the site is visible from PCH, which is eligible for designation. As discussed above, while the Pier is identified in the City Scenic Corridor Element as a scenic resource, and is also a designated historic resource, the improvements proposed to the Pier would not be visually prominent and would be designed consistent with previously upgraded portions of the Pier. Furthermore, as discussed in detail in Response VI.a., below, the proposed project would not have a significant impact on the Pier's historic resources. As such impacts related to scenic resources would be less than significant.

c) **Less Than Significant Impact With Mitigation.** As the project site is located on the Santa Monica Pier, the aesthetic character of the area is generally defined by its eclectic architecture. The Looff Hippodrome Carousel Building, which is listed as a National Historic Landmark, and Pacific Park are the predominant defining features of the Santa Monica Pier, which is also a City-designated landmark. The Carousel Building displays a Byzantine-Moorish California style that defines the character of the eastern portion of the Pier near the main entrance. Pacific Park consists of the amusement rides and attractions and consists of a varied visual environment that creates a distinct silhouette. This silhouette is dominated by the ferris wheel and the roller coaster near the western end of the Pier and the Carousel Building on the eastern portion of the Pier at the base of the Pier ramp. The western (submerged) end of the Pier is defined by the middle portion of the Pier (that contains only the wooden piles and Pier deck and is the subject of the proposed improvements), and the end of the Pier, which is characterized by a large deck area with two, two-story structures atop the deck.

Construction Impacts

Construction of the proposed project would introduce on a temporary basis visual elements to the Pier that are not visually compatible with the Pier structure, the eclectic architecture of the Pier's buildings, and the beach. These features may include construction equipment (e.g., cranes, pickup trucks, pile drivers), a temporary steel trestle structure, stockpiled materials, and construction area pedestrian barriers and fencing. As discussed in detail in Attachment A, Project Description, of this Initial Study, construction staging for equipment storage and material stockpiling for the structural improvements would occur within a designated portion of the Pier, as well as within the closed-off section of the Pier on which the construction activities are being performed at the time. Additionally, staging/stockpiling could also occur temporarily on small portions of the beach on the north side of the Pier (near the parking lot but not such that parking supply is affected or beach access restricted). Construction of the proposed project would occur in two distinct phases: (1) construction/installation of the emergency gangway and floating dock and (2) demolition and construction of the timber Pier section. It is anticipated that the emergency gangway and floating dock would commence in early Fall 2011 and would last approximately three months. The Phase 4 structural improvements are therefore expected to begin in Winter 2011 and continue for a total of nine months, followed by temporary trestle removal lasting approximately one month. Assuming this construction time frame, the proposed improvements would be completed in early Fall 2012. While construction elements would be inconsistent with the visual character of the Pier and project vicinity, these elements would be temporary and would be removed upon completion of the proposed project. Further, as mentioned above, all work areas would be screened from public view through the use of temporary barriers. Nonetheless, given the high visibility of the project area, project construction would result in a potentially significant impact to the visual character of the project area. However, Mitigation Measure I-1, which requires temporary visual barriers to be erected around work areas and be maintained in an attractive manner at all times during construction, is proposed below to reduce impacts from project construction. With implementation of Mitigation Measure I-1, impacts would be less than significant.

Mitigation Measures:

I-1 Wherever feasible, the project work, staging, and stockpiling areas shall be screened from public view through the use of a temporary barrier. This fence and/or barrier shall be maintained in an attractive manner at all times by removing any graffiti, replacing damaged portions of the barrier, and removing all posted bills as soon as feasibly possible. Additionally, if deemed appropriate and determined to be feasible, the fence/barrier shall include be decorated with a beach, ocean or amusement park theme on all sides. All decoration shall be approved by the Pier Restoration Corporation. This wall shall serve multiple beneficial purposes: (1) act as a temporary screening device to reduce the visual distraction associated with construction activities and equipment; (2) provide a barrier for public safety and security purposes; and (3) serve as a noise-attenuating sound wall. In areas where noise attenuation is warranted, the barrier should be constructed such that the "line of sight" between construction activity and the commercial/pedestrian uses on the Santa Monica Pier and beachgoers is obstructed. These portions of the barrier shall where feasible be comprised of, or lined with, acoustical sound absorption blankets. Where a temporary noise barrier is determined to be infeasible, alternate noise attenuation techniques shall be employed to reduce noise levels. Such techniques may include, but are not limited to, sound blankets on noise-generating equipment.

Operational Impacts

Replacement of the timber piles and structure supporting the Pier deck would be consistent with previous renovations to the Pier's support structure, including installation of concrete bents and piles on Pier sections to the west of the structural upgrades portion of the project site. In addition, these improvements would be consistent with the existing character of the underside of the Pier, as the wooden piles would be replaced on a one-to-one ratio with concrete piles located in approximately the same location and would be visually consistent with the concrete piles at either end of the affected area. Further, the wooden planks that comprise the Pier deck would be replaced with those that are similar in size, color, and form as those already in place. The addition of the proposed floating dock, gangway, and hydraulic crane would result in a minor change to the visual character of the Pier's southern façade. However, as discussed above, these features would be consistent with the size, scale, shape, material, color and texture as those features already in place on the affected area of the Pier. In particular, these features would have a similar visual character as the fishing deck and hydraulic crane that are a part of the existing Pier's southern façade. Furthermore, all railings, benches, light fixtures, hydrants, and other Pier features would be restored to match pre-construction conditions (although new railings would be installed to replace aging existing railings but would be comparable in appearance) in order to be visually consistent the other sections of the Pier. Additionally, all proposed improvements would be subject to review and approval by the City of Santa Monica Landmarks Commission, which would ensure that the improvements are consistent with the existing visual and historic character of the Pier. As a result, the proposed project would result in a less than significant impact to the visual character of the project site and surrounding vicinity.

d) **No Impact.** Construction of the proposed project would be limited to daytime hours and would not involve any particularly reflective surfaces or materials. As a result, project construction would not add new sources of light or glare to the project vicinity. Similarly, the proposed project does not propose any new sources of lighting or materials which could result in glare, such as glass or other highly reflective surfaces. In addition, existing lighting would be reinstalled on the new Pier section as under existing conditions, and the proposed project would not increase capacity on the Pier and therefore would not increase vehicular light or glare on the Pier. As a result, the proposed project would result in no impact with respect to light and glare.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
II. AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997), prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	☐	☐	☐	☒

a-b) **No Impact.** The project site is located within the City of Santa Monica, which is developed with residential, commercial, and recreational uses. The Pier itself is a recreational facility extending over water and the beach. There are no agricultural uses present within the project vicinity. Furthermore, the project site is not located on designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program. According to the

2008 Important Farmland Map, the project site is located in an area designated as "Z – Area Not Mapped."[1] The proposed project would continue the existing recreational uses on the Pier and would not result in the conversion of farmland to non-agricultural uses. Project implementation would not conflict with existing zoning for agricultural uses or conflict with a Williamson Act contract. Therefore, project implementation would result in no impact with respect to agricultural resources.

c) **No Impact.** As noted in Response II.b., above, the project site is designated for Residential-Visitor Commercial (RVC) in the City's Zoning Code and is currently occupied by the Santa Monica Pier. No forest land or timberland zoning is present on the site or in the surrounding area. As such, the project would not conflict with existing zoning for forest land or timberland and no impact would occur in this regard.

d) **No Impact.** The project site is currently occupied by the existing Santa Monica Pier, and the proposed improvements would be implemented generally within the existing Pier footprint. No forest land exists on the project site or within the surrounding vicinity. As such, the project would not result in the loss of forest land or conversion of forest land to non-forest use and no impact would occur in this regard.

e) **No Impact.** Since there are no agricultural uses or related operations on or near the project site, the project would not involve the conversion of farmland to other uses, either directly or indirectly. No impacts to farmland or agricultural uses would occur.

[1] California Department of Conservation, Division of Land Resource Protection. *Los Angeles Important Farmland 2008.* September 2009.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

The following analysis of air quality impacts is based upon the results of an air quality impact analysis performed by PCR for the proposed project in February 2011 (included as Appendix A of this Initial Study).

Existing Conditions

The project site is located in the City of Santa Monica found within the South Coast Air Basin (SoCAB), bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The SoCAB lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the SoCAB is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). The SoCAB has been designated as a non-attainment area as the area does not meet National Ambient Air Quality Standards (NAAQS) for certain pollutants regulated under the Federal Clean Air Act (CAA). The SoCAB fails to meet national standards for O_3, PM_{10}, and $PM_{2.5}$, and therefore is considered a Federal "non-attainment" area for these pollutants.

Where available, the significance criteria established by the South Coast Air Quality Management District (SCAQMD) or air quality management plan may be relied upon to make the following determinations. Would the project:

a) **No Impact.** The South Coast Air Quality Management District (SCAQMD) is required, pursuant to the Clean Air Act (CAA), to reduce emissions of criteria pollutants for which the SoCAB is in non-attainment. The proposed project would be subject to the SCAQMD's 2007 Air Quality Management Plan (AQMP).[2] The AQMP contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving ambient air quality standards. These strategies are developed, in part, based on regional population, housing, and employment projections prepared by the Southern California Association of Governments (SCAG).

SCAG is the regional planning agency for Los Angeles County and addresses regional issues relating to transportation, the economy, community development and the environment. With regard to air quality planning, SCAG has prepared the Regional Comprehensive Plan (RCP), which includes growth projections that form the basis for the land use and transportation control portions of the AQMP and are utilized in the preparation of the air quality forecasts and consistency analysis included in the AQMP.

A project is consistent with the AQMP if it is consistent with the population, housing and employment assumptions which were used in the development of the AQMP. The 2007 AQMP, the most recent AQMP adopted by the SCAQMD, incorporates SCAG's Regional Transportation Plan (RTP) socioeconomic forecast projections of regional population and employment growth. The proposed project would not result in an increase in long-term population or employment (jobs), and therefore is not expected to exceed AQMP projections. Because it would not affect population or employment, the Project is consistent with the population forecasts for the sub-region as adopted by SCAG. Because the project is consistent with the SCAQMD's projections incorporated into the AQMP, it can be concluded that the proposed Project would be consistent with the projections in the AQMP.

Based on the above discussion, implementation of the Proposed Project would result in no impact related to implementation of the applicable air quality plans, and no mitigation measures would be necessary.

b) **Less than Significant Impact.** The Project site is located within the SoCAB, which is characterized by relatively poor air quality. State and federal air quality standards are sometimes exceeded in many parts of the SoCAB, including those monitoring stations nearest to the Project location. The proposed project would contribute to local and regional air pollutant emissions during construction. SCAQMD regional and local significance thresholds for construction were used. Based on the following analysis, implementation of the Project would result in less than significant impacts relative to the daily significance thresholds for criteria air pollutant construction emissions established by the SCAQMD.

Construction Impacts

The SCAQMD has established daily significance thresholds that address pollution sources associated with general construction activities, such as the operation of on-site construction

[2] *South Coast Air Quality Management District, AQMD Website, http://www.aqmd.gov/aqmp/index.html.*

equipment, fugitive dust from site grading activities, and travel by construction workers. Project construction emissions were calculated using the URBEMIS2007 emissions inventory model, originally developed by the California Air Resources Board (CARB).

Construction of the proposed project is conservatively anticipated to commence in early Fall 2011 and would require a total of up to twelve months to complete the proposed improvements, which would include construction and demolition activities associated with both the emergency gangway/floating dock and Phase 4 structural upgrades. Construction of the emergency gangway is expected to occur over three months, followed by the structural improvements, which would include temporary trestle construction to be completed in one month and Pier replacement to occur for eight months (followed by deconstruction of the temporary trestle over a one-month period). No import or export of soil is anticipated.

Construction emissions are presented in **Table 1**, *Regional and Localized – Unmitigated construction emissions,* under conservative assumptions, which imply a default equipment mix and a worst-case (shorter duration with more intensive daily activity levels) 12-month total construction schedule as presented above.[3] As indicated therein, the incremental increase in emissions from project construction activities would fall below SCAQMD significance thresholds for both localized and regional emissions. Details of this analysis are available in Appendix A.

Table 1

Regional and Localized – Unmitigated construction emissions [a]
(pounds per day)

	VOC	NO_X	CO	SO_2	PM_{10} [b]	$PM_{2.5}$ [b]
Maximum Regional Emissions (On-site + Off-site) By Stage						
Emergency Gangway	3	19	10	<1	1	1
Temporary Trestle Construction	3	18	10	<1	1	1
Phase 4 Replacement	3	18	10	<1	1	1
Temporary Trestle Removal	3	18	10	<1	1	1
Maximum Regional Emissions	3	19	10	<1	1	1
Regional Construction Daily Significance Threshold	75	100	550	150	150	55
Over/(Under)	(72)	(81)	(540)	(150)	(149)	(54)
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Maximum Localized Emissions (On-site Only) By Stage						
Emergency Gangway	3	19	10	<1	1	1
Temporary Trestle Construction	3	18	10	<1	1	1
Phase 4 Replacement	3	18	10	<1	1	1
Temporary Trestle Removal	3	18	10	<1	1	1

[3] *In order to provide a conservative analysis, it is assumed that all construction activities would be completed in the minimum timeframe feasible. This is of particular importance as construction emissions are directly related to the intensity of construction activities, and significance criteria are established for emissions levels representing the "worst-case day." Actual construction may proceed at a less intensive pace, which would result in lower daily emissions.*

Table 1

Regional and Localized – Unmitigated construction emissions [a]
(pounds per day)

	VOC	NO_X	CO	SO_2	PM_{10} [b]	$PM_{2.5}$ [b]
Maximum Localized Emissions	**3**	**19**	**10**	**<1**	**1**	**1**
Localized Significance Thresholds [c]	N/A	104	833	N/A	12	4
Over/(Under) Threshold	N/A	(85)	(823)	N/A	(11)	(3)
Exceed Threshold?	**-**	**No**	**No**	**-**	**No**	**No**

[a] *Compiled using the URBEMIS2007 emissions inventory model. The equipment mix and use assumption for each phase is provided in the Air Quality Appendices.*

[b] *PM_{10} and $PM_{2.5}$ emissions estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression.*

[c] *For a conservative analysis, the SCAQMD LSTs are based on Source Receptor Area 2 (Northwest Coastal LA County (Los Angeles- VA Hospital Station)) for a one acre site with sensitive receptors located approximately 50 meters from the construction activity.*

Source: PCR Services Corporation, 2011.

Localized emissions refer to the on-site air quality, and regional emissions refer to the ambient conditions surrounding the site. Therefore, pollutant emissions associated with construction of the project would be less than significant, and no mitigation measures are necessary.

Operational Impacts

The Project's proposed improvements include an emergency gangway and structural upgrades. The Project serves to improve existing infrastructure, increase safety, require less maintenance, and would not contain on-site stationary combustion equipment. Thus, the Project would not result in new long-term stationary sources, nor would it result in a significant number of net new vehicular trips. Operation of the Pier after implementation of the improvements will not result in a change in emissions. Therefore, the proposed project would not have an impact on regional air quality, and no mitigation measures are necessary.

c) **Less than Significant Impact.** As stated above, the proposed project would not result in new long-term stationary sources or additional vehicular trips. The regional emissions calculated for construction of the proposed project, presented in Table 1, are less than the applicable SCAQMD thresholds, which are designed to assist the region in attaining the applicable State and national ambient air quality standards. These standards apply to both primary (criteria and precursor) and secondary pollutants (ozone). Although the Project site is located in a region that is in non-attainment for ozone, PM_{10}, and $PM_{2.5}$, the emissions associated with the proposed project would not be cumulatively considerable as the emissions would fall below SCAQMD thresholds. Therefore, impacts would be less than significant and no mitigation measures are necessary.

d) **Less than Significant Impact.** Sensitive receptors are located at a distance greater than 1,000 feet to the project site. The closest sensitive receptors are multi-family residential units 0.25 miles northeast of the project site along Appian Way and Arcadia Terrace, and single-family residential units located on the Ocean Front, 0.32 miles northwest of the project site. As described in Response No. III.b., above, construction and operation of the project would not result in substantial localized or regional air pollution impacts. Therefore, the Project would not expose sensitive receptors to substantial pollutant concentrations. Although construction activities would utilize diesel-powered equipment which would emit toxic air contaminants such as diesel particulate matter (DPM), the duration of construction and distance to receptors is such that these emissions would not pose a health concern. As such, impacts to off-site sensitive receptors would be less than significant and no mitigation measures are necessary.

e) **No Impact.** No objectionable odors are expected as a result of either construction or operation of the proposed project. Odors are typically associated with industrial projects involving use of chemicals, solvents, petroleum products, and other strong-smelling elements used in manufacturing processes. Odors are also associated with such uses as sewage treatment facilities and landfills. As the proposed project involves no elements related to these types of uses, no impacts are anticipated, and no mitigation measures are necessary.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
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 wetlands, etc.), through direct removal, filling, hydrological interruption or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?	☐	☐	☒	☐

The following analysis of biological resources impacts is based in part on the results of a Marine Biological Resources Assessment (MBRA) performed by Merkel & Associates (M&A) for the proposed project in April 2011 (included as Appendix B of this Initial Study).

Existing Conditions

Understanding the existing physical and biological conditions at the project site is critical to determining the potential impacts of the proposed project. Knowledge of these parameters allows calculation of mitigation requirements, determination of impacts to marine biological resources and EFH, and increases the probability of designing a low biological impact construction plan within the project's environmental regime. A qualified biologist conducted a site survey on December 6, 2010 to document site conditions and qualitatively assess habitat types, fauna, and flora of the project area. Additional information was gathered from a review of research programs and other literature sources.

Regional Overview[4]

Santa Monica Bay is located within a large and gradual bend in the coastline, regionally called the Southern California Bight (SCB). The SCB is bounded on the west by the California Current and extends from Point Conception to Cabo Colnett, Baja California, Mexico. The marine life of the SCB is abundant and diverse because of the various habitats, environmental conditions, and persistent upwelling events. Interactions between the physiography, currents, wind, and anthropogenic inputs contribute to the richness of this body of water. The continental shelf within the SCB contains relatively deep nearshore waters and a complex bottom topography resulting in habitats of rapidly changing depths, many hard- and soft-bottom regimes, multiple island outcrops, and deep basins.

Additionally, the SCB is located in a transitional area between Pacific subarctic, Pacific equatorial, and North Pacific central water masses; consequently, the fauna contains representatives from each of these sources. For example, of the 554 species and 144 families of California marine fishes, 481 species (87 percent) and 129 families (90 percent) occur in the SCB. Likewise, the marine benthic invertebrates in the SCB exhibit great diversity, including representatives of nearly all invertebrate phyla. Although the total number of species in the region is unknown, some researchers estimate there may be more than 5,000 species of invertebrates (infaunal and megabenthic invertebrates – e.g., worms, clams, oysters, mollusks, urchins, stars, shrimp, crabs) found in the SCB.

Water Quality

Water quality within the project area reflects natural seasonal patterns. During late spring through Fall, solar heating preferentially warms the ocean surface, resulting in depth-related gradients in water temperature (thermocline). A strong density gradient (pycnocline), related primarily to the water temperature changes with depth, restricts vertical mixing of the water column which affects the depth distribution of most water quality parameters.[5] During winter and early spring, the strength of the vertical stratification decreases in response to weaker solar heating, mixing by winter storms, and upwelling.

Upwelling of cold water occurs during periods of equator-ward winds when warmer surface waters are moved offshore and replaced by deep water. Local upwelling events are only observed in winter and early spring when nearshore winds within the SCB are comparable in

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[4] *City of Los Angeles Department of Public Works. Marine Monitoring in Santa Monica Bay Biennial Assessment Report. January 2005 to December 2006. 2007.*

[5] *Dailey, M.D., D.J. Reish, and J.W. Anderson. Ecology of the Southern California Bight: A Synthesis and Interpretation. University of California Press. 1993.*

magnitude to those offshore.[6] These colder waters have lower dissolved oxygen, but they have higher salinity and, most importantly, are richer in nutrients. Upwelling of nutrient rich, deeper waters is critical to primary production and the productivity of coastal waters. In summer and fall, winds are weak and local upwelling is rarely observed.

El Niño Southern Oscillation (ENSO) is a major source of inter-annual climate variability in the SCB, characterized by a warming of the tropical east Pacific and a rise in sea level that propagates northward into the SCB. The high sea level anomalies in the SCB produce warmer surface water temperatures and a deeper thermocline, while the opposite conditions accompany a cold La Niña event. The ENSO cycle in the Pacific is not regular because of the complex feedback mechanisms between the tropical ocean and the atmosphere, but it occurs on average about every four years and can last a year or more. Major El Niño events can have severe climatic and ecological effects in the SCB.

Additionally, stormwater runoff from coastal rivers and streams adds large volumes of freshwater that can cause turbidity plumes and reductions in near-surface salinity up to many miles from shore. River and stream discharges also add suspended sediments, nutrients, bacteria and other pathogens, and chemical contaminants to nearshore waters. Publicly-owned treatment works (POTWs) discharge treated sewage effluent to the ocean through subsurface wastewater outfalls, which introduces a low-salinity plume containing suspended solids and pollutants to the marine environment. Historically, municipal wastewaters were the largest source of pollutants to southern California coastal waters. However, more stringent effluent limits have reduced the mass emissions of contaminants from POTWs to the extent that non-point source inputs presently are recognized as the primary source of contaminants to coastal waters of the SCB.[7] Wastewater from the City of Los Angeles has been discharged into the waters of Santa Monica Bay since 1894 from the Hyperion Treatment Plant. As the population of Los Angeles grew, so did the flow of sewage, and as a result, treatment practices at Hyperion changed to cope with population growth and the resultant increased sewage flows to the plant. In late 1951, Hyperion initiated full secondary treatment, and by 1957, treatment volume increased to where Hyperion was discharging only partial secondary effluent into Santa Monica Bay through the 5-Mile Outfall. On November 23, 1998, following plant reconstruction and upgrades to the treatment process, Hyperion once again began discharging full secondary-treated effluent into Santa Monica Bay. The plant has a dry weather capacity of 450 million gallons per day (MGD) for full secondary treatment and an 850 MGD wet weather capacity.

Additionally, as discussed previously, bird exclusion nets were installed around the structure of the western end of the Pier in order to prevent large numbers of seabirds from roosting or nesting at this location in order to improve water quality by minimizing the amount of bird droppings entering the water around the Pier.

Temperature and Salinity

The salinity in the surface waters of the SCB is relatively constant (isohaline) with salinities in the nearshore peaking in July at approximately 33.6 parts per thousand (ppt) and decreasing in late winter and early spring to 33.4-33.5 ppt.[8] Tide and temperature data are

6 *Ibid.*

7 *Schiff, K.C., M.J. Allen, E.Y. Zeng, and S.M. Bay. Southern California. Marine Pollution Bulletin 41:76-93. 2000.*

8 *Dailey, M.D., D.J. Reish, and J.W. Anderson. Ecology of the Southern California Bight: A Synthesis and Interpretation. University of California Press. 1993.*

recorded at the National Oceanic and Atmospheric Administration (NOAA) station (Station ID: 9410840) located on the Santa Monica Pier. In 2010, the sea temperatures ranged from a low of 53.4°F in May to a high of 69.3°F in July, with an annual average of 60.9°F.

Beneficial Uses

The existing beneficial uses of Los Angeles County beaches and nearshore areas, as identified in the Basin Plan[9] include:

- COMM: includes the uses of water for commercial or recreational collection of fish, shellfish, or other organisms;
- REC-1: includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible;
- REC-2: includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible;
- WILD: includes uses of water that support terrestrial ecosystems;
- MAR: includes uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds);
- MIGR: includes uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish;
- SPAWN: includes uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. This use is applicable only for the protection of anadromous fish;
- SHELL: Includes uses of water that support habitats suitable for the collection of filterfeeding shellfish (e.g., clams, oysters and mussels) for human consumption, commercial, or sport purposes; and
- NAV: includes uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

It should also be noted that in 1998, Santa Monica Bay was listed on the 303(d) for coliform bacteria, preventing beaches from attaining REC-1 beneficial use status, and in 2003 the Santa Monica Bay Beaches Bacteria Total Maximum Daily Load (TMDL) for wet and dry weather became effective.

Sediment Quality

Sediment quality typically varies in relation to grain size and proximity to input sources. Trace metal and organic contaminants in coastal waters typically have strong affinities for

[9] *Regional Water Quality Control Board (RWQCB). Water Quality Control Plan Los Angeles Region. Basin Plan for the Coastal Watershed of Los Angeles and Ventura Counties. 2005.*

suspended particulates that eventually settle to the bottom where they become incorporated into the bottom sediment. Because of their high surface-to-volume ratio, finer sediments (silts and clays) generally have higher contaminant concentrations than coarser sediments (sands). Once incorporated into bottom sediments, contaminants may be remobilized through current- or storm induced resuspension, bioturbation, or mechanical disturbance such as dredging.

Within Santa Monica Bay, historic discharges of DDT and PCBs have accumulated in bay sediments and caused contamination of some seafood species. In addition, the Hyperion Treatment Plant, which has been in operation since 1894, discharged raw sewage into the Santa Monica Bay. Prior to 1987, sludge was disposed into Santa Monica Bay from the plant; however, since 1988, full secondary treatment has been used and has resulted in a dramatic reduction in the discharge of solids to the bay.

As part of the National Pollutant Discharge Elimination System (NPDES) permit for the operation of the Hyperion Treatment Plant and for the discharge of stormwater and urban runoff, sediment samples are collected at 44 offshore stations in Santa Monica Bay. Sediment quality was evaluated using two statistical thresholds. The ERL (Effects Range - Low) test identifies the threshold – or concentration – of metals or organic compounds below which adverse impacts are rarely found. The ERM (Effects Range - Median) identifies the concentration above which adverse impacts are frequently found. Based on their concentrations with respect to ER-L and ER-M, metals were expected to have low biological impact on benthic organisms at the 5-Mile Outfall and other locations sampled in the bay, but total DDT and PCBs were expected to have some biological impacts.[10]

While these findings are important to note, it is unlikely that similar sediment conditions would exist in the project area. While there are no data to support this conclusion, sediment quality in the vicinity of the project area would not be expected to have elevated levels of metals or organics, as the material is primarily courser sandy material as any fines would be expected to be resuspended and transported due to the high water motion (e.g., surf and littoral currents) present in the nearshore waters.

Biological Resources Within The Project Area

Four general marine habitat types occur in the project area, and a brief description of each habitat type is described in the following sections. The habitat types include:

- Sandy Beach and Intertidal Zone (> +7 to -2 feet relative to the Mean Low Low Water [MLLW] level)
- Unvegetated Sandy Subtidal (-2 to -16 feet MLLW)
- Wharf Pilings
- Water Column

[10] *City of Los Angeles Department of Public Works. Marine Monitoring in Santa Monica Bay Biennial Assessment Report. January 2005 to December 2006. 2007.*

Sandy Beach and Intertidal Zone

A portion of the Phase 4 Improvement effort occurs on the sandy beach, and includes the removal and replacement of existing piles, in addition to construction of the temporary trestle and site access.

Sandy beaches are relatively unstable habitats due to daily sand movement associated with waves and currents and larger-scale seasonal cycles of sand movement. The intertidal zone, also known as the littoral zone in marine aquatic environments is the area of the foreshore and seabed that is exposed to the air at low tide and submerged at high tide (i.e., the area between tide marks).

Most southern California beaches lose sand in the winter and gain sand in the summer. In addition, daily tidal fluctuations affect the distribution of marine organisms. Therefore, marine organisms common in sandy beach habitats are generally mobile and change position with changes in water level and sediment transport.[11] Generally higher abundances and species diversity are found on long, gently sloping beaches, while lower abundances and diversity are present on steep, coarse-grained beaches. Common invertebrates observed on southern California sandy beaches include mole crabs (*Emerita analoga*), beach hoppers (*Megalorchestia* spp, *Orchestodea* spp.), amphipods (e.g., *Eohaustorius* spp.), isopods (e.g., *Excirolana* spp.), and other crustaceans; bean clam (e.g., *Donax gouldii*), Pismo clam (*Tivela stultorum*), and olive snail (*Olivella biplicata*); bloodworm (*Euzonus mucronata*) and other polychaete worms (e.g., *Hemipodus borealis*, *Lumbrineris* spp., *Nephtys californiensis*, *Scololepis* spp.); and nemertean ribbon worms.[12] Terrestrial insects are also an important ecological component of the sandy beach as they break down kelp wrack (i.e., kelp, algae, and marine plants washed on the shore). The wrack may harbor a variety of insects and invertebrates that are important prey items for gulls and shorebirds.

Sandy beach invertebrates are an important prey base for fish and birds. Nearshore fish forage on the invertebrates when high tides cover the beach. A variety of shorebirds probe the sand in search of worms, crustaceans, and small clams. Gulls are opportunistic feeders on invertebrates they pick from the swash zone or on wrack, as well as trash or debris left by humans. Beaches are important resting areas for shorebirds, gulls, and other seabirds such as terns and the California brown pelican. Terrestrial birds also may forage along the back beach shoreline.

California grunion (*Leuresthes tenius*) may also utilize the sandy beach habitat during certain times of the year. Grunion travel from their habitat in nearshore waters to specific sandy beaches just after certain full and new moons in conjunction with their distinctive mode of spawning. Spawning takes place during night time high tides between March and August. Eggs are deposited into the sand of the upper intertidal and then hatch 10 days later following exposure during the next high tide. Given the presence of upper intertidal sandy habitat throughout the year, the beaches within Santa Monica Bay appear to be suitable grunion spawning habitat. Grunion are managed as a game species by the California Department of Fish and Game (CDFG).

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[11] *Dailey, M.D., D.J. Reish, and J.W. Anderson. Ecology of the Southern California Bight: A Synthesis and Interpretation. University of California Press. 1993.*

[12] *Ibid.*

Subtidal Zone

The subtidal zone is the coastal marine area below the intertidal zone. That is, the subtidal zone is the zone in the ocean below the lowest water line, below the lowest tide of the year, and can be extended to a depth of interest, which in this case would be approximately -20 feet MLLW. The site visit indicated that the nearshore waters in the vicinity of the project area are characterized by sandy substrate with wharf piling.

Fishes known to occur in nearshore sandy beach habitat include California corbina (*Menticirrhus undulatus*), California halibut (*Paralichthys californicus*), topsmelt (*Atherinops affinis*), guitarfish (*Rhinobatus productus*), barred sandbass (*Paralabrax nebulifer*), northern anchovy (*Engraulis mordax*), Pacific mackerel (*Scomber japonicus*), round ray (*Urolophus halleri*), kelp bass (*Paralabrax clathratus*), walleye surfperch (*Hyperprosopon argenteum*), leopard shark (*Triakis semifasciata*), barred surfperch (*Amphistichus argenteus*), sheephead (*Semicossyphus pulcher*), scorpionfish (*Scorpaena gutatta*), zebra perch (*Hermosilla azurea*), yellowfin croaker (*Umbrina roncador*), spotfin croaker (*Roncador stearnsii*), and white croaker (*Genyonemus lineatus*).

The 2003 Regional Bight Program sampled several stations in the vicinity of the project area (Stations 4101 and 4181).[13] Species collected during otter trawl sampling are listed below in **Table 2**, *Species Collected during Trawl Surveys during 2003 Bight Survey in Vicinity of Project Area*, and benthic infauna sampling indicated a variety of infaunal species, dominated by polychaete worms (e.g., *Lumbrineris zonata*, *Mediomastus* sp, *Spionidae*), crustaceans (e.g., *Ericthonius brasiliensis*), amphipods (e.g., *Ampelisca* sp.), anemones (*Zaolutus actius*), and molluscs (e.g., *Caecum crebricinctum*, *Epitonium sawinae*). Other epibenthic invertebrates common in shallow subtidal sandy habitats include sand dollars (*Dendraster excentricus*), tube-dwelling polychaete worms (*Diopatra ornata*, *Pista pacifca*), sea pens (*Sylatula elongata*), sea pansies (*Renilla koellikeri*), crabs (*Heterocrypta occidentalis*, *Randallia ornata*), snails (*Olivella biplicata*), clams, burrowing anemones (*Haranactis attenuate*), and sea stars (*Astropectin armatus*).

Table 2

Species Collected during Trawl Surveys during 2003 Bight Survey in Vicinity of Project Area

	Common Name	Scientific Name
Fish	Speckled Sanddab	*Citharichthys stigmaeus*
	California Halibut	*Paralichthys californicus*
	English Sole	*Parophrys vetulus*
	White Seaperch	*Phanerodon furcatus*
	Curlfin Turbot	*Pleuronichthys decurrens*
	Diamond Turbot	*Pleuronichthys guttulatus*
	Spotted Turbot	*Pleuronichthys ritteri*
	Hornyhead Turbot	*Pleuronichthys verticalis*
	Plainfin Midshipman	*Porichthys notatus*

[13] *Southern California Coastal Water Research Project (SCCWRP). Southern California Bight 2003 Regional Monitoring Program. Final Report. 2007.*

Table 2

Species Collected during Trawl Surveys during 2003 Bight Survey in Vicinity of Project Area

	Common Name	Scientific Name
	California Lizardfish	*Synodus lucioceps*
	Fantail Sole	*Xystreurys liolepis*
Megabenthic Invertebrates	Hydroid	*Aglaophenia* sp
	Armored Sea Star	*Astropecten armatus*
	Blackspotted Bay Shrimp	*Crangon nigromaculata*
	California Blade Barnacle	*Hamatoscalpellum californicum*
	Sponge	*Leucilla nuttingi*
	Hermit Crab	*Paguristes* sp
	Pea Crab	*Pinnixa franciscana*
	Hydroid	*Plumularia* sp
	Hemphill's Kelp Crab	*Podochela hemphillii*
	Xantus Swimming Crab	*Portunus xantusii*
	Bryozoan	*Thalamoporella* sp

Source: Merkel & Associates, 2011. Data from Stations 4101 and 4181 in water depths less than 45 feet.

In 2003, 16 species of macroinvertebrates were collected by otter trawl off the Scattergood Generating Station, located downcoast of the project area.[14] The most abundant species were spiny sand star (*Astropecten armatus*), the giant bell jelly (*Scrippsia pacifica*), California sand star (*Astropecten verrilli*), and tuberculate pear crab (*Pyromaia tuberculata*). The annual NPDES monitoring report (October 2005 through September 2006) noted at least 67 distinct macroinvertebrate taxa were impinged during normal operations at the Scattergood Generating Station.[15] The most abundant taxa were intertidal coastal shrimp (*Heptacarpus palpator*), the opalescent nudibranch (*Hermissenda crassicornis*), red rock shrimp (*Lysmata californica*), yellow crab (*Cancer anthonyi*), and the jelly (*Polyorchis penicillatus*), and combined accounted for 86 percent of annual impingement abundance.

No rocky substrata was observed within the project area, and therefore no macroalgal species associated with rocky reef habitat (e.g., kelp, surfgrass) were observed. Macroalgae were only observed on the wharf pilings.

Wharf Pilings

Wharf pilings provide a firm substrate within the water column, and the distribution of organisms can show variation that is correlated with the degree of exposure to surf and

[14] *City of Los Angeles Department of Public Works. Marine Monitoring in Santa Monica Bay Biennial Assessment Report. January 2005 to December 2006. 2007.*

[15] *Ibid.*

waves.[16] In addition, the distribution of organism on pilings can mimic similar distributional or zonation patterns observed within the rocky intertidal zone.

The faunal community on pilings can be relatively diverse, and some of this diversity can be attributed to the increased habitat complexity provided by the presence of a dominant organism, mussels (*Mytilus* sp.). While the higher tidal levels generally supported barnacles (e.g., *Balanus* sp., *Chthamalus* sp., *Pollicipes* sp.), mussel beds were common features at the lower tidal level on most pilings. Mussel beds support a diverse assemblage of sessile and mobile invertebrates such as sea stars (*Pisaster ochraceus*), hydroids (*Obelia* sp.), purple sea urchins (*Strongylocentrotus purpuratus*), rock scallops (*Crassedoma giganteum*), aggregating anemones (*Anthopleura elegantissima*), tunicates (*Styela* spp.), crustaceans (amphipods and crabs), bryozoans (*Thalamoporella californica*, *Bugula* spp.), and sponges (*Haliclona* sp.), as well as, several species of ephemeral algae (e.g., *Ulva* sp, *Egregia menziesii*).

Water Column

Water column habitat is defined as the water covering a submerged surface and its physical, chemical, and biological characteristics. Differences in the chemical and physical properties of the water affect the biological components of the water column, including fish distribution. Water column properties that may affect organisms include temperature, salinity, dissolved oxygen (DO), total suspended solids, nutrients (nitrogen, phosphorus), and chlorophyll a. Other factors, such as depth, pH, water velocity and movement, and water clarity, also affect the distribution of aquatic organisms.

One group of organisms that occupies the water column and that has not been discussed in the previous sections includes plankton. Plankton is a generic term that includes a broad and diverse group of microscopic plants and animals that occur in the water column, and although many have swimming capabilities they are subject to transport by currents. Typically, the smallest planktonic organisms are the phytoplankton, which are tiny plants. The most abundant components of the phytoplankton are the diatoms and dinoflagellates, which range in size from a few micrometers to a few hundred micrometers. Periodically, high concentrations of phytoplankton (plankton blooms) result in visible coloration of the water termed "red tides." Fish larvae and eggs are referred to as ichthyoplankton. Zooplankton include animals that reside permanently in the water column (e.g., cladocerans, copepods, salps), as well as larval forms of many benthic invertebrates (e.g., clams, crabs, lobster, sea urchin). Bacteria, which play a critical role in the degradation of particulate organic matter, also occur in the plankton. Plankton generally are short-lived organisms or larvae of fish and benthic invertebrates that have relatively short planktonic stages (ranging from days to months). This, as well as seasonal differences in spawning periods of fish and invertebrates, currents, nutrients, and oceanographic conditions, all contribute to variability in the species composition of plankton at any particular location or time.[17]

Many of the invertebrates that inhabit sandy beaches seasonally recruit from the plankton (e.g., sand crabs, bean clams, Pismo clams, worms). This also is true for intertidal and subtidal rocky habitats (e.g., shore crabs, lobster, sea urchins, sea stars).

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[16] *Ricketts, E.F., J. Calvin, and J.W. Hedgpeth. Between Pacific Tides. Fifth Edition. Stanford University Press. 1985.*

[17] *Dailey, M.D., D.J. Reish, and J.W. Anderson. Ecology of the Southern California Bight: A Synthesis and Interpretation. University of California Press. 1993.*

Birds

Based on surveys conducted in Santa Monica Bay between January 2006 and July 2007, a total of 6,306 individual birds were observed.[18] The most commonly sighted seabirds were gulls (family Laridae, genus Larus), which comprised approximately 56 percent (or 3,508) of the observations. The majority of gulls were Western gulls (*Larus occidentalis*), California gulls (*L. californicus*), ring-billed gulls (*L. delawarensis*), Heermann's gulls (*L. heermanni*), and Bonaparte gulls (*L. philadelphia*). Pelicans (*Pelecanus occidentalis*) were the second group most often observed (approximately 19 percent or 1,736), followed by terns (approximately 7 percent or 616), and Western grebes (*Aechmophorus occidentalis*) which accounted for approximately 7 percent or 412) of the observations. While endangered (State and federal) California least terns (*Sternula antillarum browni*) were typically recorded during coastal surveys in the summer months, elegant terns (*Sterna elegans*) were observed both in coastal and offshore water. Sooty shearwaters (*Puffinus griseus*) were also more common during the summer months in the offshore waters, and comprise approximately 5 percent or 339) of the observations. Xantus's murrelet (*Synthliboramphus hypoleucus*), a State-threatened species was also observed during surveys in offshore waters. Generally, the distribution of seabirds was closely correlated to prey availability, which tended to be higher in more productive areas, such as the submarine canyons.[19]

While many seabird species use the bay on a year-round or seasonal basis, and may opportunistically use the project area for foraging or resting, few nest in the area. One important exception is the California least terns, as there is a least tern nesting area in Venice Beach (approximately 3.6 miles away). Foraging surveys for the Venice Beach colony indicate that least terns are opportunistic feeders, but have higher foraging activity within 1 mile of the nesting area than further away.[20] As such, it would be uncommon to find least terns around the Pier when young are in the nest. Terns may forage irregularly in the area prior to egg laying of while incubating.

Marine Mammals

Marine mammal species known to occur within Santa Monica Bay include the California sea lion (*Zalophus californianus*), harbor seals (*Phoca vitulina rishcardsi*), northern elephant seal (*Mirounga angustirostris*), bottlenose dolphin (*Tursiops truncatus*), shortbeaked common dolphins (*Delphinus delphis*), long-beaked common dolphins (*D. capensis*), and gray whales (*Eschrichtius robustus*).

Given the project area, greater concern is placed on those species that occur closer to shore. Sea lions and harbor seals are regularly observed in coastal waters (< 0.3 miles from shore), but also use the entire Bay with both species showing a preference for areas around submarine canyons.[21] The project area is not considered a major seal or sea lion haul out area. Northern elephant seals were only seen in offshore waters and mostly in proximity of

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[18] *Bearzi, M., C.A. Saylan, and J. Feenstra. Seabird Observations During Cetacean Surveys In Santa Monica Bay, California. Bull. Southern California Acad. Sciences 108(2). 2009.*

[19] *Ibid.*

[20] *Atwood, J.L. and D.E. Minky. Least tern foraging ecology at three major California breeding colonies. Western Birds 14(2): 57-72. 1983.*

[21] *Bearzi, M., C.A. Saylan, and C. Barroso. Pinniped ecology in Santa Monica Bay, California. Acta Zoologica Sinica 54(1):11-11. 2008.*

canyons.[22] Bottlenose dolphins were also observed year-round in shallow waters (within 0.3 miles from shore) clearly separated from the distribution of short-beaked and long-beaked common dolphins, which were found year-round in the bay but mostly far from shore.[23] Gray whales may also be observed close to shore during their annual migration between the Arctic to the lagoons of Baja California, Mexico.

Threatened and Endangered Species

California least terns (*Sternula antillarum browni*) are one of three least tern subspecies breeding in North America, and nests from April through August along the coast from the San Francisco Bay in California to lower Baja California. They have nested near Venice Beach since 1894, although colony size and reproductive success have varied widely from year to year depending on the quality of nesting habitat, predation and predator presence, prey availability, and human disturbance.[24]

Xantus's murrelet (*Synthliboramphus hypoleucus*) have been observed within Santa Monica Bay, but generally in offshore waters.[25] They breed on islands off the coast of southern California, and feed on larval fish or other small prey by diving down to depths of 70 feet and remaining underwater for up to 28 seconds.

Essential Fish Habitat

Under the provisions of the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act[26], the amendments require the delineation of "essential fish habitat" for all managed species. Essential fish habitat (EFH) has been designated over all tidal marine waters in southern California. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH, and respond in writing to the NMFS's recommendations.

The entire coastal area ranging from the mean high tide line to offshore depths represents EFH, and are managed through two applicable plans, the Pacific Groundfish and Coastal Pelagic fishery management plans (FMPs). The habitat designations associated with those plans are defined below.

EFH for species in the Pacific Groundfish FMP[27], which applies to 89 fish species (e.g., flatfish, rockfish, sharks) is identified as all waters and substrate within the following areas:

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22 *Ibid.*

23 *Bearzi, M. Habitat partitioning by three species of dolphins in Santa Monica Bay, California. Bull. Southern California Acad. Sci. 104(3):113–124. 2005.*

24 *Ryan, T. and S. Vigallon. Report to Volunteers: Breeding Biology of the California Least Tern at Venice Beach, Marina Del Rey, California in the 2009 Breeding Season. 2009.*

25 *Bearzi, M., C.A. Saylan, and J. Feenstra. Seabird Observations During Cetacean Surveys In Santa Monica Bay, California. Bull. Southern California Acad. Sciences 108(2). 2009.*

26 *Federal Register, 1997. EFH Coordination, Consultation, and Recommendations. Volume 62, Number 244, Pages 66555-66559. December 1997.*

27 *National Marine Fisheries Service (NMFS). Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery. Pacific Fishery Management Council. July 2008.*

- Depths less than or equal to 3,500 meters (1,914 fathoms) to mean higher high water (MHHW);
- Water level (MHHW) or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow;
- Seamounts in depths greater than 3,500 m as mapped in the EFH assessment GIS; and
- Areas designated as Habitat Areas of Particular Concern (HAPC) (e.g., seagrass, kelp canopy, estuaries, rocky reef).

EFH for species in the Coastal Pelagic FMP[28], which applies to four fish and one invertebrate species (e.g., anchovy, sardine, Pacific mackerel, jack mackerel, and market squid) is identified as all waters and substrate within the following areas:

- All marine and estuarine waters from the shoreline to the limits of the Exclusive Economic Zone (EEZ), which extends approximately 200 nautical miles offshore; and
- Water surface boundary, which is the water column between the thermoclines where temperatures range from 10 to 26 degrees Celsius.

To support the EFH consultation process, an assessment of the project effects on EFH is provided in Appendix A of the MBRA (Appendix B of this Initial Study).

a) **Less Than Significant Impact With Mitigation.** The following discussion summarizes the construction-related and operational impacts of the proposed emergency gangway/floating dock and structural upgrades, respectively. Refer to the MBRA (Appendix B of this Initial Study) for a detailed discussion of existing conditions and affected species and habitats.

Construction Impacts

Emergency Gangway and Floating Dock

Short-term increases in turbidity during pile removal and anchor placement may lead to reduction of water quality leading to displacement or potential mortality of benthic infauna and epifauna (e.g., worms, crustaceans, anemones, crabs, molluscs, clams, sea stars), or fish. Given the substrate type (i.e., sand) and open ocean environment, this impact is considered short-term and localized, as it is expected that any resuspended sediment would quickly settle to the bottom or be dispersed by water motion. Additionally, project-related turbidity is not expected to affect foraging by least terns (see discussion regarding least tern foraging and behavior below in the structural upgrades impacts discussion). As such, impacts associated with construction-related turbidity would be less than significant.

Direct loss/mortality of benthic infauna and epifauna could occur due to ground disturbance during existing pile removal and installation of helical anchors that support the seaflex mooring system. Assuming construction would require the insertion of 12 helical anchors with a one-foot diameter, approximately nine square feet would be disturbed from

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28 *Ibid.*

anchor installation; and assuming one, 18-inch pile will be installed, approximately two square feet of benthic habitat would be disturbed from pile driving. However, this impact is considered short-term and localized, with the rapid recovery of existing marine species composition and diversity expected within two years or less. As such, impacts related to loss or mortality of infauna and epifauna species would be less than significant since the habitat is dynamic and the species that inhabit the seafloor are relatively opportunistic (so any losses of species would quickly recover), and furthermore, none of the affected species are special-status species.

Short-term increases in noise during construction (e.g., pile removal, anchor driving activities) could affect the behavior of some species in the immediate vicinity. However, this impact is not considered significant for waterbirds, mammals, fish, and mobile marine invertebrates that can temporarily relocate to adjacent habitats away from noise and vibration effects. Given the mobility of these species, noise-related impacts would be less than significant.

Phase 4 Structural Upgrades

As noted in the MBRA, endangered (State and federal) California least terns (Sternula antillarum browni) have typically been seen and recorded in and around Santa Monica Bay during coastal surveys in the summer months. As such, as the structural upgrades would require the use of driven pile casings for Pier construction, construction activities could have adverse effects on this species. However, pile driving activities have been conducted at a number of locations in close proximity to least tern nesting areas. For example, several projects have been implemented in San Diego Bay during the least tern nesting season (e.g. Glorietta Bay Marina, North Harbor Drive Bridge). These activities were monitored to assess the effects of pile driving on least tern behavior, as well as turbidity generation in the water where pile driving is being conducted. In both pile driving and vibratory pile jetting activities, least terns were observed to forage normally within the immediate proximity of the work area, and turbidity generation at the pile placement location was either nominal or non-detectable at the surface. Similarly, in another example in San Diego Bay, piles were vibrated down and then driven to completion on the wharf extension for the National City Marine Terminal. These also were conducted during the least tern nesting season. During construction, bird activities were monitored at the D Street Fill colony, which is located in proximity to the Marine Terminal, and no observed adverse effects on bird behavior were noted with this work. As such, given that the closest nesting area to the project is located relatively far away from the project site (the Venice Beach nesting area is approximately 3.6 miles from the project area), pile driving activities are not expected to result in significant impacts to least tern foraging or nesting activities.

As noted above, the City installed bird exclusion nets around the below-deck structure of the Pier's western end, and therefore no nests currently occur on the Pier itself. As such, implementation of the proposed improvements would not have the potential to directly affect nesting of any special status bird species and no impacts would occur in this regard.

Similar to the emergency gangway and floating dock, direct loss/mortality of benthic infauna and epifauna during pile removal and installation could occur. Assuming 76, 18-inch piles will be installed, approximately 170 square feet of benthic habitat would be disturbed. It can also be assumed that at a similar amount of area would be affected during pile removal. Therefore, approximately 340 square feet of benthic habitat would be directly affected from pile removal and installation. This impact is considered short-term and localized, with the rapid recovery of existing marine species composition and diversity expected within two years or less. Further, the benthic and epibenthic community complexity is expected to increase in the area as a result of detrital rain (i.e., plants and animals living at or near the water surface die and sink to the bottom) from the new pile field. Therefore, impacts related to loss or mortality of infauna and epifauna species are considered less than significant, since the habitat is dynamic and the species that inhabit the seafloor are relatively opportunistic (so any losses of species would quickly recover), and furthermore, none of the affected species are special-status species. Additionally, the overall affected seafloor area is relatively small given that most of Santa Monica Bay is characterized by similar habitat.

In addition, the construction of the temporary trestle would result in a similar level of disturbance to benthic habitat (approximately 340 square feet) due to the installation and removal of steel piling for the temporary trestle. Similar to the Pier piles, the impacts to infauna and epifauna associated with temporary trestle piles are considered short-term and localized with the rapid recovery of existing marine species composition and diversity expected following removal of the temporary structure. As such, given the relatively small size of the affected area and the opportunistic nature of affected species, impacts related to loss or mortality of infauna and epifauna species would be less than significant.

Pile removal would also result in the loss of the fauna and flora associated with the piling community. Since organisms that occupy this habitat are opportunistic, this impact is considered short-term and minimal, with the rapid recovery of existing marine species composition and diversity expected within two to four (2-4) years or less. Impacts related to loss of fauna and flora associated with the piling community would be less than significant.

Similar to the emergency gangway and floating dock impacts, short-term increases in noise during construction (e.g., pile removal, anchor driving activities) could affect the behavior of some species in the immediate vicinity. However, this impact is not considered significant for waterbirds, mammals, fish, and mobile marine invertebrates that can temporarily relocate to adjacent habitats away from noise and vibration effects. Given the mobility of these species, noise-related impacts would be less than significant.

Short-term increases in turbidity during pile removal may lead to reduction of water quality leading to displacement or potential mortality of benthic infauna, epifaunal, and fish. Given the substrate type (i.e., sand) and open ocean environment, this impact is considered short-term and localized, as it is expected that any resuspended sediment would quickly settle to the bottom or be dispersed by water motion. As previously noted, there is an environmental benefit by replacing the treated wooden timber piles with inert concrete piles. As such, indirect impacts related to water quality would be less than significant.

The construction of the temporary trestle would result in a temporary alteration of approximately 8,000 square feet of open water habitat due to a reduction of surface coverage and increased shading impacts. While the reduction of water surface area is a concern in enclosed bays and estuaries, as it reduces foraging habitat for seabirds, given the project area (open coast), the area lost does not constitute a substantial portion of Santa Monica Bay. In addition, the temporary trestle is anticipated to be in place for approximately ten months, and after completion of the structural upgrades, would be removed. Shading impacts are not expected to have any measureable effect, as the project area does not support any macroalgae or plants, except algae associated with the Pier itself. Impacts associated with shading from the temporary trestle would be less than significant.

No change in water circulation due to placement of temporary trestle is anticipated, although additional piles may affect littoral transport of sediments. This is expected to be a temporary impact, as the trestle would be removed following completion of the structural upgrades. Therefore, impacts associated with water circulation related to the temporary trestle would be less than significant.

Disturbance to grunion spawning habitat (i.e., sandy beach habitat) may occur during the removal of the temporary trestle (anticipated in early Fall 2012). Grunion spawning occurs from March to August, although the peak runs occur early in the season. Impacts related to grunion spawning are considered potentially significant if construction activities that could affected grunion spawning habitat overlaps with a grunion spawning event. However, mitigation measures are provided below that would reduce impacts to grunion to less than significant.

Operational Impacts

Emergency Gangway and Floating Dock

Alteration of 1,800 square feet of open water (ocean) habitat due to placement of the proposed floating dock would reduce the exposed water surface area and increase overall Pier-related shading effects. While the reduction of water surface area is a concern in enclosed bays and estuaries as it reduces foraging habitat for seabirds, given the project area (open coast), the area lost does not constitute a substantial portion of Santa Monica Bay. The increased shading is not expected to have any measureable effect, as the project area does not support any macroalgae or plants. Therefore, impacts related to water surface area and shading associated with the floating dock would be less than significant.

No detectable change in water circulation or littoral transport is expected from the installation of the mooring system or floating dock. Additionally, as noted previously, no increased impacts to water or sediment quality are anticipated from operation of the emergency gangway and floating dock. As such, no long-term indirect effects would occur.

Phase 4 Structural Upgrades

Portions of the Pier have undergone structural upgrades as part of the previously completed Phase 1, Phase 2, and Phase 3 Pier Replacement Projects. The last remaining portion of the Pier still supported by submerged timber piles is the portion of the Pier that is the subject of the proposed Phase 4 structural upgrades. There is an environmental benefit by replacing the treated wooden timber piles with inert concrete piles in that inert concrete piles would have less potential to alter water conditions (e.g., pH levels, turbidity, pollutant concentrations) in the immediate vicinity of the piles. As such, no operational impacts related to water quality would result from the proposed structural upgrades.

No additional operational noise impacts are expected to occur since the current and proposed land uses and intensities in the project area would remain unchanged. Further, no reduction or impairment to water or sediment quality is anticipated from operations following the structural upgrades. As such, no long-term indirect effects would occur.

Mitigation Measures:

IV-1 Temporary trestle removal (or any beach-disturbing activity) shall be scheduled outside of the grunion spawning season (March to August).

IV-2 If construction of the Pier structural upgrades overlaps the grunion spawning season, grunion monitoring shall be conducted prior to any beach-disturbing activity occurring during a predicted grunion run (refer to the California Department of Fish and Game [CDFG] website for predicted spawning events, as spawning events occur bi-weekly). The monitoring shall be conducted by City staff or a qualified consultant, as deemed appropriate by CDFG. If grunion are observed by the monitor during the CDFG-predicted run period, the extent and location of the run shall be quantified using the Walker Scale (i.e., the scale of spawning intensity ranging from W0 to W5, from least intense to most intense) and CDFG shall be notified regarding potential action. If the observed grunion spawning event is considered a significant run by CDFG (i.e., W4 or higher on the Walker Scale, or several thousand or more fish on a large portion of the beach), as determined by CDFG staff, construction activities occurring on the affected portion of the beach shall cease for the remainder of the two-week spawning cycle. If no grunion are observed, it is assumed that construction can proceed.

b) **No Impact.** The project site is characterized by sand beach and open ocean, neither of which are considered riparian habitats, and the project site does not contain and is not located in proximity to a sensitive natural community as identified in the City or regional plans, policies, regulations by the California Department of Fish and Game or U.S. Fish and Wildlife Service. As such, no impacts would occur in this regard.

c) **No Impact.** Although located along the Pacific coast, the project site does not contain any federally protected wetlands as defined by Section 404 of the Clean Water Act. As such no impacts would result from project implementation.

d) **Less Than Significant Impact.** As noted above, the proposed project would result in temporary impacts to species and habitats within and around the project site, particularly marine species and habitats. Such impacts could affect the movement of fish and wildlife species in the area while construction activities are occurring due to increased noise levels, ground disturbance, water turbidity, or physical obstructions (e.g., temporary trestle). However, given the temporary nature of construction activities, and implementation of applicable mitigation measures, the proposed improvements would not substantially interfere with 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. As such, impacts would be less than significant.

e) **No Impact.** The proposed improvements would not result in the removal of any street trees or other biological resources that are subject to local policies or ordinances protecting biological resources. As such, no impacts would result from project implementation.

f) **Less Than Significant Impact.** The project site is located partially within the waters of the Pacific Ocean, the affected portion of which is under subject to the requirements of the Pacific Groundfish Fishery Management Plan (FMP) and the Coastal Pelagic FMP with regard to Essential Fish Habitat (EFH). These plans are intended to facilitate maintenance and preservation of EFH for various fish species within each plan's respective affected habitat areas. While the marine habitats associated with the project site are subject to these FMPs, the proposed activities would result in temporary construction-related impacts to marine habitats and species, which would be less than significant with implementation of applicable mitigation measures. No impacts to the applicable FMPs would occur during project operation, as the Pier would continue to operate passively as under existing conditions. As such, since the proposed project would not result in significant adverse impacts to marine species or habitats, impacts would be less than significant in this regard.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CONSTRUCTION EFFECTS. Would the project:				
a) Have considerable construction-period impacts due to the scope, or location of construction activities?	☐	☐	☒	☐

a) **Less Than Significant Impact.** As discussed in the respective sections of this Initial Study, the proposed project would involve temporary construction activities that would result in short-term adverse impacts related to aesthetics, air quality, biological resources, cultural resources, greenhouse gas emissions, geology and soils, hydrology and water quality, noise, shadows, and transportation/traffic. All such temporary effects would be less than significant or less than significant with mitigation. As such, impacts related to construction effects of the proposed project would be less than significant. Refer to Section I, Aesthetics; Section III, Air Quality; Section IV, Biological Resources; Section V, Cultural Resources; Section VI, Greenhouse Gas Emissions; Section VII, Geology and Soils; Section X, Hydrology and Water Quality; Section XIV, Noise; Section XVIII, Shadows; and Section XIX, Transportation/Traffic, for a detailed discussion of construction-related environmental impacts of the proposed project.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☐	☒	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

The following analysis of cultural resources impacts is based in part on the results of a Historic Resources Assessment (HRA) performed by PCR for the proposed project in February 2011 (included as Appendix C of this Initial Study).

a) **Less Than Significant Impact With Mitigation.** A historical resource is defined in Section 15064.5(a)(3) of the CEQA *Guidelines* as any object, building, structure, site, area, place, record, or manuscript determined to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Historical resources are further defined as being associated with significant events, important persons, or distinctive characteristics of a type, period or method of construction; representing the work of an important creative individual; or possessing high artistic values. Resources listed in or determined eligible for the California Register, included in a local register, or identified as significant in a historic resource survey are also considered historical resources under CEQA.

Similarly, the National Register criteria (contained in 36 CFR 60.4) are used to evaluate resources when complying with National Historic Preservation Act (NHPA) Section 106. Specifically, National Register criteria state that eligible resources comprise districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (a) 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 distinctive characteristics of a type, period, or method of construction, or that possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction; or (e) that have yielded or may be likely to yield, information important to history or prehistory.

The subject property is located in the City of Santa Monica in Los Angeles County. The City of Santa Monica formally initiated a historic preservation program with its 1976 adoption of the Landmark and Historic Preservation Ordinance. This ordinance established the

Landmarks Commission whose powers include designation of Structures of Merit and Landmarks, and recommendation to the City Council for the designation of historic districts. Furthermore, it identified both obligations required of historic property ownership and a broad range of incentives available to owners of historic properties.

A substantial adverse change in the significance of a resource, as a result of a project or development, is considered a significant impact on the environment. Substantial adverse change is defined as physical demolition, relocation, or alteration of a resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. Direct impacts are those that cause substantial adverse physical change to a historic property. Indirect impacts are those that cause substantial adverse change to the immediate surroundings of a historic property, such that the significance of a historical resource would be materially impaired.

The Santa Monica Pier was named a Los Angeles County Landmark in 1975 and designated a City of Santa Monica Landmark in August, 1976. The Landmarks Commission found that the Pier "exemplifies, symbolizes and manifests elements of the cultural and social history of the city in that it has been utilized as a social and recreational center for Santa Monica from its conception in 1890; has architectural interest and value notably in the merry-go-round structure and the Sinbad building; identifies with important events in local history in that it was the site of the first musical variety program in July, 1948; identified with famous persons in that William Saroyan lived in one of the apartments above the merry-go-round; and symbolizes elements of the city's economic history in that on the site was a structure that predates the founding of the city, namely the Shoo Fly pier which was utilized as a shipping point." The Santa Monica Looff Hippodrome (Carousel) Building was designated a National Historic Landmark in March, 1987 and was listed on the National Register of Historic Places in 1988.

A site visit was conducted by qualified architectural historians to identify historic resources and assess potential impacts. A historical resources investigation was conducted for the proposed project that included archival records searches and literature reviews to determine: (i) if known historical resources sites have previously been recorded within the project site or within a one-half mile radius of the project site; (ii) if the project site has been systematically surveyed by historians prior to the initiation of the study; and/or (iii) whether there is other information that would indicate whether or not the project site is historically sensitive. A records search was conducted at the South Central Coastal Information Center (CHRIS-SCCIC) housed at California State University, Fullerton. This records search included a review of all previous historical resources investigations within the project area and within a one-mile radius of the project area. In addition, the California Points of Historical Interest (PHI), the California Historical Landmarks (CHL), the California Register of Historic Places (California Register), the National Register of Historic Places (National Register), the California State Historic Resources Inventory (HRI), and the "City of Santa Monica Historic Resources Inventory" were reviewed. Historic Sanborn maps as well as historic photographs and assessor's records were also examined to determine whether historical resources may be present within the project area. A site visit was conducted by qualified architectural historians to identify historic resources and assess potential impacts. The plans for the proposed project were reviewed for conformance with the Secretary of the Interior's Standards for Rehabilitation, in compliance with CEQA.

Historic Context

Santa Monica. In 1875, the original town site of Santa Monica was surveyed, including all of the land extending from Colorado Avenue on the south to Montana Avenue on the north, and from 26th Street on the east to the Pacific Ocean on the west. Between 1893 and the 1920s, the community operated as a tourist attraction, visited by mostly wealthy patrons. Those areas just outside of the incorporated City limits were semi-rural in setting and were populated with scattered residences. After the advent of the automobile in the 1920s, Santa Monica experienced a significant building boom, which included the development of the area known as Ocean Park, south of the downtown commercial district.

The close proximity to the ocean was no doubt a strong attraction to prospective year-round residents, as well. As early as 1896, a reliable interurban rail line had made it possible to commute to Los Angeles, but it was the advent of the automobile which gave significant momentum to the building boom which Santa Monica experienced in the 1920s. Whereas a significant portion of the first homes built in the older sections of the City, such as the Palisades Tract were originally used as retirement homes or vacation retreats, the tracts north of Montana Avenue and east of 7th Street were developed for year-round residents.

The commercial area, located along 2nd, 3rd, and 4th Streets between Wilshire Boulevard and Colorado Avenue, reflected the development of the City as well. Closely integrated with residences in the nineteenth-century community, the commercial district expanded with the burgeoning population. A few surviving residences changed use; some were moved to other sites.

While tourism had always been the primary industry of the city, other companies contributed to the community's economic base, as well. A brick, terra cotta, and pottery facility was located in the southern portion of the City in the early years of the twentieth century. The Merle Norman Cosmetics Company, founded in the 1920s, had its headquarters on Main Street. Perhaps the best-known industry was Douglas Aircraft located in the southeastern portion of the city. Opening in 1923, the company became well-known for its innovations in the field of global flight and became a primary contractor for manufacturing aircraft during World War II. The Rand Corporation, a nationally known "think tank," maintains a highly visible presence on Main Street. A small industrial section, which includes studio and entertainment-related uses, has grown up around Olympic Boulevard, and an office park has developed off Ocean Park Boulevard near the southeast corner of the City.

A postwar building boom began in 1946, with the construction of whole residential tracts of single-family residences. Multi-family housing became a major factor in planning and zoning issues as the City's population continued to grow. While single-family neighborhoods occupy the greater percentage of residential zoned acreage, the population of multi-family areas is in fact greater. Within the past decades, Santa Monica has been transformed bit by bit. Many of the modest single-family houses have been replaced by larger homes or modern condominium units in the areas north of the Santa Monica Freeway. Neighborhoods south of the freeway have also experienced a construction growth of multiple housing types, ranging from high-rise towers to the two- and three-story townhouses, which continue to be developed today.

Santa Monica Municipal Pier and Pleasure Pier. On September 9, 1909, after sixteen months of construction, the Santa Monica Municipal Pier opened to the public. This was California Admission Day, and the thousands of people who swarmed onto the 1,600-foot-long wooden pier were in a holiday mood as they enjoyed a festive day of band concerts, swimming races, and the novelty of walking above the waters of the Pacific Ocean. Constructed at the base of Colorado Avenue, the Pier was not purely for tourism, but also functioned to pump the city's sewage out to sea. The Pier was originally constructed with concrete piles, the first concrete Pier on the west coast, but they were replaced with wood piles after the sand aggregate was deemed to be too porous and permeable causing most of the piles to fail by 1919. New wood piles were driven during 1920 and the Pier reopened in 1921.

The Municipal Pier's continuing ability to attract large crowds impressed Charles Looff, a pioneer amusement entrepreneur who had built Coney Island's first carousel in Brooklyn, New York and then opened a carousel factory nearby. Sensing vast potential for amusement attractions on the Southern California coast, he moved his operations to Long Beach in 1910, when he began to consider building a pleasure pier of his own.

In 1916, after lengthy negotiations with the City of Santa Monica, he started construction alongside the Municipal Pier. Looff's Santa Monica Pleasure Pier featured the landmark Hippodrome building, a California-Byzantine-Moorish-style fantasy that has housed a succession of vintage merry-go-rounds and Wurlitzer organs. In the beginning it also boasted the Blue Streak Racer wooden roller coaster and the Whip and Aeroscope thrill rides. More attractions followed and soon the Looff Pier was enlarged to its current size of 270 feet by 1,080 feet.

As arts and entertainment flourished in Santa Monica, so did the Pier. In 1924 the vast and ornate La Monica Ballroom opened to become the site of some of the earliest national radio and television broadcasts. It also played host to throngs of dancers who came nightly to enjoy the big band sound, including "Western Swing."

The Pier's popularity continued to be high throughout 1930, but severe storms, heavy use and changing tastes began to take their toll. The Blue Streak roller coaster was torn down in 1930, and the La Monica Ballroom closed down some 33 years later.

While the Municipal Pier continued to be owned and operated by the City of Santa Monica, the Looff Pleasure Pier had a succession of owners. In 1953, it was taken over by the City, which leased it to a private operator who, among other things, offered rooms for rent overlooking the merry-go-round. Painters, musicians, and writers, including novelist William Saroyan, occupied these rooms.

Approximately twenty years later, the Santa Monica City Council ordered the demolition of both deteriorating piers. Outraged by this move, residents fought back with a "Save Our Pier Forever" initiative, with one of its objectives being to establish the Pier as a Los Angeles County Historical Landmark. In 1981, the City appointed the Pier Task Force (later named the Pier Restoration Corporation or PRC) to provide management and oversee restoration, including stripping the famed Hippodrome building back to its original framework and reconstructing it piece by piece. Although two fierce storms halted work in 1983, washing away 100,000 square feet of the ocean end of the Pier, good news would soon follow as the Hippodrome and its carousel were designated a National Historic Landmark by the National Park Service.

In 1988, the Santa Monica Pier Development Program was adopted by Santa Monica's City Council. As part of the Development Program, a new concrete substructure was built, adding strength and stability to a pier that could now withstand violent storms. A variety of retail, food and entertainment outlets, as well as a police substation and a world class amusement park were constructed on the Pier to enhance the overall experience for a crowd that has grown to 3 million visitors a year.

Historical Significance

The Santa Monica Pier, located on the site of the original Shoo Fly Landing and the succeeding 1875 Wharf, the Ocean terminus of the Los Angeles and Independence Railroad, has been a center of social and recreational activities since the 1890s. The Santa Monica Pier is listed in the National Register and is a designated National Historic Landmark. Further, it is a Los Angeles County and City of Santa Monica Landmark. Additionally, for the purposes of CEQA compliance, it is considered a historic resource.

Though not previously identified or surveyed, many of the individual buildings and related features located on the Pier contribute to its overall sense of historical importance and help define it as a social and recreational landmark in the City of Santa Monica. The principal historic element of the formerly extensive collection of amusement facilities at the Santa Monica (Looff) Amusement Pier, is the Looff Hippodrome, constructed in 1916 to shelter the carousel. Other buildings and features of the Pier include restaurants, concession stands, and amusement park rides of varying age and integrity. Many of these elements reflect a sense of cohesiveness and relationship to the Pier in their scale, massing, character, theme, materials, function, and design.

Impacts Assessment

The proposed project includes construction of an access ramp (or “gangway”) and floating barge to provide a means for evacuation from the western end of the Pier during an emergency as well as structural improvements to one portion of the Pier. The Pier, as well as construction of the gangway and floating barge to provide a means for evacuation from the western end of the Pier during an emergency. The gangway would be located on a section of the Pier reconstructed after the 1983 storms and therefore does not alter original fabric. However, historically compatible handrails and decking would be removed as part of the construction of the new gangway and floating barge and therefore could result in a negative impact to the historic character of the pier. In addition, the new gangway and floating barge are considered additions to the pier and must be compatible in design to the historic pier. If the design of the new gangway and floating barge are not compatible in design to the historic pier, their construction could result in a negative impact to the historic character of the pier. However, after implementation and completion of Mitigation Measure VI-1 below, the potentially significant impacts of the proposed project on the historic Santa Monica Pier would be minimized and reduced to a less than significant level.

The structural upgrades include the removal of wood piles and replacing them with concrete piles. The Pier was originally constructed with concrete piles which were removed and replaced with wood piles in 1920. After the 1983 storms, concrete piles were reinserted into areas of the Pier that failed during the storm. Thus, the structural history of the Pier includes both wood and concrete piles. The Pier piles are character-defining features of the historic Pier. However, the ongoing replacement and repair on an as needed basis, and the historic use of both concrete and wood piles, makes both new wood or concrete piles compatible to the character of the historic Pier. The new concrete pile layout is spaced roughly the same as the existing wood piles, and therefore does not add a new visual appearance to the spacing of the Pier piles from the beach. However, historic and historically compatible handrails and decking would be removed as part of the construction of the new piles and therefore could result in a negative impact to the historic character of the pier.

Construction activities would involve the use of pile driving equipment for the installation of the new concrete piles for the affected Pier section. Pile driving generates vibrations that, if substantial enough, could result in structural effects on nearby buildings. Given the presence of historic resources, including historic buildings, in the project area and on the Pier itself, construction-related vibration could potentially adversely affect historic resources on the Pier. However, as discussed in greater detail below in Section XIV, Noise, construction-related vibration attenuates (decreases) very quickly as one moves away from the source (i.e., within 100 feet). Pile driving activities would be limited to the structural upgrade portion of the project site and off-site temporary trestle to the north of the Pier, which is at least 100 feet away from any historic structures. Additionally, vibration does not travel efficiently in low-density geologic units such as sand, which would further reduce the potential for vibration effects. Given the localized nature of vibration effects, the low density of on-site soils, and distance of pile driving activities from identified historic resources, construction-related vibration impacts to historic resources would be less than significant.

Mitigation Measures:

The following mitigation measure is recommended to reduce the level of potential impacts by providing greater clarity and specificity concerning preservation treatment in the final project plans to ensure compliance with the Secretary of the Interior's Standards:

VI-1 The project shall conform to the Secretary of the Interior's Standards by providing appropriate preservation treatments of retained historic building fabric and features (historic fabric), historically compatible new design and construction components, compatible in-kind replacement of removed historic features. The project applicant shall engage a qualified historic preservation consultant to review the proposed project. A qualified architectural historian, historic architect, or historic preservation professional is someone who satisfies the *Secretary of the Interior's Professional Qualification Standards for History, Architectural History, or Architecture,* pursuant to 36 CFR 61, and has at least 10 years experience in reviewing architectural plans for conformance to the *Secretary's Standards and Guidelines*. The project applicant shall undertake and complete construction in a manner consistent with the preservation consultant's recommendations to ensure that the project meets the *Secretary of the Interior's Standards* for rehabilitation. The preservation consultant shall review the final construction drawings for conformance to the *Secretary of the Interior's Standards* and prepare a memo commenting on the final project. A project that conforms to the Secretary of the Interior's Standards is considered fully mitigated under CEQA.

a) **Less Than Significant Impact With Mitigation.** As noted previously, the proposed improvements would be carried out entirely within the footprint of the existing Pier, with the exception of the temporary trestle that would be constructed adjacent to the Pier on the north side. Ground disturbance activities would be limited to the removal of existing wooden Pier piles, installation removal of temporary steel piles for the trestle, installation of permanent concrete piles for the Pier structural upgrades, and installation of anchors for the floating dock. Such activities would be temporary and would cease upon completion of construction. While removal and installation of piles and anchors would result in ground disturbance under and around the Pier, all ground disturbance would occur within off-shore seabed and near-shore beach sand deposits, which are subject to ocean currents and wave action, and therefore have little potential to contain significant archaeological resources. Specifically, as noted in the Geotechnical Investigation performed for the proposed project by URS Corporation (URS) in August 2010 (included as Appendix D of this Initial Study), the project site soils consist of about 35 feet of dense sands to silty sands with more gravelly materials at the lower 10 to 20 feet of the layer; stiff to very stiff silts and sandy silts with occasional clayey seams underlie the upper sandy layers to the maximum explored depths of approximately 100 feet. Although coastal areas of southern California typically have a high potential for the presence of archaeological resources, the unstable nature of beach and seafloor sand and silt deposits would limit the potential for the presence of buried resources within the project site. However, there is still the potential that proposed construction activities would encounter buried archaeological resources because previously identified archaeological resources may be present along the shoreline within the project site or because the shifting sand and seabed of the shoreline may move archaeological resources into the project site, and therefore impacts are considered potentially significant. However, mitigation measures are provided below to address impacts to archaeological resources. With implementation of applicable mitigation, impacts would be less than significant.

Mitigation Measures:

VI-2 If archaeological resources are encountered during implementation of the project, ground-disturbing activities shall temporarily be redirected from the vicinity of the find. The City shall immediately notify a qualified archaeologist of the find. The archaeologist shall coordinate with the City as to the immediate treatment of the find until a proper site visit and evaluation is made by the archaeologist. The archaeologist shall be allowed to make an evaluation of the find and determine appropriate treatment that may include the development and implementation of a data recovery investigation or preservation in place. All cultural resources recovered will be documented on California Department of Parks and Recreation Site Forms to be filed with the CHRIS-SCCIC. The archaeologist shall prepare a final report about the find to be filed with the City and the CHRIS-SCCIC. The report shall include documentation and interpretation of resources recovered including full evaluation of the eligibility with respect to the National Register of Historic Places and California Register of Historical Resources and CEQA. The City shall designate repositories in the event that resources are recovered. The archaeologist shall also determine the need for archaeological monitoring for any additional ground-disturbing activities in the area of the find thereafter.

b) **Less Than Significant Impact.** As discussed previously, the soils beneath the project site are composed of thick layers of sand and silt, which have a very low potential to contain fossil resources. While fossils can be found outside the rock formations in which they were formed (i.e., fossil-bearing rocks are eroded and fossils are deposited in other soil media), the potential for significant fossil resources to be located within the sandy layers beneath the project site is considered very low. As such, given the remote potential for encountering or adversely affecting paleontological resources, impacts in this regard would be less than significant.

c) **Less Than Significant Impact With Mitigation.** As noted previously for archaeological resources, although coastal areas of southern California typically have a high potential for the presence of archaeological resources (including human remains), the unstable nature of beach and seafloor sand and silt deposits would limit the potential for the presence of buried resources within the project site. However, there is still the potential that proposed construction activities could encounter buried human remains during pile removal and installation. As such, this impact is considered potentially significant; however, mitigation measures are provided below to address potential adverse effects. With implementation of applicable mitigation, impacts would be less than significant.

Mitigation Measures:

VI-3 If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains. The City shall then under take additional steps as necessary in accordance with CEQA *Guidelines* Section 15064.5(e) and Assembly Bill 2641.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death, involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent 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.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

The following analysis of impacts related to geology and soils is based, in part, on information and conclusions contained in the project-specific geotechnical report prepared for the proposed project by URS Corporation in August 2010. The Geotechnical Report is included as Appendix D of this Initial Study.

a) i) **No Impact.** The project site is located in a seismically active area, as is the case throughout the Southern California region. Major faults and fault zones characterize the region. Fault rupture occurs when movement on a fault deep within the earth breaks through to the surface. Based on criteria established by the California Geological Survey (CGS), faults can be classified as active, potentially active, or inactive. Active faults are those having historically produced earthquakes or shown evidence of movement within the past 11,000 years (during the Holocene Epoch).

The project site is not located within a designated Alquist-Priolo Earthquake Fault Zone or City of Santa Monica Fault Hazard Management Zone. [29,30] The closest faults are the Santa Monica-Hollywood Fault (located approximately 1.7 miles north of the project site), the Malibu Coast Fault (located approximately 2.5 miles west of the project site), the Newport-Inglewood Fault (located approximately 6.8 miles east of the project site, and the Palos Verdes Fault (located approximately 6.0 miles southwest of the project site. Nonetheless, as no active or potentially active faults cross the project site, there would be no potential for surface fault rupture and therefore no impact would result from the proposed project.

ii) **Less Than Significant Impact.** As stated above, the project sites are located within the seismically active southern California region. The closest fault to the project site is the Santa Monica-Hollywood Fault, which is located approximately 1.7 mile north of the project site. During an earthquake, this or other faults could produce moderate to strong seismic ground shaking at the project site. As with any new construction in the State of California, design and construction techniques for the project would be required to conform to the current seismic design provisions of the CBC (as amended by Santa Monica Building Code). The 2007 CBC incorporates the latest seismic design standards for structural loads and materials to provide for the latest in earthquake safety. Furthermore, the operation of the Pier following construction would be similar to existing conditions, as no increase intensity or use would result from the proposed improvements, and therefore the proposed project would not increase risks to people or structures related to seismic ground shaking. Overall, given compliance with regulatory requirements, impacts associated with seismic ground shaking would be less than significant.

iii) **Less Than Significant Impact.** Depending on the levels of ground shaking, groundwater conditions, the relative density of soils, and the age of the geologic units in the area, the potential for liquefaction may vary in the City of Santa Monica. Seismic-related ground failure, including liquefaction, occurs when a saturated, granular deposit of low relative density is subject to extreme shaking and loses strength or stiffness due to increased pore water pressure. The consequences of liquefaction are expected to be predominantly characterized by the uneven settlement or uplift of structures, and increase in the lateral pressure on buried structures. The project site would improve portions of the Santa Monica Pier, which extends outward from the beach at an elevation of approximately 35 feet of sea level. The supporting piles would be driven into the beach and seabed below the Pier to a depth of approximately 30 feet below the seafloor. Given the presence of shallow groundwater and loose, granular soils (i.e., sand), the project site is identified as having a high liquefaction risk.[31] The proposed Pier improvements would be designed and constructed to meet applicable seismic safety standards, as previously indicated, and given the depth of the proposed piles, and relatively light load of the undeveloped

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29 *State of California Department of Conservation. Alquist-Priolo Earthquake Fault Zone Map: Beverly Hills Quadrangle, 1986. Available at: http://www.quake.ca.gov/gmaps/ap/ap_maps.htm. Accessed February 16, 2010.*

30 *City of Santa Monica Department of Building and Safety. Guidelines for Geotechnical Reports, Version 1.5. May 2008.*

31 *City of Santa Monica, Final Santa Monica Hazard Mitigation Plan. Map 2.3: Faults, Liquefaction Zones in Santa Monica. October 2007.*

Pier deck, notable adverse impacts related to liquefaction are not anticipated. Therefore, the project would result in less than significant impacts with respect to seismic-related ground failure, including liquefaction.

iv.) **Less Than Significant Impact.** The California Geological Survey (CGS) has designated certain areas within California as having the potential for earthquake-induced landsliding. These are areas where previous occurrence of landslide movement, or local topographic, geologic, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement during a seismic event. The project site is located on the beach at the base of the Santa Monica Palisades Bluffs, a sheer cliff of fragile sandstone that rises approximately 100 feet above the coast. While the Palisades Bluffs are designated as being at high risk for landslide susceptibility, the beach on which the existing Pier is located is not designated as having a high landslide susceptibility given the gently sloping nature of the ground surface. If landslides were to occur on the bluffs to the north, it is unlikely that they would be extensive enough to affect the Pier structure given the distance of the Pier from the bluffs. Additionally, with regard to seismically induced submarine landslides, according to the Geotechnical Report (Appendix D of this Initial Study), the portion of the site below water is characterized by a gently sloping gradient; therefore, the potential hazard of seismically induced submarine landsliding at the site is considered to be low. Therefore, impacts regarding landslides would be less than significant.

b) **Less Than Significant Impact.** The construction and operation of the proposed project would occur on the Pier deck, the Santa Monica beach, and seabed just offshore of the beach. The Pier deck and beach contain no topsoil that could be eroded by the proposed project. Given that the seabed is below the water surface, there no potential for runoff or wind to result in soil erosion. In addition, the existing Pier structure, piles, and bents currently do not form an impervious surface over soils. The proposed project would involve negligible excavation and grading, as the Phase 4 structural upgrades would be constructed using pile casings driven into the existing sea floor. Nonetheless, the project would implement the City's required erosion controls and best management practices during construction, as outlined in Section 7.10 of the SMMC. These controls and practices could include silt fencing, covering any exposed sediment, and removing any sediment tracked onto or off of the project site. Regarding project operations, the project would not introduce any new uses that have the potential to increase soil erosion. All new structural components would be located within the shallow off-shore waters in the Santa Monica Bay. Therefore, with compliance with regulatory requirements, project construction and operation would result in less than significant impacts with respect to soil erosion.

c) **Less Than Significant Impact.** As the project would be constructed in shallow waters, no unusual water extractions or other practices would occur with the project that are typically associated with subsidence effects. The ground surface conditions at the site slope are offshore and slope slightly downward into the Pacific. The project site is located on a geologic unit that is considered unstable (beach sand), but the Pier structure is supported completely on submerged piles. The emergency gangway and floating dock would not involve notable load-bearing structural elements, and therefore no impacts related to this improvement would occur. The proposed structural upgrades would involve the installation of reinforced concrete piles driven to a depth of approximately 30 feet below the seafloor to support the relatively minor structural load of the affected Pier section (i.e., this section does not support buildings, amusement park attractions, or other heavy structures or equipment), which would minimize seismic hazards related to lateral spreading, liquefaction, or collapse. As indicated in Response VII.a., above, the proposed structural upgrades would be constructed within the same footprint as the existing Pier structure, and would be designed and constructed to meet applicable seismic safety standards. As further indicated in Response VII.a, there is less than significant landslide potential at the project site due to the distance of the Palisades Bluffs from the project site. Therefore, construction and operation of the proposed project would not be expected to cause the local geologic units or soil to become unstable, or result in on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse. Impacts would be less than significant in this regard.

d) **No Impact.** Expansive soils are defined as fine-grained clayey soils that have the potential to shrink and swell with repeated cycles of wetting and drying. As previously indicated, all improvements would occur on the beach and shallow off-shore seafloor composed entirely of sand, which does not exhibit shrink-swell potential or associated hazards. Furthermore, the project would be designed in accordance with all CBC requirements, as amended by the Santa Monica Building Code. Therefore there would be no risk to life or property associated with expansive soils and no impact would occur in this regard.

e) **No Impact.** The proposed improvements would improve the structural stability of the Pier structure and provide a means of evacuation in the event of an emergency, and would not generate any wastewater or require additional wastewater disposal systems. Thus, the project would not result in impacts related to the ability of soils to support septic tanks or alternative wastewater disposal systems.

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

a) **Less than Significant Impact.** Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation and storms. Historical records indicate that global climate changes have occurred in the past due to natural phenomena; however some data indicate that the current global conditions differ from past climate changes in rate and magnitude; thus, the current changes in global climate have been attributed to anthropogenic activities by the Intergovernmental Panel on Climate Change (IPCC).

GHGs include carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor (H_2O), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). CO_2 is the most abundant GHG in the atmosphere, and represents 77 percent of total GHG emissions. GHGs are the result of both natural and anthropogenic activities. Forest fires, decomposition, industrial processes, landfills, and consumption of fossil fuels for power generation, transportation, heating, and cooking are the primary sources of GHG emissions. In the state of California, the transportation sector is the greatest source of GHG emissions, accounting for 38 percent of total GHG emissions in 2004, the latest year for which data are available.

Not all GHGs exhibit the same ability to induce climate change; as a result, GHG contributions are commonly quantified in the equivalent mass of CO_2, denoted as CO_2e. CO_2e allows for comparability among GHGs with regard to the global warming potential (GWP). Mass emissions are calculated by converting pollutant specific emissions to CO_2e emissions by applying the proper global warming potential (GWP) value. These GWP ratios are available from the United States Environmental Protection Agency (USEPA) and published in the California Climate Action Registry (CCAR) Protocol. By applying the GWP ratios, project related CO_2e emissions can be tabulated in metric tons per year. The CO_2e values are calculated for the entire construction period. Construction output values used in this analysis are adjusted to represent a CO_2e value representative of CO_2, CH_4, and N_2O emissions from project construction activities. HFCs, PFCs, and SF_6 are not byproducts of combustion, the primary source of construction-related GHG emissions, and therefore are not included in the analysis. Construction CH_4 and N_2O values are derived from factors published in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. These values are then converted to metric tons of CO_2e for consistency.

Section 15064.4 of the CEQA *Guidelines* states "…[a] lead agency shall have discretion to determine, in the context of a particular project, whether to: (1) [u]se a model or methodology to quantify greenhouse gas emissions resulting from a project….; or (2) [r]ely on a qualitative analysis or performance based standards." It was determined that for the proposed project, a quantitative analysis was most appropriate.

Significance Threshold

Section 15064.7 of the CEQA *Guidelines* defines a threshold of significance as an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. CEQA gives wide latitude to lead agencies in determining what impacts are significant and does not prescribe thresholds of significance, analytical methodologies, or specific mitigation measures. CEQA leaves the determination of significance to the reasonable discretion of the lead agency and encourages lead agencies to develop and publish thresholds of significance to use in determining the significance of environmental effects. Section 15064.7(c) also states "when adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies…". The California Air Pollution Control Officers Association (CAPCOA) released a white paper, entitled *CEQA and Climate Change*, in January 2008. The white paper examines various threshold approaches available to air districts and lead agencies for determining whether GHG emissions are significant, including a number of "non-zero" thresholds for residential and commercial projects.

The City of Santa Monica, as the lead agency, has selected a dual threshold methodology that considers both quantitative and qualitative assessments. The City determined that the 10,000 metric tons CO_2e/year threshold (the second lowest non-zero threshold proposed by CAPCOA) is the appropriate a quantitative benchmark to determine significance of projects such as the proposed project. In addition to this quantitative threshold, for projects below 10,000 metric tons CO_2e/year threshold, the proposed project must also demonstrate consistency with the California Environmental Protection Agency's (CalEPA) GHG emissions reduction strategies prepared by CalEPA's Climate Action Team (CAT). The CAT strategies are recommended to reduce GHG emissions at a statewide level to meet the goals of the Executive Order S-3-05. Consistency with this qualitative criterion will be discussed under Checklist question "b" below.

GHG Emission Impacts

Project-Level Impacts

Construction. Construction of the proposed project will last up to approximately twelve months (with one additional month for temporary trestle removal) and is anticipated to begin in early Fall 2011. Emissions from fossil fuel powered on-site construction equipment and off-site vehicles used to transport construction workers and supplies were calculated.

To be consistent with guidance from the SCAQMD for calculating criteria pollutants from construction activities, GHG emissions from on-site construction activities and off-site hauling and construction worker commuting are considered as project-generated. Construction of the project is estimated to emit a total of 360 tons of CO_2e over the twelve months of construction and one month of temporary trestle removal. Results of this analysis are presented in **Table 3**, *Construction Greenhouse Gas Emissions*. Annual emissions are less than the 10,000 metric ton threshold established by the City of Santa Monica.

Table 3

Construction Greenhouse Gas Emissions

Emission Source	CO_2e (Metric Tons)
Pier Construction	
Calendar Year 2011	193
Calendar Year 2012	167
Construction Total (annual)	360
Exceeds 10,000 tons/year CO_2e **Threshold?**	**No**

Source: PCR Services Corporation, 2011.

Operation. The project consists of an emergency gangway and structural upgrades. The Project serves to improve existing infrastructure, increase safety, require less maintenance, and would not contain on-site stationary combustion equipment. During operation, the proposed project improvements would therefore not result in an increase in GHG emissions. The proposed project would not result in new long-term stationary sources or additional vehicular trips and thus would not generate new or additional GHG emissions.

As such, total net GHG emissions would fall below the City's threshold of 10,000 metric tons CO_2e.

b) **No Impact.**

Significance Threshold

There exist a number of plans and policies designed to reduce GHG emissions potentially applicable to the proposed project. The California Global Warming Solutions Act of 2006 (also known as Assembly Bill, AB, 32) commits the State to achieving 2000 GHG emission levels by 2010, which represents an approximately 11 percent reduction from business as usual (BAU), 1990 levels by 2020, approximately 30 percent below BAU, and 80 percent carbon emission reductions by 2050 across all sectors of the economy. California Senate Bill 375 (SB375), which was signed by the Governor on September 30, 2008, links regional planning for housing and transportation with the greenhouse gas reduction goals outlined in AB 32. Under the bill, each Metropolitan Planning Organization (MPO) is required to adopt a sustainable community strategy to encourage compact development so that the region will meet a target, created by CARB, for reducing GHG emissions.

The City of Santa Monica has developed a Sustainable City Progress Report to measure their performance in achieving goals set forth in the City's Sustainable City Plan (revised 2006). The Progress Report uses a range of indicators to measure the City's progress toward a more sustainable city. Building upon the Sustainable City Plan, the City recently adopted the Land Use and Circulation Element (LUCE) which creates the framework to achieve the Sustainable City Plan targets through an integrated land use and transportation network. The LUCE also contains specific policies designed to meet or exceed the State's goals of reducing GHG emissions, as promulgated in AB 32 and SB 375. Some goals of the LUCE include reducing GHGs from privately and publicly-operated sources, including reducing emissions from municipal sources, facilitating expansion of public transit, reducing overall energy use through increased efficiency, increasing the use of renewable energy, reducing water consumption and solid waste generated, and preparing a Climate Action Plan (CAP) to determine the City's approach to reducing GHG emissions.

The CAT strategies are recommended to reduce GHG emissions at a statewide level to meet the goals of the Executive Order S-3-05, whereby emissions targets are set for the State through the year 2050, a date beyond AB 32's mandates. The CAT published its report in March 2006, which includes voluntary recommendations and strategies such as diesel anti-idling regulations, GHG Vehicle Standards (AB 1493), zero waste/high recycling programs, appliance efficiency standards, as well as Green Building initiatives. All of which are currently being implemented by local jurisdictions to reach the targets established in the executive order.[32]

The City has established consistency with the CAT recommendations as a part of the dual threshold for determining significance of impacts under CEQA. In addition, consistency with other potentially applicable measures, such as those contained in the *Global Warming Measures* (2008) and the CAPCOA and OPR's released white paper, *CEQA and Climate Change* (2008) will be assessed. Therefore, if a project is consistent with applicable local and State policies and regulations aimed at reducing GHG emissions, its impacts will be less than significant.

Impact Analysis

As shown on Table 3 above, construction results in a temporary increase in GHG emissions. However, post-construction operation is not expected to result in any practical change in operations as compared to current use. Therefore, the policies and regulations listed on Table 4 are applicable primarily to construction activities. If a policy or regulation is not listed, it was determined not to apply.

Table 4

Project's Consistency with Applicable Policies and Regulations

Strategies for Reducing GHG Emissions	Project Conformance
CAT Recommendations[1]	
Diesel Anti-Idling Reduce GHG emissions from diesel-fueled commercial motor vehicle idling, by reducing idling times and electrifying truck stops.	Signs will be posted throughout the construction site to state that all construction vehicles would be prohibited from idling in excess of five minutes, both on- and off-site.

[32] http://www.climatechange.ca.gov/publications/factsheets/2005-06_GHG_STRATEGIES_FS.PDF

Table 4

Project's Consistency with Applicable Policies and Regulations

Strategies for Reducing GHG Emissions	Project Conformance
Achieve 50 percent Statewide Recycling Goal	
Achieve California's 50 percent waste diversion mandate (AB 939, Integrated Waste Management Act of 1989) to reduce GHG emissions associated with virgin material extraction. AB 939 required each city or county plan to include an implementation schedule that showed 50 percent diversion of all solid waste by January 1, 2000, through source reduction, recycling, and composting.	The project would divert at least 50 percent of construction waste from disposal.
Santa Monica LUCE Goals[2]	
Goal S7: Reduce the carbon footprint of the City's municipal operations.	The project would reduce on-going regular maintenance efforts of the pier through the use of more durable building materials, thereby reducing the City's GHG emissions resulting from long-term municipal operations.

1. CAT Report: http://www.climatechange.ca.gov/publications/cat/index.html

2. Santa Monica Land Use and Circulation Element (LUCE); Chapter 3.1 Sustainability and Climate Change, 2010

Source: PCR Services Corporation, 2011.

As shown on Table 4, construction equipment used for the project would comply with the CAT recommendation to limit idling of diesel-fueled vehicles and would divert at least 50 percent of construction waste from disposal. Structural improvements and upgrades provide for efficiency and durability over time, thus decreasing need for maintenance and repairs, thereby reducing GHG emissions resulting from municipal maintenance operations.

Because the State's CAT recommended strategies and the City's LUCE encourages the reduction of GHG emissions from new projects and existing operations, it is supportive of the goals of AB32. As shown on Table 4, the project is consistent with the identified applicable policies. The proposed project is therefore supportive of local and State goals regarding global climate change (Santa Monica LUCE, AB 32, CAT Report) and does not conflict with any identified applicable plan, policy, or regulation for reducing GHG emissions. Therefore, no impacts are anticipated, and no mitigation measures are necessary.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☒
e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) 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?	☐	☐	☐	☒
g) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

a) **Less Than Significant Impact.** Project construction activities would result in a temporary increase in the use of typical construction materials, including concrete, hydraulic fluids, paints, cleaning materials, and vehicle fuels. The use of these materials during project construction would be short-term in nature and would occur in accordance with standard construction practices, as well as with all applicable federal, State, and local regulations. Construction activities would, therefore, not create a hazard to the public or environment through the routine transport, use, or disposal of hazardous materials and impacts would less than significant.

The proposed project would not result in a change of use at the project site. As a result, the types of hazardous materials associated with operation of the proposed project include those already in use on the affected portion of the Pier. As the affected portion of the Pier would not include any commercial or recreational uses, any use of hazardous materials used would be limited to those typical in the maintenance of the Pier (e.g., cleaning solvents, small quantities of paint, pesticides). These materials would be stored in small quantities in existing storage areas on or near the Pier. All potentially hazardous materials would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations. With compliance with existing federal, State, and local regulations, the transport, use, and storage of these materials would not pose a significant hazard to the public or the environment and the proposed project would result in a less than significant impact.

b) **Less Than Significant Impact With Mitigation.** Project construction activities would use standard construction materials, including paints, cleaning materials, and vehicle fuels. The use of these materials would be short-term in nature and would occur in accordance with standard construction practices. Hazardous materials may be present the existing Pier structure due to the structure's age. Hazardous substances potentially present on the Pier structure include asbestos-containing materials and/or lead-based paint, as well as preservatives (e.g., creosote, arsenic, pentachlorophenol) used to treat the existing timber piles. Exposure of construction workers to these materials would be considered a potentially significant impact. However, mitigation measures provided below would require that prior to demolition activities associated with the proposed project, the City would be required to conduct surveys of all buildings and Pier structural elements to verify the presence or absence of any of these materials and conduct remediation or abatement in accordance with all applicable regulations and standards before any disturbance occurs. If the timber piles and bents are found to contain harmful levels of preservatives, the structural features would be treated in accordance all applicable regulations, including the use of protective equipment on workers and the disposal of the affected timber in a Class I, II, or III solid waste disposal facility. Therefore, with implementation of applicable mitigation measures, a less than significant impact associated with exposure to these materials would occur during construction.

Regarding proposed project operations, as mentioned above, the types of hazardous materials associated with operation of the proposed project include those already in use on the affected portion of the Pier and would be limited to small quantities of commercially available hazardous materials. All potentially hazardous materials would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations. With compliance with existing local, State, and Federal regulations, as well as all manufacturers' recommendations, these materials would not create a significant hazard to the public or the environment.

Overall, impacts regarding the release of hazardous materials during both construction and operation of the proposed project would be less than significant.

Mitigation Measures:

IX-1 Prior to demolition activities, the City shall conduct surveys of all buildings and Pier structural elements to verify the presence or absence of asbestos-containing materials and lead-based paint, as well as conduct remediation or abatement in accordance with all applicable regulations and standards before any disturbance occurs. If the timber piles and bents are found to contain harmful levels of preservatives, the structural features shall be treated in accordance all applicable regulations, including the use of protective equipment on workers and the disposal of the affected timber in a Class I, II, or III solid waste disposal facility.

c) **No Impact.** As discussed above in Section III, Air Quality, construction of the proposed project would involve the use of diesel construction equipment, but none of these emissions would be generated at levels that are considered hazardous. The proposed project would also require the use of other construction-related materials (e.g., hydraulic fluid, fuel, cleaners). However, all such materials, as well as construction debris/waste, would be used and handled in accordance with applicable codes and regulations. Such materials are not expected to include acutely hazardous materials, substances, or waste. In addition, no schools are located within one-quarter mile of the Pier or proposed staging area. As noted previously, operation of the proposed project would not result in the release of hazardous emissions or materials. Therefore, no impacts associated with the emission of hazardous materials near an existing or proposed school would result from the proposed project.

d) **No Impact.** The project site is developed with the existing Pier structure, and is not listed in government databases compiled pursuant to Government Code Section 65962.5. One listed site is located within ½-mile of the project site, the former Sears Auto Center #6081. The former Sears Auto Center is listed for potentially affecting groundwater with contaminants of concern. Nevertheless, the site is currently undergoing a voluntary cleanup program under the oversight of the Los Angeles Regional Water Quality Control Board (RWQCB). Regulation by RWQCB, among other agencies, requires remediation of existing groundwater contamination and generally precludes the potential for adverse health effects through containment of contaminated materials, removal or treatment of materials, and/or exclusion of individuals from areas with contamination on-site. In addition, given the relatively large distance between the former auto center and the project site, and the fact that it is undergoing voluntary remediation, the identified site is not anticipated to affect the proposed project. As a result, the proposed project would result in no impacts with respect to listed hazardous materials sites.

e) **No Impact.** The closest airport to the project site is the Santa Monica Municipal Airport, which is located approximately 2.25 miles west of the Pier and operates small- to mid-sized commercial and private aircraft. Although the airport is relatively close vicinity to the project site, the proposed project would not increase the height of any of the Pier's structures, which are all currently below the elevation of the airport. Additionally, the project site is not located within the boundaries of the Santa Monica Airport Land Use Plan or Airport Influence Area.[33] As such, because the proposed project does not involve placing people in proximity to aircraft operations, no risks to life or property from airport operations could occur as a result of the proposed project. Therefore, no impacts would occur in this regard.

f) **No Impact.** The project is not located within two miles of a private airstrip. As discussed above, the closest airport to the project site is the Santa Monica Municipal Airport, which is located approximately 2.25 miles west of the Pier. However, the proposed project would not

[33] *Los Angeles County Airport Land Use Commission. Los Angeles County Airport Land Use Plan. Airport Influence Area–Santa Monica Airport. May 2003.*

increase the height of any of the Pier's structures, which are all currently below the elevation of the airport. The construction and operation of the proposed Pier improvements would not result in any impacts related to aircraft or airstrip operations in the area.

g) **Less Than Significant Impact.** The proposed project would not impair or physically interfere with an adopted emergency response plan or a local, state, or federal agency's emergency evacuation plan. The proposed project's construction and operation would not have a measurable impact on PCH, an identified emergency evacuation route. Additionally, access will be maintained for pedestrians and emergency vehicles throughout construction activities (per a Santa Monica Fire Department-required minimum 15-foot-wide unobstructed access along the entire length of the Pier). The proposed project would enhance the emergency evacuation of the Pier, as it would provide the emergency gangway and floating dock that would serve as an additional means of evacuation in an emergency. Therefore, the proposed project would not physically interfere with an adopted emergency response plan or emergency evacuation plan, and a less than significant impact would result.

h) **No Impact.** The project site is located above the ocean waters of the Santa Monica shoreline and is not subject to wildfires. Therefore, the proposed project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltuation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of a failure of a levee or dam?	☐	☐	☐	☒

		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
j)	Inundation by seiche, tsunami or mudflow?	☐	☐	☒	☐

a) **Less Than Significant Impact.** The Pier is located over the beach and shallow waters of the Santa Monica shoreline. As a result, all of the stormwater from the Pier flows directly into Santa Monica Bay, which is listed as an impaired water body by the Los Angeles RWQCB. Nonetheless, construction activities associated with the proposed Pier improvements have a limited potential to affect water quality within Santa Monica Bay. This is principally due to the fact that the project site is subject to the water quality requirements of the California Coastal Commission (CCC) and the RWQCB. Since the proposed improvements would take place in the coastal zone, the CCC has jurisdiction over the project and typically requires various permit conditions, including marine construction Best Management Practices (BMPs) that are protective of coastal water quality. The RWQCB is authorized to implement a municipal storm water permitting program as part of the National Pollutant Discharge Elimination System (NPDES) authority granted it under the federal Clean Water Act. The "Statewide General Construction Stormwater Permit," which is applicable to the proposed construction activities, addresses waste discharge requirements for storm water runoff associated with construction activities.

As a co-permittee to Municipal Storm Water NPDES Permit No. CAS004001 issued by the RWQCB, the City of Santa Monica is required to implement a Storm Water Pollution Prevention Plan (SWPPP) to minimize the incidence of construction-related pollutants entering the storm water system. Although a SWPPP by definition usually assumes groundbreaking activities (i.e., ground disturbance greater than one acre), anything that is related to construction, including material storage, demolition activities, and stockpiling are all covered under the SWPPP, which are unrelated to ground breaking activities. As such, while the proposed project does not involve substantial groundbreaking activities and it is not yet known whether or not the RWQCB will require that a SWPPP be prepared for the proposed improvements, if one is ultimately required, it would serve to further address construction-related water quality in addition to the CCC-required marine construction BMPs.

Several items are required in an SWPPP, including site maps showing drainage and discharge locations (if applicable) and the location of control measures, a description of the pollution prevention BMPs to be implemented on the site, BMP inspection procedures, and the requirements for storm water monitoring. The preparation and implementation of the SWPPP and implementation of CCC-required marine construction BMPs would effectively address control of pollutants from the construction activities. The SWPPP would establish effective BMPs, in addition to CCC-required BMPs, which would control pollutants during all stages of construction. Typical BMPs that would be considered in the project SWPPP to address construction activities would include, but not necessarily limited to, stabilized construction entry, designated wash area, conveyance controls, and filters. Compliance with these requirements would prevent violation of water quality standards and waste discharge requirements during project construction.

During operation, the improved Pier would operate passively, and would not result in or contribute to water quality violations, as the Pier would operate as it does under existing conditions. Additionally, any bird exclusion nets temporarily removed from the Pier structure during construction activities would be replaced following construction in order to maintain water quality by preventing large numbers of birds from contributing bird droppings to the water around the Pier. Overall, the construction and operation of the proposed project would result in less than significant water quality impacts.

b) **No Impact.** The project site is located above the beach and shallow waters of the Santa Monica shoreline. As a result, the majority of the project site is inundated with salt water and is not suitable for groundwater recharge. No dewatering would occur during proposed project construction or operation. Therefore, the proposed project would not contribute to the depletion of groundwater supplies, interfere substantially with groundwater recharge, or lower the level of the groundwater table. As such, no impacts to groundwater supply or recharge are expected.

c-d) **Less Than Significant Impact.** The proposed project would largely be constructed within the existing Pier structure. The one exception is the emergency gangway and barge adjacent to the south side of the Pier. This addition would slightly increase the overall surface area of the Pier. However, runoff from the existing southern fishing deck and Pier currently drains directly off the Pier structure and into the ocean and there is no potential for soil erosion. As a result, the proposed project would not alter the drainage pattern of the project site. Given the large volume of water in the Pacific Ocean, the negligible stormwater runoff from the Pier, which already flows into the ocean, would not result in an increase in sea level to the point where it would flood the coast line. Therefore, impacts would be less than significant.

e) **Less Than Significant Impact.** The Pier currently drains into the Pacific Ocean, and therefore construction of the proposed improvements could not exceed the capacity of existing or planned stormwater drainage systems. Additionally, as discussed above, construction activities would be carried out in accordance with a project-specific SWPPP (if required) and CCC-required marine construction BMPs, which would minimize the potential for construction activities to contribute substantial additional sources of polluted runoff to Santa Monica Bay. Operation of the proposed project would occur passively as under existing conditions and therefore would not create or contribute additional runoff or pollutant loads. Consequently, no impacts to stormwater systems from increased runoff volumes would occur, and impacts related to increased pollution in runoff due to construction or operation of the proposed project would be less than significant.

f) **Less Than Significant Impact.** As discussed above in Response X.a., the proposed project would comply with RWQCB requirements, including implementation of a SWPPP (if required) and CCC-required marine construction BMPs during construction activities, which would preclude substantial adverse water quality impacts. Once construction activities have been completed, the Pier improvements would operate passively as structural features and an as-needed emergency gangway and floating dock for emergency evacuations. Therefore, the operation of the proposed project would not result in any water quality impacts. As such, water quality impacts would be less than significant.

g-h) **No Impact.** The project would not include the development of housing or structures that could impede or redirect flood flows. Thus, no impacts would occur in these regards.

i) **No Impact.** The proposed project would improve public safety through structural upgrades and would not include the development of new structures that would be exposed to flooding impacts. The proposed improvements would be carried out within submerged portions of the Pier footprint and adjacent area to the north, as well as on a limited narrow strip of beach north of the Pier. The majority of project site is therefore submerged and the remaining portion is very well drained beach sand, which is not conducive to flooding. Given the coastal location of the project site and the nature of proposed improvements, no flooding impacts are anticipated.

j) **Less Than Significant Impact**. The following discusses potential inundation/flooding impacts of the proposed project relative to seiche, tsunami, and mudflow.

Seiche

A seiche is an oscillation of an enclosed or semi-enclosed basin, such as a reservoir, harbor, lake, or storage tank. Despite the oceanfront location, there are no large contained bodies of water near the project site, such as a lake or reservoir; thus, there would be no chance of seiche-related impacts.

Tsunamis

A tsunami is a great sea wave produced by a significant undersea disturbance. Given the proximity to the Pacific Ocean, the project site is susceptible to inundation by a tsunami. The City of Santa Monica Draft Natural Hazards Mitigation Plan[34] discusses the risks, effects, and response actions associated with tsunami events affecting the City, and serves as the basis for the following discussion of tsunami hazards.

Tsunami Hazard Identification

A tsunami threat to the City of Santa Monica is considered low to moderate. Santa Monica occupies a central position along the arching shoreline of Santa Monica Bay. The beach, which has grown through accretion, is several hundred feet wide—one of the widest stretches of beach in this part of southern California. Santa Monica sits atop a coastal plain that is defined on its northern boundary by Santa Monica Canyon. This deep arroyo attracted native American settlements and then the area's first European settlement in the 1860s—a summer colony for residents of the new City of Los Angeles some twelve miles inland along the foot of the mountains. South of the canyon, the rugged terrain gives way to the gently south sloping upland of the City's north side. The land descends to a historic drainage channel that ran west to the sea along the general line of the present-day Santa Monica freeway. This drainage formed a distinctive draw that originally marked the edge of the Palisades and defined the City's southerly border. It is this collision of this south sloping upland with the southwesterly trending coastline that creates the City's most memorable topographic feature—the Palisades—a sheer cliff of fragile sandstone that rises about 100 feet above the coast that separates the northern portion of the City from the beach below.

Damage Factors of Tsunamis

Tsunamis cause damage in three ways: inundation, wave impact on structures, and erosion.

> "Strong, tsunami-induced currents lead to the erosion of foundations and the collapse of bridges and sea walls. Flotation and drag forces move houses and overturn railroad cars. Considerable damage is caused by the resultant floating debris, including boats and cars that become dangerous projectiles that may

[34] *City of Santa Monica. Santa Monica Natural Hazards Mitigation Plan. Working Draft January 18, 2011.*

> crash into buildings, break power lines, and may start fires. Fires from damaged ships in ports or from ruptured coastal oil storage tanks and refinery facilities, can cause damage greater than that inflicted directly by the tsunami. Of increasing concern is the potential effect of tsunami draw down, when receding waters uncover cooling water intakes of nuclear power plants."

Tsunamis are not triggered by local earthquakes in the project area, but rather result from large off-shore earthquakes and ocean landslides. Dangerous tsunamis affecting the project area would most likely originate in the Aleutian and Chilean offshore submarine trenches. The City of Santa Monica has western-facing beaches that are vulnerable to tsunamis or tidal surges from the west.

Predicted wave heights, exclusive of tide and storm generated wave heights are:

- For a 100-year occurrence: 4.0 feet minimum, 6.6 feet average, and 9.2 feet maximum
- For a 500-year occurrence: 6.8 feet minimum, 11.4 feet average, and 16.0 feet maximum

According to the Modern Tsunami Run-up Map, the entire coastline of Santa Monica would be severely impacted. During the summer months, the City of Santa Monica can attract over 200,000 people a day to its beaches. If a tsunami were to occur it could devastate the entire coastal area. However, plans and procedures have been put in place to reduce the potential adverse effects of tsunamis on coastal areas, as discussed below.

Tsunami Watches and Warnings

Warning System

The tsunami warning system in the United States is a function of the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service. Development of the tsunami warning system was impelled by the disastrous waves generated in Alaska in April 1946, which surprised Hawaii and the U.S. West Coast, taking a heavy toll in life and property.

The disastrous 1964 tsunami resulted in the development of a regional warning system in Alaska. The Alaska Tsunami Warning Center is in Palmer, Alaska. This facility is the nerve center for an elaborate telemetry network of remote seismic stations in Alaska, Washington, California, Colorado, and other locations. Tidal data is also telemetered directly to the ATWC from eight Alaskan locations. Tidal data from Canada, Washington, Oregon, and California are available via telephone, teletype, and computer readout.

Watch vs. Warning

The National Warning System (NAWAS) is an integral part of the Alaska Tsunami Warning Center. Reports of major earthquakes occurring anywhere in the Pacific Basin that may generate seismic sea waves are transmitted to the Honolulu Observatory for evaluation. An Alaska Tsunami Warning Center is also in place for public notification of earthquakes in the Pacific Basin near Alaska, Canada, and Northern California. The Observatory Staff determines action to be taken and relays warnings over the NAWAS circuits to inform and warn West Coast states. The State NAWAS circuit is used to relay the information to the Orange County Operational Area warning center which will in turn relay the information to local warning points in coastal areas. The same information is also transmitted to local jurisdictions over appropriate radio systems, teletype, and telephone circuits to ensure maximum dissemination.

A Tsunami Watch Bulletin is issued if an earthquake has occurred in the Pacific Basin and could cause a tsunami. A Tsunami Warning Bulletin is issued when an earthquake has occurred and a tsunami is spreading across the Pacific Ocean. When a threat no longer exists, a Cancellation Bulletin is issued.

When there is a high probability that a tsunami will reach City of Santa Monica, the City would activate its Warning Siren System. When activated, the sirens alert the public to turn on their AM/FM radio and listen to the Emergency Alerting System (EAS). The City Public Information Officer would activate EAS and provide them with a prepared statement of who should evacuate, where to evacuate to and what routes to take.

Evacuation

Upon receipt of a Tsunami Watch/Warning Bulletin, an immediate evaluation will be made of the potential threat to the coastal areas of the City of Santa Monica. After a thorough evaluation, a determination would be made as to the degree of evacuation necessary to eliminate any threats to the resident and visiting populations.

Once the degree of evacuation has been determined, the Police Department would begin an immediate evacuation of the low-lying areas that have been determined to be at risk. Officers would block all movements on Pacific Coast Highway except those necessary to gain access to the nearest arterial highway leading away from the ocean. The population would be directed inland using the closest available northbound or eastbound arterial highway, as it is imperative that the evacuation routes be kept open and clear at all times.

Impact Conclusion

As discussed above, while the project site is located along the coastline of the Pacific Ocean, which is susceptible to tsunamis from off-shore earthquakes and landslides, the City has a number of plans and procedures in place that address the hazards associated with such events. Such existing measures include the City's Warning Siren System, the Public Information Plan for Emergency Alerting System (EAS), and ongoing Disaster Preparedness Public Education. Given the City's coordinated efforts to plan for and provide measures to minimize hazards associated with tsunami events, impacts related to tsunamis are considered less than significant.

Mudflows

Mudflows result from the downslope movement of soil and/or rock under the influence of gravity. Surrounding sloped areas, including bluffs to the north of the project site, may have previous histories with mudflows and slope failures, but this potential would not be exacerbated by the proposed Pier improvements in this area, given the distance of the Pier structure from the slopes. Thus, the project would have no impacts with regard to mudflows.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☒	☐	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a) **No Impact.** Construction impacts from the proposed project would be short-term and would be confined to the Pier and temporary trestle. Though the construction would occur adjacent to an established community, the proposed project would not physically divide the community because the proposed improvements would occur within the existing Pier footprint (and adjacent beach/off-shore area for trestle access during construction). Since the Pier would continue to operate passively as it does under existing conditions, and the proposed improvements would be limited to the existing Pier structure, the proposed project would not physically divide the community. No impacts are expected and no mitigation is required.

b) **Less Than Significant Impact With Mitigation.** According to the City's General Plan Land Use and Circulation Element (LUCE) the project site is located within the Beach and Oceanfront District, and per the Santa Monica Municipal Code (SMMC), is zoned Residential-Visitor Commercial (RVC). The proposed project does not propose changes to the existing land use or zoning designations, or changes in the operation of existing Pier-related uses. Further, the project would not involve development of new structures or active land uses that could conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project.

The project site is within the jurisdictional boundaries of the Local Coastal Program (LCP) of the City of Santa Monica. The LCP was formulated to implement, at the local level, the California Coastal Act. The LCP has two components, the Land Use Plan (LUP) and the Implementation Plan. The California Coastal Commission certified the City's LUP in 1992 except for those policies and recommendations that affect the area of the Coastal Zone west of the centerline of Ocean Avenue (with the exception of the Santa Monica Pier). The Santa Monica Pier is located within Subarea 2, and its designation is Residential-Visitor-Commercial (RVC). The following policies pertain to Subarea 2 (Santa Monica Pier):

59. Uses on the Santa Monica Pier platform shall include amusements, visitor serving uses, fishing, public areas, facilities for administration of the Pier and adjacent water area, cultural or visitor information uses, public parking and bed and breakfast uses above the ground floor. New development on the platform of the

Pier added after the effective date of Proposition S shall not exceed 140,000 square feet. Lighting associated with development on the Pier shall be designed to minimize impacts to surrounding residential uses. No residential uses shall be permitted on the platform of the Pier.

60. Building height shall not exceed 2 stories 30 feet and the floor area ratio (FAR) shall not exceed 1.0. Amusement rides shall not exceed a height of 115 feet above the Pier deck.

61. A 20-foot access land open to the public shall be provided around the perimeter of the Pier.

The proposed project would be consistent with the goals of the LCP. For instance, the proposed project would not alter existing uses or propose new uses (including residential uses) on the Pier platform. In addition, the proposed project would not alter any building heights. Further, lighting on the Pier would remain unchanged from existing conditions. Construction of the project may require temporary staging and stockpiling on the beach north of the Pier structure. This could result in a potentially significant impact if the staging were to reduce pedestrian access to a width of less than 20 feet on the north side of the Pier. To ensure that an acceptable pedestrian is maintained, Mitigation Measure XI-1 is proposed below, which requires the staging and stockpiling area to provide a 20-foot-wide buffer around the Pier's perimeter. Therefore, with the implementation of the below mitigation measure, impacts would be less than significant in this regard.

Mitigation Measures:

XI-1 If a staging and/or stockpiling area is required on the beach north of the Pier structure, the area shall be located as to maintain a minimum 20-foot-wide access buffer around the perimeter of the Pier.

c) **Less Than Significant Impact.** As discussed previously under Response IV.f, the project site is located partially within the waters of the Pacific Ocean, the affected portion of which is under subject to the requirements of the Pacific Groundfish Fishery Management Plan (FMP) and the Coastal Pelagic FMP with regard to Essential Fish Habitat (EFH). These plans are intended to facilitate maintenance and preservation of EFH for various fish species within each plan's respective affected habitat areas. While the marine habitats associated with the project site are subject to these FMPs, the proposed activities would result in temporary construction-related impacts to marine habitats and species, which would be less than significant with implementation of applicable mitigation measures. No impacts to the applicable FMPs would occur during project operation, as the Pier would continue to operate passively as under existing conditions. As such, since the proposed project would not result in significant adverse impacts to marine species or habitats, impacts would be less than significant in this regard.

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

a) **Less Than Significant Impact.** Development of the proposed project would involve the use of construction materials, which includes negligible quantities of non-renewable resources (including mineral resources such as earth materials for concrete and petroleum-based fuels). Construction of the proposed project would follow industry standards and would not use non-renewable resources in a wasteful or inefficient manner. No mineral resources that are of value to the region or residents of the state have been identified in the vicinity of the project site. The proposed project is not located within a Significant Mineral Aggregate Resources Area as designated by the State of California Department of Conservation. Therefore, the proposed project would not result in the loss of availability of any mineral resource that would be of value to the region and the residents of the State. Once constructed, operation of the Pier would not affect known mineral resources. Impacts to known mineral resources (i.e., aggregate, minerals, and/or petroleum fuels) from construction and operation of the proposed project are expected to be less than significant and no mitigation is required.

b) **No Impact.** The proposed project would not be located in an area designated as containing locally important mineral resources. Therefore, the construction and operation of the proposed project would not result in the loss of availability of any mineral resource and no mitigation is required.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. NEIGHBORHOOD EFFECTS. Would the project:				
a) Have considerable effects on the project neighborhood?	☐	☐	☒	☐

a) **Less Than Significant Impact.** As discussed previously, the proposed project would result mainly in short-term, construction-related impacts, with very minor long-term operational impacts. This is due primarily to the fact that the proposed improvements would generally operate passively once constructed, with only emergency events triggering the need to active operation of the proposed emergency gangway and floating dock. Since construction activities would result in the vast majority of environmental impacts, neighborhood effects would generally be limited to the duration of construction. Such impacts are related to physical effects to the nearby neighborhood, including residential neighborhoods to the east of the project site. Short-term neighborhood effects are anticipated to include aesthetics, air quality, noise, and traffic effects that would occur during the construction of the proposed improvements. Specifically, the placement of construction equipment, screening, and the temporary trestle would temporary detract from the visual quality of the Pier and adjacent beach areas, while air emissions from construction vehicles and equipment would temporarily increase air pollutant concentrations near the Pier. Additionally, construction equipment would create additional sources of noise that could temporarily adversely affect nearby residents, Pier visitors, and beachgoers near the site, and construction worker vehicle and haul and equipment delivery truck traffic would increase traffic on local streets throughout construction. However, as discussed in Section I, Aesthetics, Section III, Air Quality, Section XIV, Noise, and Section XIX, Transportation/Traffic, such impacts would be less than significant or less than significant with mitigation. As such, impacts related to neighborhood effects would be less than significant.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
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?	☐	☐	☐	☒

a) **No Impact.** With the exception of beachgoers and Pier visitors, no sensitive receptors are located within close proximity of the Pier. The nearest residential development is 800 feet south of the proposed work area. The proposed Pier improvements would generate construction related noise for the duration of the construction period. Construction-related noise associated with maintenance and improvement of public facilities is exempt from the City's noise regulations. Specifically, pursuant to Section 4.12.030, Exemptions, of the SMMC, several activities are exempt from the provisions of the City's noise regulations, including the "installation, maintenance, repair or replacement of public utilities or public infrastructure conducted by the City of Santa Monica or a public utility company, or their agents and employees, while conducting duties associated with their employment, subject to the restrictions contained in [Section] 4.12.110(a) for allowable construction times." As such, the proposed project's construction activities, as long as they are conducted within the City's established construction times, would be exempt from the City's noise regulations. Therefore, no impact would occur in this regard.

b) **Less Than Significant Impact.** Pile driving would not be necessary for the construction of the emergency gangway and floating dock improvements, but would be necessary for the installation of piles for the structural upgrades (and temporary trestle), which would create groundborne vibration during these activities. It is not possible at this time to determine the exact length of time that pile driving would occur on the site, but construction activities are not expected to occur for more than a few months, with the activities producing the highest levels of groundborne vibration only occurring for a few weeks of this period. Additionally, the closest residential uses to the project site are located over 800 feet away, and given the fact that vibration tends to attenuate quickly (i.e., within 100 feet or less of its generation source), particularly in low density geologic materials (such as sand), vibration effects at the closest sensitive receptors would not be perceptible. As such, while the construction of the proposed project would generate localized vibration, impacts would be less than significant. Operation of the Pier following the proposed improvements would not measurably change relative to existing conditions and therefore no operational vibration impacts would occur.

c) **No Impact.** The existing noise environment in the project area is dominated by pedestrian activity on the Pier, amusement park attractions, beach-related noise, and traffic noise from nearby roadways. Based on the nature of the proposed improvements, long-term operation of the project would not have a measurable effect on the community noise environment in proximity to the project site. Noise sources on the Pier, as well as the intensity of its use, would not be affected by the proposed structural upgrades and emergency gangway/floating dock. As such, no operational noise impacts would occur.

d) **Less Than Significant Impact With Mitigation.** As noted above, the project would result in a temporary increase in ambient noise near the project site during construction period. While the temporary noise increase associated with the proposed improvements would occur for the duration of construction activities, the nearest residential uses to the project site are located over 800 feet away at the closest point. As such, although the proposed project is exempt from the City's noise regulations, provided construction is carried out within allowable construction hours, the noise associated with construction is not expected to result in substantial noise increases at the closest noise-sensitive receptors. However, since people visiting the Pier and adjacent beaches would be exposed to construction-related noise throughout the duration of construction activities, impacts in this regard are considered potentially significant. Mitigation Measure I-1, above, requires the use of a temporary barrier, which would serve to minimize visual impacts as well as reduce noise effects on the Pier uses and beachgoers to the extent feasible. Additionally, Mitigation Measures XIV-1 and XIV-2 are also proposed to further reduce noise impacts to Pier and beach visitors during construction activities. With implementation of applicable mitigation measures, construction noise impacts would be less than significant. Operation of the Pier following the proposed improvements would not measurably change relative to existing conditions and therefore no operational noise impacts would occur.

Mitigation Measures:

XIV-1 **Diesel Equipment Mufflers.** All diesel equipment shall be operated with closed engine doors and shall be equipped with factory-recommended mufflers. Further, all equipment not in use shall be turned off.

XIV-2 **Electrically-Powered Tools.** Electrical power shall be used to run air compressors and similar power tools.

e) **No Impact.** The project site is not located within an airport land use plan area or within two miles of a public airport or public use airport. Therefore, construction or operation of the project would not expose people to excessive airport-related noise levels. No impact would occur in this regard.

f) **No Impact.** The project site is not located within the vicinity of a private airstrip, or heliport or helistop. Therefore, the project would not expose people residing or working in the project area to excessive noise levels from such uses. No impact would occur in this regard.

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

a) **No Impact.** Construction and operation of the proposed project would serve to increase the safety and structural integrity of the existing Pier, and would not result in the construction of new land uses or increase existing use of the Pier. As such, the project would not induce population growth in the area, either directly or indirectly. No growth-inducing impacts are anticipated to result from the proposed project, as the project would merely accommodate existing Pier users.

b) **No Impact.** The construction and operation of the proposed project would occur within the existing footprint of the Pier and a portion of the adjacent beach/oceanfront. No housing is to be removed as part of the proposed project. Therefore, construction and operation of the proposed project would not have any impacts on the number or availability of existing housing in the area and would not necessitate the construction of replacement housing elsewhere.

c) **No Impact.** As mentioned in Response XV.b., above, the construction and operation of the proposed project would not displace any housing, and therefore would not result in the displacement of people. Therefore, no impact is expected and no mitigation is required.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☒	☐
b) Police protection?	☐	☐	☒	☐
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

a) **Less Than Significant Impact.** Construction of the proposed project could have the potential to reduce access for emergency vehicles near construction activities. However, all construction activities would occur on the existing Pier site and would be carried out in accordance with all applicable City and/or Santa Monica Fire Department (SMFD) emergency access standards, and access would be maintained throughout construction to the entire length of the Pier via a minimum 15-foot-wide access that is separated from the construction area. Operation of the proposed project would be passive and similar to existing conditions, and therefore would not require additional fire protection services, facilities, or equipment. Furthermore, the proposed project would facilitate and improve emergency evacuation capabilities at the Pier. No significant adverse physical impacts would occur to fire services and no mitigation is required.

b) **Less Than Significant Impact.** Construction of the proposed project could have the potential to reduce access for emergency vehicles near construction areas if adequate right-of-way is not provided throughout construction activities. However, as noted above, all construction activities would be carried out in accordance with all applicable City and/or Santa Monica Police Department (SMPD) emergency access standards, and access would be maintained throughout construction via a minimum 15-foot-wide access that is separated from the construction area. Operation of the proposed project would be passive and would not require additional police protection. No significant adverse physical impacts would occur relative to police services and no mitigation is required.

c) **No Impact.** Project implementation would not result in land uses that would generate students. Therefore, no impacts regarding school facilities would occur with project implementation.

d) **No Impact.** The project would not introduce any new population that would create additional demands on existing or planned park facilities, and would not expand the capacity of the Pier or draw additional visitors to recreational facilities, including the Pier.

Furthermore, the project would not displace or directly impact any parks or recreational facilities. Thus, no impacts to park facilities would occur.

e) **No Impact.** Operation of the Pier following construction activities would involve periodic inspection and/or maintenance of facilities on the Pier. However, no measurable increase in City services would be required above and beyond those already provided for by the City, as the proposed improvements would replace the existing structural components and construct a dock/gangway for as-needed emergency evacuation. Thus, no impacts regarding other public facilities would occur.

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

a) **Less Than Significant Impact.** The construction and operation of the proposed project would not generate any additional population that would increase demand for neighborhood or regional parks or other recreational facilities. However, temporary construction activities could affect the use of the Pier (a City-owned recreational facility) if adequate public access were not maintained. However, as discussed above, per SMFD requirements, a minimum 15-foot-wide access that is separated from the construction area would be maintained throughout construction activities. As such, the proposed improvements would not detract from access to, or use of, the Santa Monica Pier. Operation of the improved Pier would be similar to existing conditions and therefore would not have any affect on recreational facilities in the City. Accordingly, adverse physical impact to recreational facilities would be less than significant, and no mitigation is required.

b) **No Impact.** The construction and operation of the proposed project would be not expected to result in adverse physical impacts associated with any other public facilities in the area or in the City of Santa Monica as a whole, since the project would not result in a net increase in City population or increase in the use of recreational facilities (including the Pier itself). No impacts are anticipated and no mitigation is required.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. SHADOWS. Would the project:				
a) Produce extensive shadows affecting adjacent uses or property?	☐	☐	☒	☐

a) **Less Than Significant Impact.** The proposed improvements would not create new structures or features that would permanently increase shade or shadow on the Pier itself or adjacent beach or urbanized areas. The temporary construction activities would involve the use of a temporary steel trestle adjacent to the existing Pier structure, as well as the use of construction equipment, including a crane. While the temporary trestle and crane (or other tall equipment), as well as the floating dock, may increase the area of water/beach covered by shade or shadows, the extent of shading/shadow effects would be limited to a small area in which construction activities are occurring, and would not result in substantial shading given the extent of adjacent open beach/water areas. Once construction is completed, the only component of the project that would increase shadows in the area would be the floating dock; however, shade/shadow effects would be limited to the seafloor beneath the dock itself, which would not be considered a significant shadow impact. As such, shadow-related impacts would be less than significant.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX. TRANSPORTATION/TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) 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?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☒	☐	☐

a) **Less Than Significant Impact.** The proposed project would result in temporary traffic system impacts during construction activities. Construction worker vehicle trips to and from the project site, as well as delivery and haul truck trips to and from the project site, would increase traffic levels on affected streets in the area. However, given the nature and intensity of proposed construction activities, worker vehicle and delivery/haul truck traffic is not anticipated to be substantial, and would cease at the completion of construction activities. Operation of the proposed Pier improvements would not affect traffic in the area, as the ongoing maintenance and operation activities for upgraded Pier would be similar to under existing conditions and therefore project-related traffic impacts would not occur. As such, temporary construction activities and long-term operation of the proposed project would result in less than significant impacts related to conflicts with applicable plans, ordinances, and policies intended to maintain the function of the local and regional circulation system.

b) **Less Than Significant Impact.** The Congestion Management Program (CMP) is a state-mandated program enacted by the State legislature to address impacts that urban congestion has on local communities and the region as a whole. The Metropolitan Transportation Authority (Metro) is the local agency responsible for implementing the requirements of the CMP. New projects located in the City must comply with the requirements set forth in the CMP. These requirements include the provision that all freeway segments where a project could add 150 or more trips in each direction during peak hours must be evaluated. The guidelines also require evaluation of all designated CMP roadway intersections where a project could add 50 or more trips during peak hours. The proposed project would not result in a net increase of more than 50 trips during either the A.M. or P.M. peak hours. Thus, the project would not generate 150 or more trips to a freeway segment or 50 trips to a CMP roadway intersection. Accordingly, less than significant impacts to CMP facilities would occur with project implementation.

c) **No Impact.** The project does not involve air transportation and would not result in the disruption or change of air traffic patterns in the area. Due to the nature and scope of the project, no change in air traffic patterns or location would occur. Thus, no impact would occur in this regard.

d) **No Impact.** The project would not involve the construction of a hazardous design feature or modification of roadway improvements that would create a hazard. Additionally, the project would not involve the development of any uses that would be considered incompatible with existing uses. Furthermore, the floating dock would not be accessible to the public except during an emergency, and the emergency gangway would be located on the edge of the Pier structure and kept in the raised position unless lowered by authorized personnel to access the floating dock. Thus, no impact would occur in this regard.

e) **Less Than Significant Impact.** As discussed above in Response IX.g., the proposed project would not hinder emergency access in the area, since access to the entirety of the Pier would be provided throughout construction activities via a minimum 15-foot-wide access that is separated from the construction area. Additionally, all construction activities would be carried out in accordance with all City, SMFD, and SMPD emergency access requirements. No significant emergency access impacts are expected and no mitigation is required.

f) **Less Than Significant Impact With Mitigation.** The proposed project would not conflict with adopted policies supporting alternative transportation, as it involves structural upgrades and the addition of an emergency gangway and floating dock to the existing Pier. Construction activities would be coordinated with Big Blue Bus, as appropriate, in order to minimize impacts to alternative transportation facilities (e.g., bus stops, bike lanes), if any, during construction. Access to public transportation and bike lanes would be maintained throughout construction, as required by the City and Big Blue Bus. Nonetheless, although project construction would not take place near the Strand Bicycle Path, construction vehicles may need to cross the bike path to access the work area. While temporary in nature (i.e., lasting no more than a few minutes), to ensure bicyclist safety, Mitigation Measure XIX-1 is proposed below. This mitigation measures requires the use of flaggers when construction equipment traverses the Strand bike path, As a result, impacts from construction of the proposed project would be less than significant with implementation of applicable mitigation measures.

Mitigation Measures:

XIX-1 Whenever construction equipment is required to cross the Strand Bicycle Path, flaggers shall be located on both sides of the equipment's path to warn bicyclists of the passing equipment and ensure bicyclist safety until the equipment has cleared the bicycle path. Additionally, construction vehicles shall be restricted to a maximum of 15 bicycle path crossings on any given construction day.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XX. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) 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?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state and local statutes and regulations related to solid waste?	☐	☐	☒	☐

a) **No Impact.** The proposed project would not result in changes to facilities or operations at existing wastewater treatment facilities, as the proposed improvements would include structural Pier upgrades and the installation of an emergency gangway and floating dock, neither of which would generate wastewater during construction or operation. Hence, no impact to wastewater treatment requirements of the applicable Regional Water Quality Control Board would occur.

b) **No Impact.** The construction and operation of the proposed project would not generate wastewater or water demand, and therefore would not require the construction of new water or wastewater treatment facilities or expansion of existing facilities. However, it should be noted that water and sewer pipelines currently serving the Pier would be temporarily relocated during construction activities in order to allow for the structural upgrades to occur while maintaining service to end-of-Pier uses. Once construction activities are completed, all utilities including water and sewer infrastructure would be permanently reinstalled under the Pier structure. As such, no impacts are anticipated in this regard.

c) **No Impact.** Stormwater drainage facilities are provided throughout the City. However, the Pier is located at the ocean, where the City's stormwater outfalls ultimately drain. As such, stormwater flows generated at and around the Pier drain directly into the ocean via sheet flow off the Pier or infiltration into beach sands. Therefore, since the proposed improvements would not affect stormwater drainage facilities, no impacts are expected and no mitigation is required.

d) **No Impact.** No new or expanded water entitlements would be required with implementation of the project, as the project consists of structural and emergency evacuation-related improvements to the existing Pier, with no new land uses or increase in intensity of existing uses. Thus, no impacts would occur in this regard.

e) **No Impact.** The project would not generate wastewater and therefore, would not impact the capacity of any wastewater treatment provider. Thus, no impacts would occur in this regard.

f) **Less Than Significant Impact.** Excavation and construction debris would be recycled or transported to an inert waste facility and disposed of appropriately. It is anticipated that the construction contractor will work with the City to ensure that source reduction techniques and recycling measures are incorporated into project construction. Specifically, in accordance with the City's construction waste recycling requirements as noted in Chapter 8.108, *Green Building, Landscape Design, Resource Conservation and Construction And Demolition Waste Management Standards*, of the SMMC, a minimum of 75 percent of construction waste materials would be required to be recycled in order to reduce the amount of construction-related waste requiring landfill disposal. The amount of debris generated during project construction is not expected to significantly impact landfill capacities. Operation of the improved Pier would not generate any solid waste. As such, no significant impacts to landfill capacity are anticipated.

g) **Less Than Significant Impact.** As mentioned above in question XX.f., above, construction debris would be recycled or disposed of according to local and regional standards, and operation of the proposed project would not generate any solid waste. As such, no significant impacts related to compliance with solid waste statutes and regulations are expected to occur.

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XXI. MANDATORY FINDINGS OF SIGNIFICANCE				
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 wild-life population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plants or animals, or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
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.	☐	☐	☒	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

a) **Less Than Significant Impact**. As previously discussed in Section IV, Biological Resources, potentially significant impacts to grunion spawning and associated spawning habitat would be reduced to less than significant levels with implementation of applicable mitigation measures, while impacts to all other species and habitats (including the endangered California least tern) would be less than significant. Additionally, no impacts to riparian habitats, sensitive natural communities, or federally protected wetlands would occur. Furthermore, the project would not 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 nursery sites. No significant impacts to cultural resources would result from implementation of the proposed project given compliance with applicable mitigation measures to address archaeological resources, including human remains, while no adverse impacts would occur related to historic resources. Given the scope of the proposed project in conjunction with implementation of the prescribed mitigation measures, project implementation would not have the potential degrade the quality of the environment, substantially reduce the habitat of 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.

b) **Less Than Significant Impact.** Due to the nature of the project, the project would not involve significant cumulative impacts, since the proposed activities would be temporary in nature and impacts would generally be limited to the immediate area in which construction is occurring at the time. The proposed project would only result in environmental impacts during construction activities associated with each of the project components, which would be constructed sequentially in distinct phases and would not overlap. Other effects are isolated to the project site and adjacent trestle footprint, and have been determined to be less than significant, either with or without mitigation. Although the project may incrementally affect other resources that have been determined to be less than significant, the project's contribution to these effects is not considered "cumulatively considerable."

c) **No Impact.** Project implementation would be beneficial to human beings by improving the structural integrity of the Pier and providing a means of evacuation by boat in the event of an emergency. All potentially significant impacts would be reduced to a less than significant level through compliance with applicable regulatory requirements and/or implementation of the prescribed mitigation measures. Thus, the project would not cause adverse effects on human beings directly or indirectly.

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20) State of California Department of Conservation. Alquist-Priolo Earthquake Fault Zone Map: Beverly Hills Quadrangle, 1986. Available at: http://www.quake.ca.gov/gmaps/ap/ap_maps.htm. Accessed February 16, 2010.

MITIGATION MONITORING AND REPORTING PROGRAM

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared for the Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade Project in compliance with Section 21081.6 of the Public Resources Code and Section 15097 of the CEQA Guidelines, which is required for all projects where an Environmental Impact Report or Mitigated Negative Declaration (MND) has been prepared. Section 21081.6 of the Public Resources Code sates: " ...the [lead] agency shall adopt a reporting or monitoring program from the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment...[and the program] shall be designed to ensure compliance during project implementation". The primary purpose of this MMRP is to ensure that the mitigation measures identified in the MND are implemented, thereby minimizing identified environmental effects. The City of Santa Monica is the Lead Agency for the proposed project.

The MMRP for the proposed project will be in place through all phases of project implementation. The Public Works Department shall be responsible for administering the MMRP activities to its staff, other City departments (e.g., Planning and Community Development Department), consultants, and/or contractors. The Public Works Department will also ensure that mitigation monitoring is documented through reports and that deficiencies are promptly corrected. The designated environmental monitor (e.g., City building inspector, project contractor, certified professionals, etc., depending on the provisions specified below) will track and document compliance with mitigation measures, note any problems that may result, and take appropriate action to remedy problems. The MMRP lists mitigation measures according to the same numbering system contained in the MND sections. Each mitigation measure is categorized by topic, with an accompanying discussion of the following:

- The monitoring phase of the project during which the mitigation measure should be monitored (i.e., Operation, Construction, or Prior to Construction Activities);
- The monitoring frequency of the mitigation measures (i.e., during periodic field inspection); and
- The enforcement agency (i.e., the agency with the authority to enforce the mitigation measure).

Mitigation Monitoring and Reporting Program				
Mitigation Measure		**Monitoring Phase**	**Monitoring Frequency**	**Enforcement Agency**
I-1	Wherever feasible, the project work, staging, and stockpiling areas shall be screened from public view through the use of a temporary barrier. This fence and/or barrier shall be maintained in an attractive manner at all times by removing any graffiti, replacing damaged portions of the barrier, and removing all posted bills as soon as feasibly possible. Additionally, if deemed appropriate and determined to be feasible, the fence/barrier shall include be decorated with a beach, ocean or amusement park theme on all sides. All decoration shall be approved by the Pier Restoration Corporation. This wall shall serve multiple beneficial purposes: (1) act as a temporary screening device to reduce the visual distraction associated with construction activities and equipment; (2) provide a barrier for public safety and security purposes; and (3) serve as a noise-attenuating sound wall. In areas where noise attenuation is warranted, the barrier should be constructed such that the "line of sight" between construction activity and the commercial/pedestrian uses on the Santa Monica Pier and beachgoers is obstructed. These portions of the barrier shall where feasible be comprised of, or lined with, acoustical sound absorption blankets. Where a temporary noise barrier is determined to be infeasible, alternate noise attenuation techniques shall be employed to reduce noise levels. Such techniques may include, but are not limited to, sound blankets on noise-generating equipment.	Throughout Construction Activities	As necessary during construction.	Santa Monica Public Works Department

Mitigation Monitoring and Reporting Program

Mitigation Measure		Monitoring Phase	Monitoring Frequency	Enforcement Agency
IV-1	Temporary trestle removal (or any beach-disturbing activity) shall be scheduled outside of the grunion spawning season (March to August).	Prior to removal of temporary Trestle at close of Pier construction activities.	As necessary prior to trestle removal.	Santa Monica Public Works Department
IV-2	If construction of the Pier structural upgrades overlaps the grunion spawning season, grunion monitoring shall be conducted prior to any beach-disturbing activity occurring during a predicted grunion run (refer to the California Department of Fish and Game [CDFG] website for predicted spawning events, as spawning events occur bi-weekly). The monitoring shall be conducted by City staff or a qualified consultant, as deemed appropriate by CDFG. If grunion are observed by the monitor during the CDFG-predicted run period, the extent and location of the run shall be quantified using the Walker Scale (i.e., the scale of spawning intensity ranging from W0 to W5, from least intense to most intense) and CDFG shall be notified regarding potential action. If the observed grunion spawning event is considered a significant run by CDFG (i.e., W4 or higher on the Walker Scale, or several thousand or more fish on a large portion of the beach), as determined by CDFG staff, construction activities occurring on the affected portion of the beach shall cease for the remainder of the two-week spawning cycle. If no grunion are observed, it is assumed that construction can proceed.	Prior to beach-disturbing activities throughout construction.	As necessary prior to site disturbance when a grunion run is predicted by CDFG.	Santa Monica Public Works Department and/or CDFG

Mitigation Monitoring and Reporting Program

Mitigation Measure		Monitoring Phase	Monitoring Frequency	Enforcement Agency
VI-I	The project shall conform to the Secretary of the Interior's Standards by providing appropriate preservation treatments of retained historic building fabric and features (historic fabric), historically compatible new design and construction components, compatible in-kind replacement of removed historic features. The project applicant shall engage a qualified historic preservation consultant to review the proposed project. A qualified architectural historian, historic architect, or historic preservation professional is someone who satisfies the *Secretary of the Interior's Professional Qualification Standards for History, Architectural History, or Architecture,* pursuant to 36 CFR 61, and has at least 10 years experience in reviewing architectural plans for conformance to the *Secretary's Standards and Guidelines*. The project applicant shall undertake and complete construction in a manner consistent with the preservation consultant's recommendations to ensure that the project meets the *Secretary of the Interior's Standards* for rehabilitation. The preservation consultant shall review the final construction drawings for conformance to the *Secretary of the Interior's Standards* and prepare a memo commenting on the final project. A project that conforms to the Secretary of the Interior's Standards is considered fully mitigated under CEQA.	Prior to Construction Activities	As necessary prior to construction.	Santa Monica Public Works Department
VI-2	If archaeological resources are encountered during implementation of the project, ground-disturbing activities shall temporarily be redirected from the vicinity of the find. The City shall immediately notify a qualified archaeologist of the find. The archaeologist shall coordinate with the City as to the immediate treatment of the find until a proper site visit	Throughout Construction	As necessary during excavation and ground disturbance.	Santa Monica Public Works Department

Mitigation Monitoring and Reporting Program				
Mitigation Measure		**Monitoring Phase**	**Monitoring Frequency**	**Enforcement Agency**
	and evaluation is made by the archaeologist. The archaeologist shall be allowed to make an evaluation of the find and determine appropriate treatment that may include the development and implementation of a data recovery investigation or preservation in place. All cultural resources recovered will be documented on California Department of Parks and Recreation Site Forms to be filed with the CHRIS-SCCIC. The archaeologist shall prepare a final report about the find to be filed with the City and the CHRIS-SCCIC. The report shall include documentation and interpretation of resources recovered including full evaluation of the eligibility with respect to the National Register of Historic Places and California Register of Historical Resources and CEQA. The City shall designate repositories in the event that resources are recovered. The archaeologist shall also determine the need for archaeological monitoring for any additional ground-disturbing activities in the area of the find thereafter.			
VI-3	If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains. The City shall then under	Throughout Construction	As necessary during excavation and ground disturbance.	Santa Monica Public Works Department

Mitigation Monitoring and Reporting Program

Mitigation Measure		Monitoring Phase	Monitoring Frequency	Enforcement Agency
	take additional steps as necessary in accordance with CEQA Guidelines Section 15064.5(e) and Assembly Bill 2641.			
IX-1	Prior to demolition activities, the City shall conduct surveys of all buildings and Pier structural elements to verify the presence or absence of asbestos-containing materials and lead-based paint, as well as conduct remediation or abatement in accordance with all applicable regulations and standards before any disturbance occurs. If the timber piles and bents are found to contain harmful levels of preservatives, the structural features shall be treated in accordance all applicable regulations, including the use of protective equipment on workers and the disposal of the affected timber in a Class I, II, or III solid waste disposal facility.	Prior to Demolition Activities	Prior to Issuance of Demolition Permits	Santa Monica Public Works Department
XI-1	If a staging and/or stockpiling area is required on the beach north of the Pier structure, the area shall be located as to maintain a minimum 20-foot-wide access buffer around the perimeter of the Pier.	Throughout Construction Activities	As necessary during construction.	Santa Monica Public Works Department
XIV-1	Diesel Equipment Mufflers. All diesel equipment shall be operated with closed engine doors and shall be equipped with factory-recommended mufflers. Further, all equipment not in use shall be turned off.	Throughout Construction Activities	As necessary during construction.	Santa Monica Public Works Department
XIV-2	Electrically-Powered Tools. Electrical power shall be used to run air compressors and similar power tools.	Throughout Construction Activities	As necessary during construction.	Santa Monica Public Works Department

Mitigation Monitoring and Reporting Program				
Mitigation Measure		**Monitoring Phase**	**Monitoring Frequency**	**Enforcement Agency**
XIX-1	Whenever construction equipment is required to cross the Strand Bicycle Path, flaggers shall be located on both sides of the equipment's path to warn bicyclists of the passing equipment and ensure bicyclist safety until the equipment has cleared the bicycle path. Additionally, construction vehicles shall be restricted to a maximum of 15 bicycle path crossings on any given construction day.	Throughout Construction Activities	As necessary during construction.	Santa Monica Public Works Department

Appendix A

Air Quality/Global Climate Change Data

SANTA MONICA PIER UPGRADES

Air Quality Technical Report
Appendix A

Air Quality Assessment Files

Provided by PCR Services Corporation

April 2011

- Project Construction Emissions
    - URBEMIS Outputs
    - Construction GHG Analysis

Construction Emissions

- URBEMIS2007 Outputs

Santa Monica Pier Upgrades MND
URBEMIS Output: Construction Emissions (Summer)

4/6/2011 04:54:12 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: V:\ACTIVE PROJECTS\Santa Monica Pier Upgrades MND\Construction\URBEMIS2007 (revised dates).urb924

Project Name: SM Pier Improvements

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 9/6/2011-12/1/2011 Active	2.89	19.02	10.36	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,129.88
Building 09/06/2011-12/01/2011	2.89	19.02	10.36	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,129.88
Building Off Road Diesel	2.89	19.01	10.29	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,119.87
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.96
Time Slice 12/2/2011-12/31/2011	2.89	19.02	10.36	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,129.88
Building 12/02/2011-01/02/2012	2.89	19.02	10.36	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,129.88
Building Off Road Diesel	2.89	19.01	10.29	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,119.87
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.96
Time Slice 1/2/2012-1/2/2012 Active	2.68	17.75	10.06	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,129.88
Building 12/02/2011-01/02/2012	2.68	17.75	10.06	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,129.88
Building Off Road Diesel	2.68	17.74	9.99	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,119.87
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.96
Time Slice 1/3/2012-9/1/2012 Active	2.68	17.75	10.06	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,129.88
Building 01/03/2012-09/01/2012	2.68	17.75	10.06	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,129.88
Building Off Road Diesel	2.68	17.74	9.99	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,119.87
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.96
Time Slice 9/3/2012-10/1/2012 Active	2.68	17.75	10.06	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,129.88
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Building Off Road Diesel	2.68	17.74	9.99	0.00	0.00	1.09	1.09	0.00	1.01	1.01	2,119.87

Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.96

Phase Assumptions

Phase: Building Construction 9/6/2011 - 12/1/2011 - Emergency Gangway Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 4 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

1 Pumps (53 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Building Construction 12/2/2011 - 1/2/2012 - Temporary Trestle Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 4 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

1 Pumps (53 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Building Construction 1/3/2012 - 9/1/2012 - Phase 4 Pier Replacement

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 4 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

1 Pumps (53 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Building Construction 9/2/2012 - 10/1/2012 - Temporary Trestle Removal

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 4 hours per day

4/6/2011 04:54:12 PM

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

1 Pumps (53 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Santa Monica Pier Upgrades MND
URBEMIS Output: Construction Emissions (Annual)

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: V:\ACTIVE PROJECTS\Santa Monica Pier Upgrades MND\Construction\URBEMIS2007 (revised dates).urb924

Project Name: SM Pier Improvements

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	CO_2
2011 TOTALS (tons/year unmitigated)	107.56
2012 TOTALS (tons/year unmitigated)	250.26

AREA SOURCE EMISSION ESTIMATES

	CO_2
TOTALS (tons/year, unmitigated)	

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	CO_2
TOTALS (tons/year, unmitigated)	2.59

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	CO_2
TOTALS (tons/year, unmitigated)	2.59

CO_2e[d] (Metric Tons)				
Emission Source	**2011**	**2012**	**Total**	**Amortized (30 years)**
CO_2 Emissions	108	250	358	12
CH_4 Emissions	0	1	1	
N_2O Emissions	0	1	1	
CO_2e Emissions	**109**	**252**	**360**	
2004 Statewide Total[c]	479,740,000	479,740,000	479,740,000	
Net Increase as Percentage of 2004 Statewide Inventory	**0.0000%**	**0.0001%**	**0.0001%**	

[a] *Mobile source values were derived using EMFAC2007 in addition to the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008.*

[b] *On site construction equipment values were derived using OFFROAD2007 in addition to the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008.*

c Statewide totals were derived from the CARB Draft California GHG Inventory.

[d] *All CO_2 E factors were derived using the California Climate Action Registry General Reporting Protocol; Version 3.0, April 2008.*

Source: PCR Services Corporation, 2011.

Appendix B

Marine Biological Resources Assessment

10-097-01

DRAFT
MARINE BIOLOGICAL RESOURCES TECHNICAL REPORT AND ESSENTIAL FISH HABITATASSESSMENT FOR THE SANTA MONICA PIER IMPROVEMENT PROJECT

Prepared for:

PCR Services Corporation
One Venture, Suite 150
Irvine, California 92618
Attn: David A. Crook

Prepared by:

Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, CA 92123
Phone: (858) 560-5465
Fax: (858) 560-7779

April 2011

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Marine Biological Resources Technical Report and Essential Fish Habitat Assessment for the Santa Monica Pier Improvement Project

April 2011

INTRODUCTION

PCR Services Corporation has contracted Merkel & Associates, Inc. (M&A) to conduct an assessment of marine biological resources and Essential Fish Habitat Assessment (see Appendix A) for proposed improvements of the Santa Monica Municipal Pier (pier). The pier is located at the western edge of the City of Santa Monica, at the western terminus of Colorado Avenue near the intersection of Colorado Avenue and Ocean Avenue. The site is bounded by Santa Monica State Beach, the beach bike path, and Pacific Coast Highway to the east and the Pacific Ocean to the south, west, and north (Figure 1). The City of Santa Monica Department of Public Works (SMDPW) is proposing the Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade Project (proposed project). The proposed project involves structural improvements to one portion of the pier, as well as construction of an access ramp (or "gangway") and floating dock to provide a means for evacuation from the western end of the pier during an emergency.

PLANNED IMPROVEMENTS

Emergency Gangway and Floating Dock

The proposed emergency gangway and floating dock component consists of: 1) demolition and removal of one existing concrete piling and an 18-foot-long by 8-foot (ft) wide section of the concrete decking of the southern fishing platform; 2) installation of a 2.5-ton capacity hydraulic crane lift on the pier; 3) construction, transportation, and anchoring of a 60-ft-long by 36-ft-wide floating barge (dock) on the south side of the pier (anchoring will be with 12 screw-type anchors or piles driven into the seafloor in approximately 16 ft of water [MLLW]); 4) installation of a 88-ft-long by 5-ft-wide aluminum gangway on the south side of the pier; 5) installation of various railings, utilities, and amenities at the project site; and 6) demobilization and removal of construction equipment and site cleanup. Figures 2 and 3 illustrate the emergency gangway and floating dock project components.

The emergency gangway (ramp) and floating dock (anchored barge) would be installed near the western end of the pier on its south side, immediately east of the pier-end restaurant and retail uses. Construction activities would begin with the closing of the southern fishing platform and a small area further west where the proposed crane would be installed (Figure 2), followed by removal of an existing concrete pile and an approximately 8-foot by 18-foot portion of the fishing platform at the platform's southwest corner. The existing bench at this location would be relocated, and the existing fish cleaning counter, water line, and guardrail would be removed along with the concrete pier portion. Next, a 2.5-ton capacity hydraulic crane lift would be installed to the west of the fishing platform, and a pre-fabricated 88-foot by five-foot aluminum gangway ramp would be attached to the fishing platform where the platform section was previously removed, with the other end of the ramp suspended by the new crane lift (Figure 3).

Figure 1. Vicinity Map, Santa Monica Municipal Pier.
Bight 2003 Sampling Stations and Venice Beach Least Tern Nesting Area also included

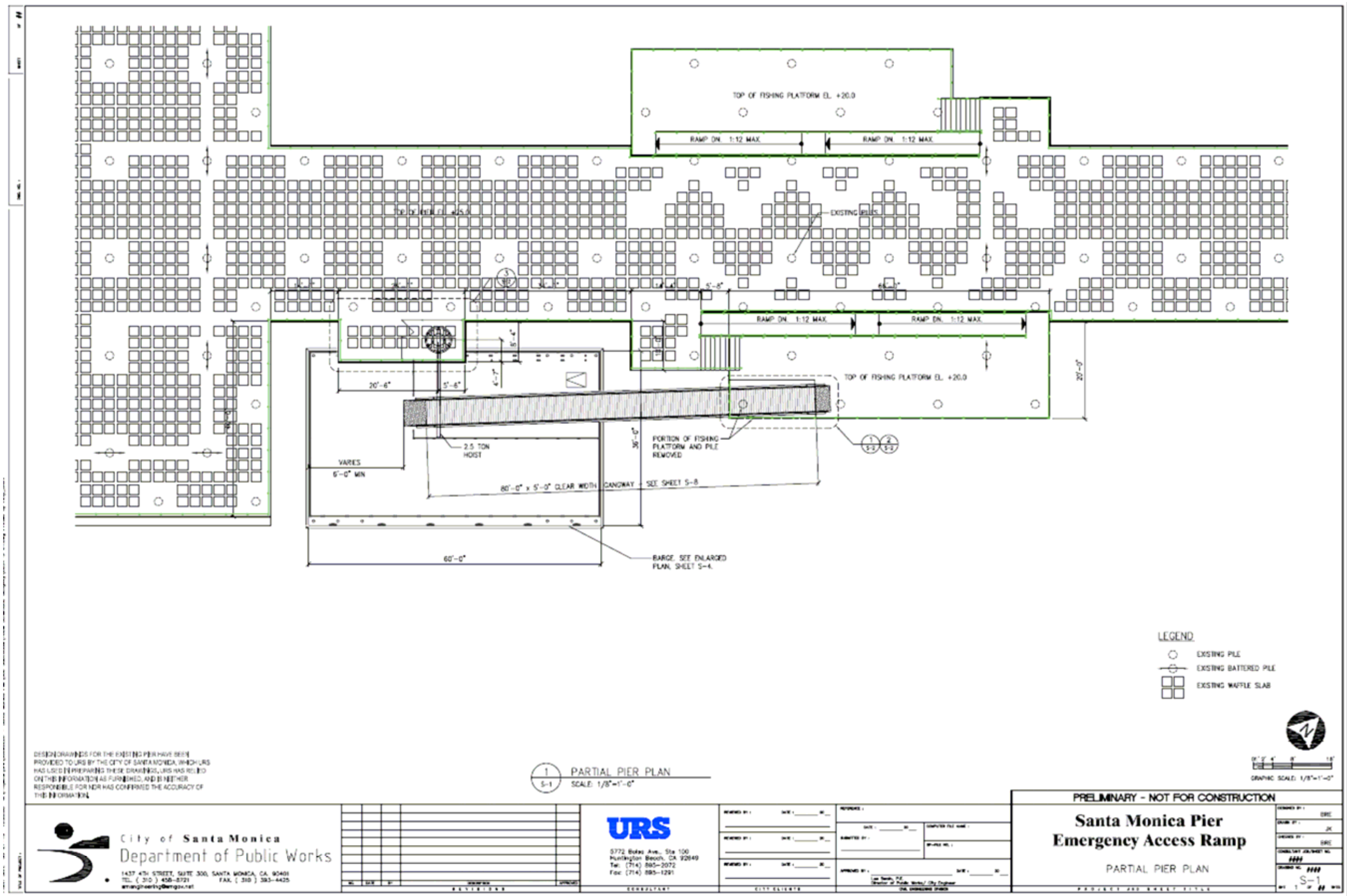

Figure 2. Emergency Gangway and Floating Dock Plan.

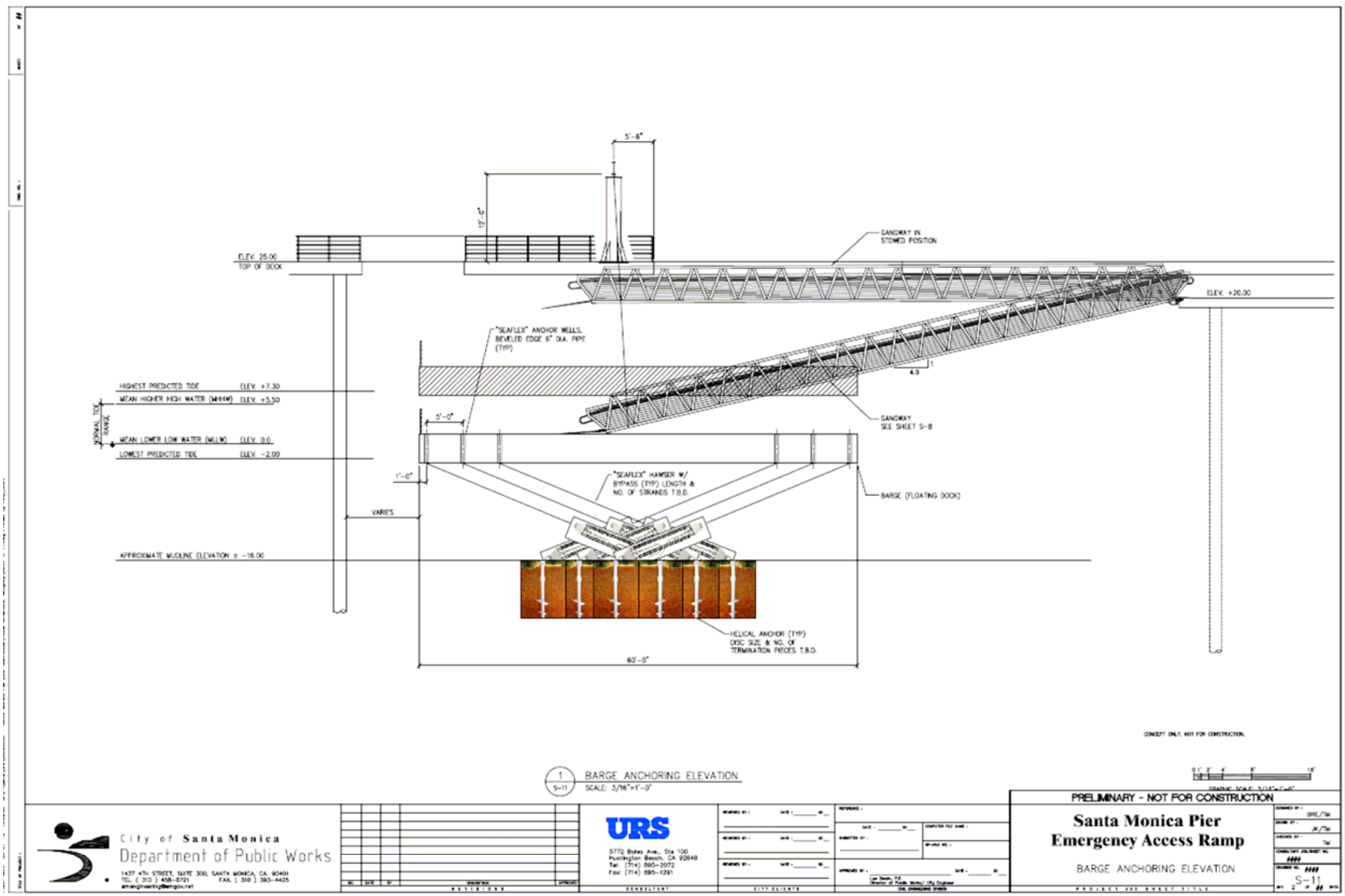

Figure 3. Emergency Gangway and Floating Dock Elevation.

Following completion of the emergency gangway ramp, a 36-ft by 60-ft pre-fabricated barge would be towed into place (Figure 2), and anchored to the seabed using “Seaflex” mooring system, polyester connecting cables, and helical anchors “screwed” into the seafloor (Figure 3). The barge, once anchored, would function as a floating dock and therefore would include fixed and removable 3.5-ft-high (minimum) steel guardrails, eight anchor wells, and six 15-inch cleats for docking boats to the structure. A three-foot by four-foot stainless steel access hatch would provide access for inspection and maintenance, and a stainless steel bumper would be installed at the point where the gangway contacts the floating dock once construction is completed.

Phase 4 Structural Upgrades

The Phase 4 structural upgrade component of the proposed project consists of: 1) construction of a temporary pile-supported wooden trestle on the north side of the existing pier; 2) demolition and replacement of a 363-ft-long by 36-ft-wide wooden section of the pier; 3) removal and disposal of 19 wooden pier bents and piles that support that pier section; 4) replacement of the wooden piles and bents with pre-stressed concrete piles and concrete piling caps (one bent is a set of four 18-inch diameter round piles and a pre-stressed concrete piling cap connecting the tops of the four pilings); 5) installation of on- and under-pier utilities; and 6) removal of temporary trestle, demobilization and removal of construction equipment, and site cleanup. Figures 4 and 5 illustrate the portions of the pier structure to be replaced and the configuration of the new structure. Additionally, the proposed construction phases (or stages) for the proposed improvements are shown in Figures 6 and 7.

The structural upgrades to the affected section of the pier would begin with the construction of a temporary trestle (pier) along the north side of the structure from bents 41 to 59 to allow for continued unimpeded access for pedestrian, emergency vehicle, and other vehicular traffic throughout construction activities (refer to Figures 6 and 7 for the location of the temporary trestle). Construction of the trestle is assumed to require driving up to 100 temporary steel piles. Once the temporary access trestle has been completed, the affected section of the pier would be closed to the public and access to the area (the construction site) would be restricted to construction workers/vehicles. It should be noted that along with access, utilities would also be maintained for pier uses to the west of the affected section. Once the construction site has been isolated from the rest of the pier, the contractor would commence with removal of various pier deck features, including light poles, railings, fire hydrants, benches, telescopes, and other incidental features. All of these items with the exception of the railings would be stored and reinstalled following completion of the new pier section; the railings would be replaced with new railings of similar type and design as those removed.

Demolition activities would begin on the northern half of the pier section with removal of the wooden decking and timber piles, as shown in Figures 6 and 7. Following demolition and removal of the northern pier section, new pre-stressed concrete piles would be installed for each bent starting just west of the existing Bent 41 (at the new Bent 41.5, specifically) and would continue westward to Bent 59, where concrete piles have already been installed. Each of the pilings would be installed using an 18-inch diameter steel pile casing that would be driven with a diesel pile driver to a depth of approximately 30 ft below the seabed, then a prefabricated steel rebar cage would be inserted into the pile casing, and the casing filled with concrete. New concrete piling caps to connect the four piles on each bent would be installed, and four continuous concrete stringers would be installed longitudinally connecting each bent to one another (see Figure 5), with new wooden decking and edge stringer installed above to complete the pier structure. Stored light poles and new hand rails would be installed along the northern edge of the new pier section, followed by demolition of the southern portion of the affected pier section. Similar to the northern portion, demolition would commence at existing Bent 42 and would continue westward along the pier section, upon completion of which construction would commence at new Bent 41.5 and end at Bent 59. New hand rails would then be installed along the southern edge of the section. The northern and southern portions of the new pier section would be connected by a new construction joint, as illustrated in Figure 5. A new service access "catwalk" would then be constructed beneath the construction joint along the length of the new section, and utility connections would be relocated to the permanent structure. Finally, construction equipment would be removed, benches, fire hydrants, telescopes and other pier deck features would be re-installed and the temporary access trestle removed. The pier would operate in the same manner as under current conditions, but would have increased longevity and added safety, and be able to better withstand major storm events.

Construction Staging and Material Stockpiling

Construction staging for equipment storage and material stockpiling for the Phase 4 structural improvements would occur within the closed-off section of the pier on which the construction activities would be performed. Additionally, and only if necessary, staging/stockpiling could also occur on small portions of the beach on the north side of the pier, but such temporary storage would not affect beach or pier parking or access to coastal resources. Similarly, material storage and equipment staging for the emergency gangway and floating dock would be located on or adjacent to the pier in the area where construction activities are occurring at the time; generally, this would be limited to the southern fishing platform, which would be closed throughout construction activities.

Construction Schedule and Phasing

Construction of the proposed project would occur in two distinct phases: (1) construction/installation of the emergency gangway and floating dock and (2) demolition and construction of the timber pier section (Table 1). It is anticipated that the emergency gangway and floating dock would commence in late-summer 2011 and would last approximately 3 months. The Phase 4 structural improvements would commence with the construction of the temporary trestle, which is anticipated to take approximately one month and start in winter 2012. The structural improvements would start after completion of the temporary trestle, and is expected to last for approximately 8 month. Following completion of the construction, the temporary trestle would be removed. Assuming this construction time frame, the proposed improvements would be completed in late-summer 2012 and the pier would re-open for public use shortly thereafter.

Table 1. Anticipated Construction Schedule.

Phase	Start Date	End Date
Building Construction- Emergency Gangway	9/6/2011	12/1/2011
Temporary Trestle Construction	12/2/2011	1/2/2012
Building Construction- Phase 4 Structural Improvements	1/3/2012	9/1/2012
Temporary Trestle Removal	9/2/2012	10/1/2012

Total Construction Period Duration = 15 months

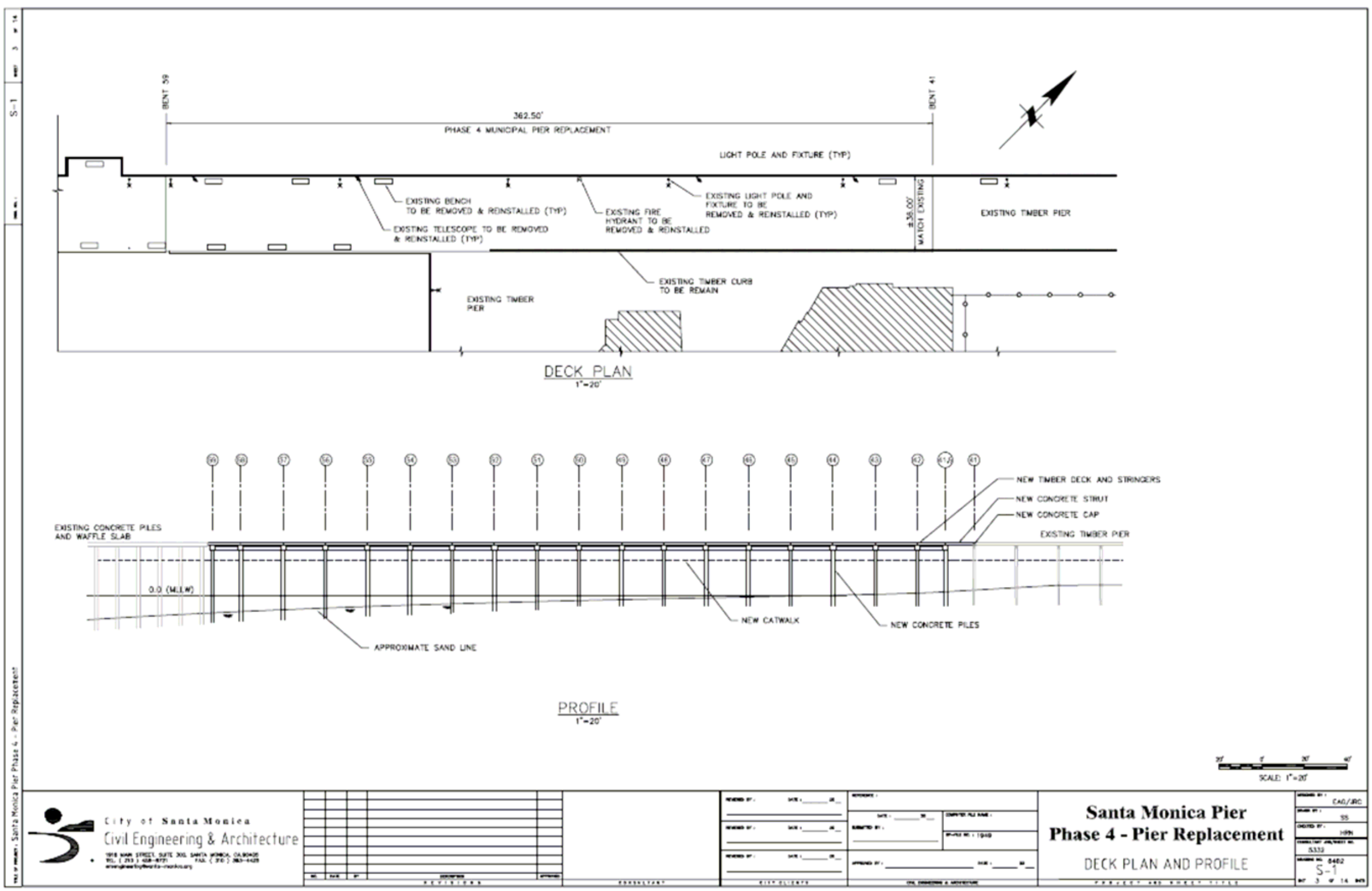

Figure 4. Phase 4 Structural Improvements Deck Plan and Profile.

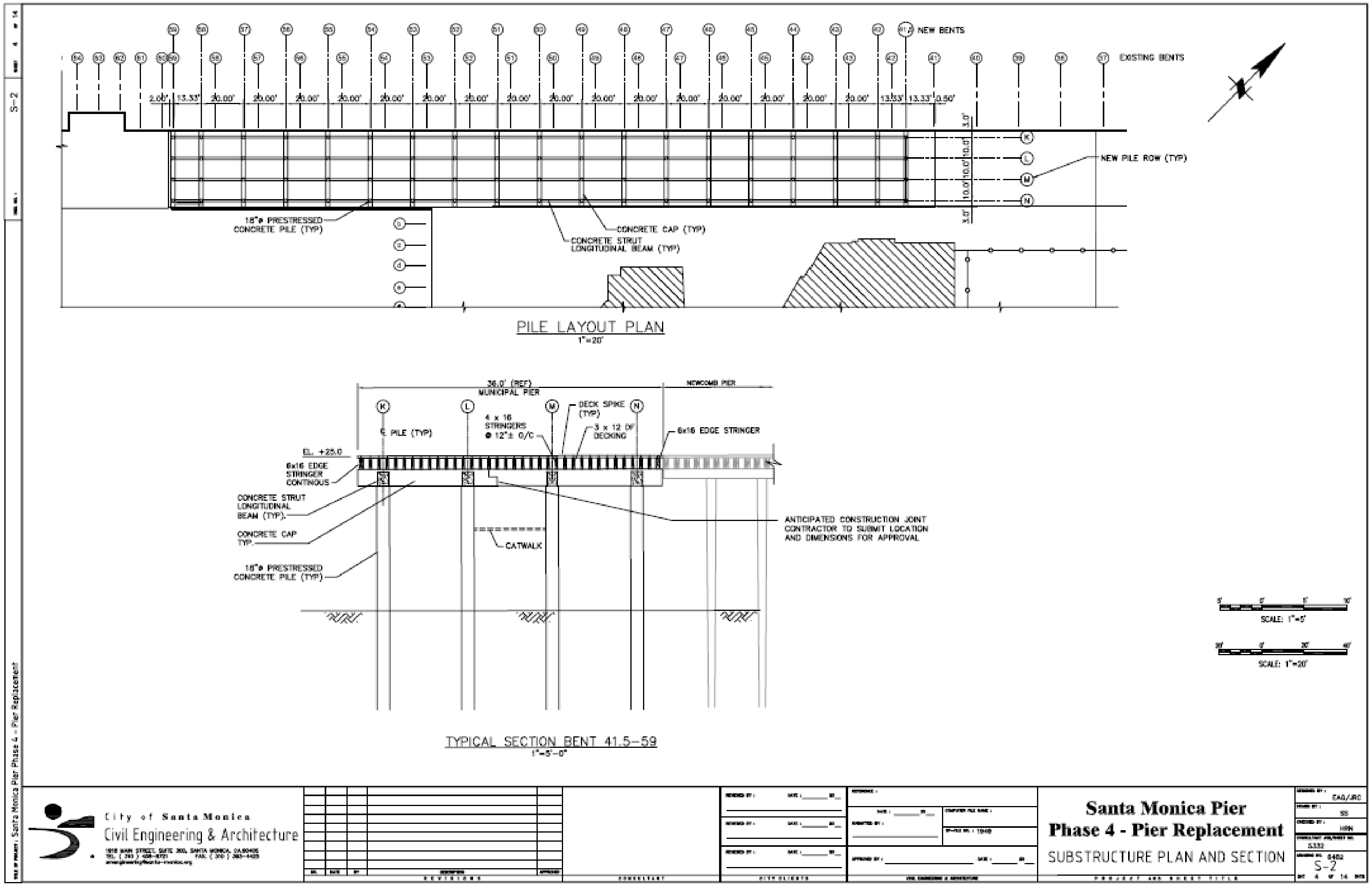

Figure 5. Phase 4 Structural Improvements Substructure Plan and Cross-Section.

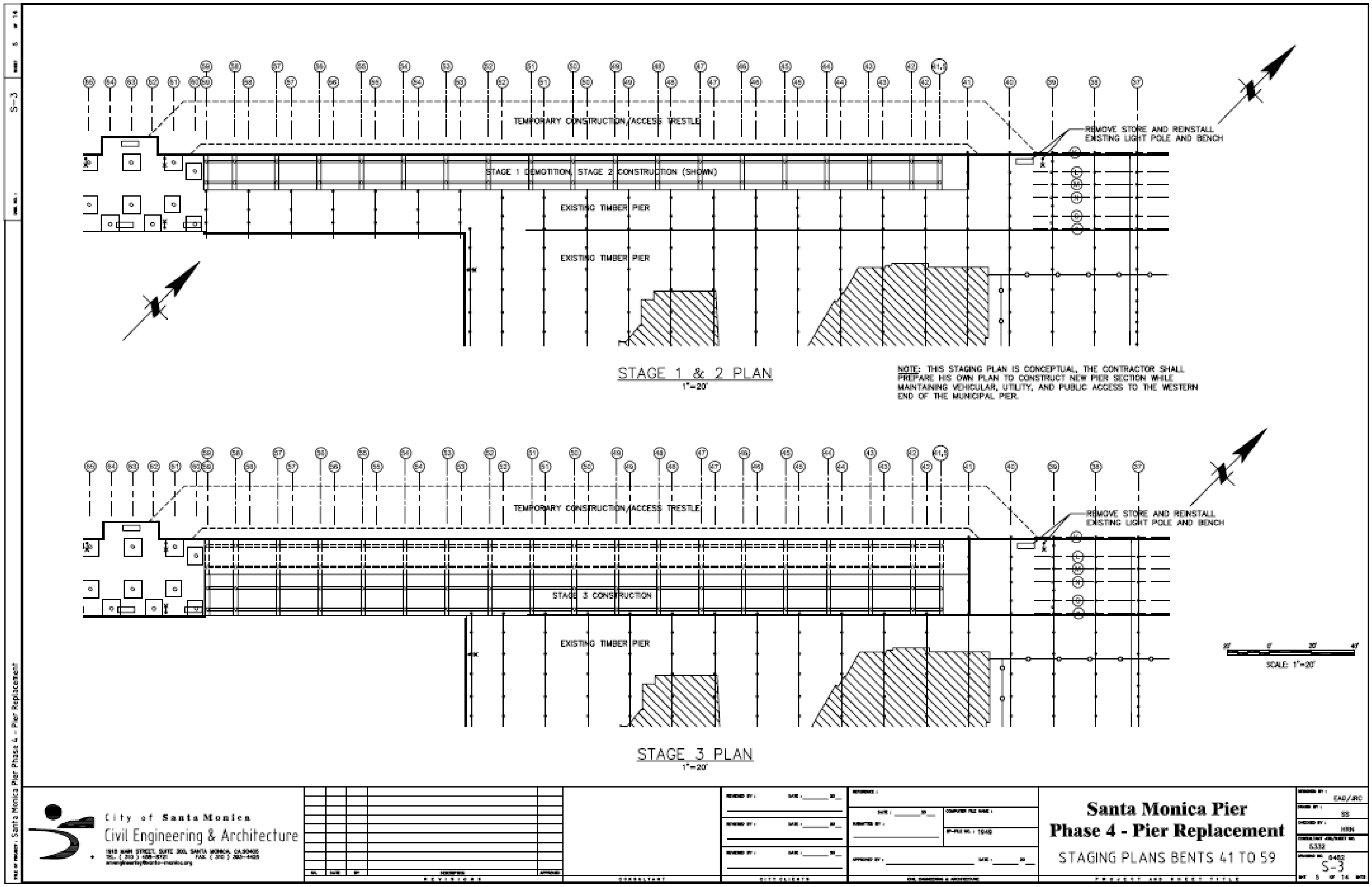

Figure 6. Phase 4 Structural Improvements Staging Plan.

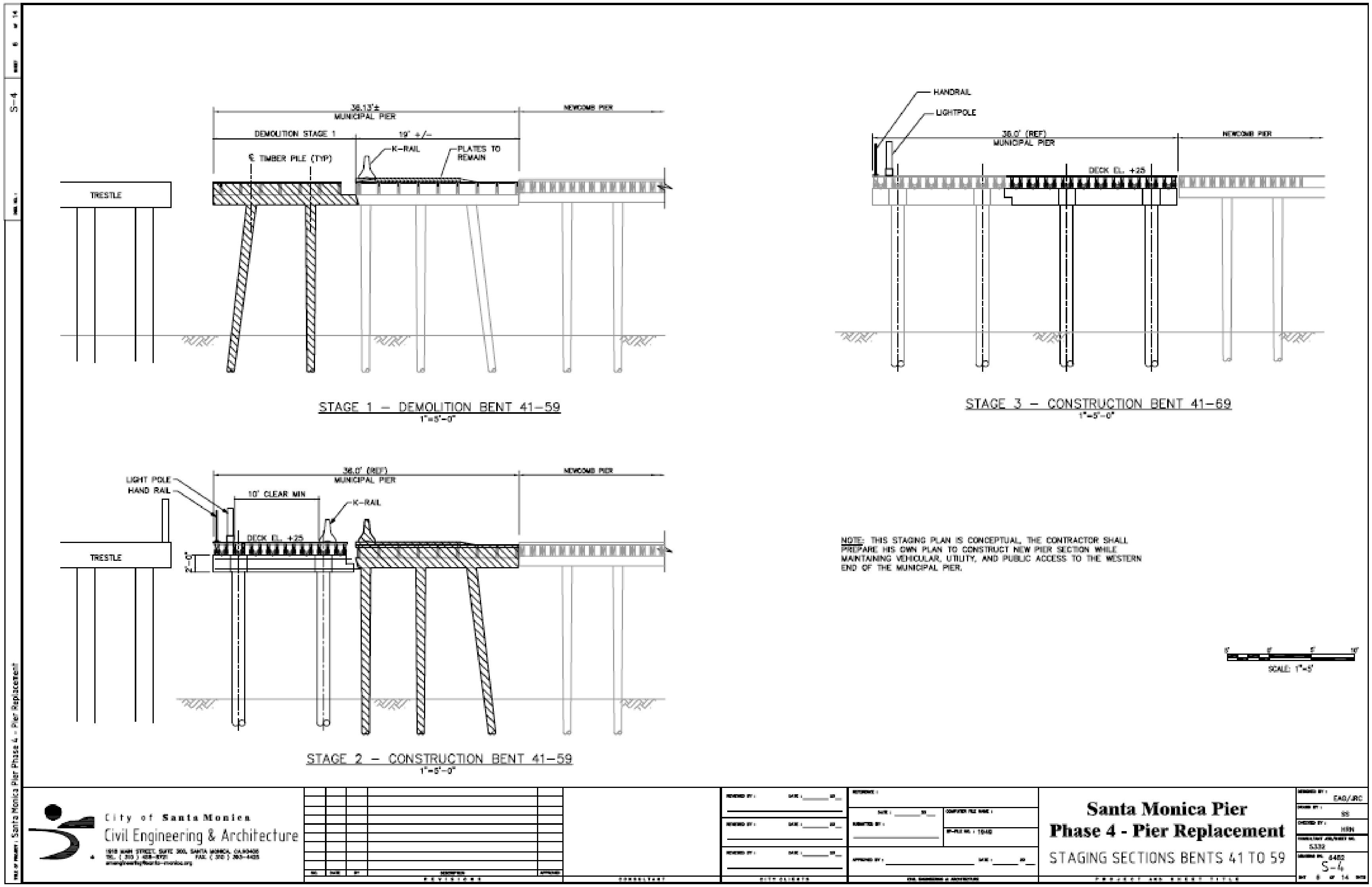

Figure 6. Phase 4 Structural Improvements Staging Cross-Sections.

EXISTING CONDITIONS

Understanding the existing physical and biological conditions at the project site is critical to determining the potential impacts of the proposed project. Knowledge of these parameters allows calculation of mitigation requirements, determination of impacts to marine biological resources and EFH, and increases the probability of designing a low biological impact construction plan within the project's environmental regime. M&A biologist, Lawrence Honma, conducted a site survey on December 6, 2010 to document site conditions and qualitatively assess habitat types, fauna, and flora of the project area. Additional information was gathered from a review of research programs and other literature sources.

REGIONAL OVERVIEW

The following regional overview information was obtained from City of Los Angeles 2007.

Santa Monica Bay is located within a large and gradual bend in the coastline, regionally called the Southern California Bight (SCB). The SCB is bounded on the west by the California Current and extends from Point Conception to Cabo Colnett, Baja California, Mexico. The marine life of the SCB is abundant and diverse because of the various habitats, environmental conditions, and persistent upwelling events. Interactions between the physiography, currents, wind, and anthropogenic inputs contribute to the richness of this body of water. The continental shelf within the SCB contains relatively deep nearshore waters and a complex bottom topography resulting in habitats of rapidly changing depths, many hard- and soft-bottom regimes, multiple island outcrops, and deep basins.

Additionally, the SCB is located in a transitional area between Pacific subarctic, Pacific equatorial, and North Pacific central water masses; consequently, the fauna contains representatives from each of these sources. For example, of the 554 species and 144 families of California marine fishes, 481 species (87%) and 129 families (90%) occur in the SCB. Likewise, the marine benthic invertebrates in the SCB exhibit great diversity, including representatives of nearly all invertebrate phyla. Although, the total number of species in the region is unknown, some researchers estimate there may be more than 5,000 species of invertebrates (infaunal and megabenthic invertebrates) found in the SCB.

Santa Monica Bay bathymetry is primarily composed of soft-bottom shelf, punctuated with substantial deep rocky reef (e.g., Short Bank). Two submarine canyons, Redondo and Santa Monica, are prominent features of this otherwise homogeneous setting. Specifically, Santa Monica Bay soft-bottom habitats are a mixture of silt, sand, clay, and gravel. The combination of diverse sediment types and complex bottom topography creates a heterogeneous benthic environment throughout the Bay. The composition of demersal fish and benthic invertebrate populations varies along these heterogeneous gradients.

Water Quality

Water quality within the project area reflects natural seasonal patterns. During late spring through fall, solar heating preferentially warms the ocean surface, resulting in depth-related gradients in water temperature (thermocline). A strong density gradient (pycnocline), related primarily to the water temperature changes with depth, restricts vertical mixing of the water column, which affects the depth distribution of most water quality parameters (Daley et al. 1993). During winter and early spring, the strength of the vertical stratification decreases in response to weaker solar heating, mixing by winter storms, and upwelling.

Upwelling of cold water occurs during periods of equatorward winds when warmer surface waters are moved offshore and replaced by deep water. Local upwelling events are only observed in winter and early spring when nearshore winds within the SCB are comparable in magnitude to those offshore (Dailey et al. 1993). These colder waters have lower dissolved oxygen, but they have higher salinity and, most importantly, are richer in nutrients. Upwelling of nutrient rich, deeper waters is critical to primary production and the productivity of coastal waters. In summer and fall, winds are weak and local upwelling is rarely observed.

El Niño Southern Oscillation (ENSO) is a major source of inter-annual climate variability in the SCB, characterized by a warming of the tropical east Pacific and a rise in sea level that propagates northward into the SCB. The high sea level anomalies in the SCB produce warmer surface water temperatures and a deeper thermocline, while the opposite conditions accompany a cold La Niña event. The ENSO cycle in the Pacific is not regular because of the complex feedback mechanisms between the tropical ocean and the atmosphere, but it occurs on average about every four years and can last a year or more. Major El Niño events can have severe climatic and ecological effects in the SCB.

Additionally, stormwater runoff from coastal rivers and streams adds large volumes of freshwater that can cause turbidity plumes and reductions in near-surface salinity up to many miles from shore. River and stream discharges also add suspended sediments, nutrients, bacteria and other pathogens, and chemical contaminants to nearshore waters. Publicly-owned treatment works (POTWs) discharge treated sewage effluent to the ocean through subsurface wastewater outfalls, which introduces a low-salinity plume containing suspended solids and pollutants to the marine environment. Historically, municipal wastewaters were the largest source of pollutants to southern California coastal waters. However, more stringent effluent limits have reduced the mass emissions of contaminants from POTWs to the extent that non-point source inputs presently are recognized as the primary source of contaminants to coastal waters of the SCB (Schiff et al. 2000). Wastewater from the City of Los Angeles has been discharged into the waters of Santa Monica Bay since 1894 from the Hyperion Treatment Plant. As the population of Los Angeles grew, so did the flow of sewage, and as a result, treatment practices at Hyperion changed to cope with population growth and the resultant increased sewage flows to the plant. In late 1951, Hyperion initiated full secondary treatment, and by 1957, treatment volume increased to where Hyperion was discharging only partial secondary effluent into Santa Monica Bay through the 5-Mile Outfall. On November 23, 1998, following plant reconstruction and upgrades to the treatment process, Hyperion once again began discharging full secondary-treated effluent into Santa Monica Bay. The plant has a dry weather capacity of 450 million gallons per day (MGD) for full secondary treatment and an 850 MGD wet weather capacity.

Temperature and Salinity

The salinity in the surface waters of the SCB is relatively constant (isohaline) with salinities in the nearshore peaking in July at approximately 33.6 parts per thousand (ppt) and decreasing in late winter and early spring to 33.4 -33.5 ppt (Dailey et al. 1993). Tide and temperature data are recorded at the National Oceanic and Atmospheric Administration (NOAA) station (Station ID: 9410840) located on the Santa Monica Pier. In 2010, the sea temperatures ranged from a low of 53.4°F in May to a high of 69.3°F in July, with an annual average of 60.9°F (Figure 7.)

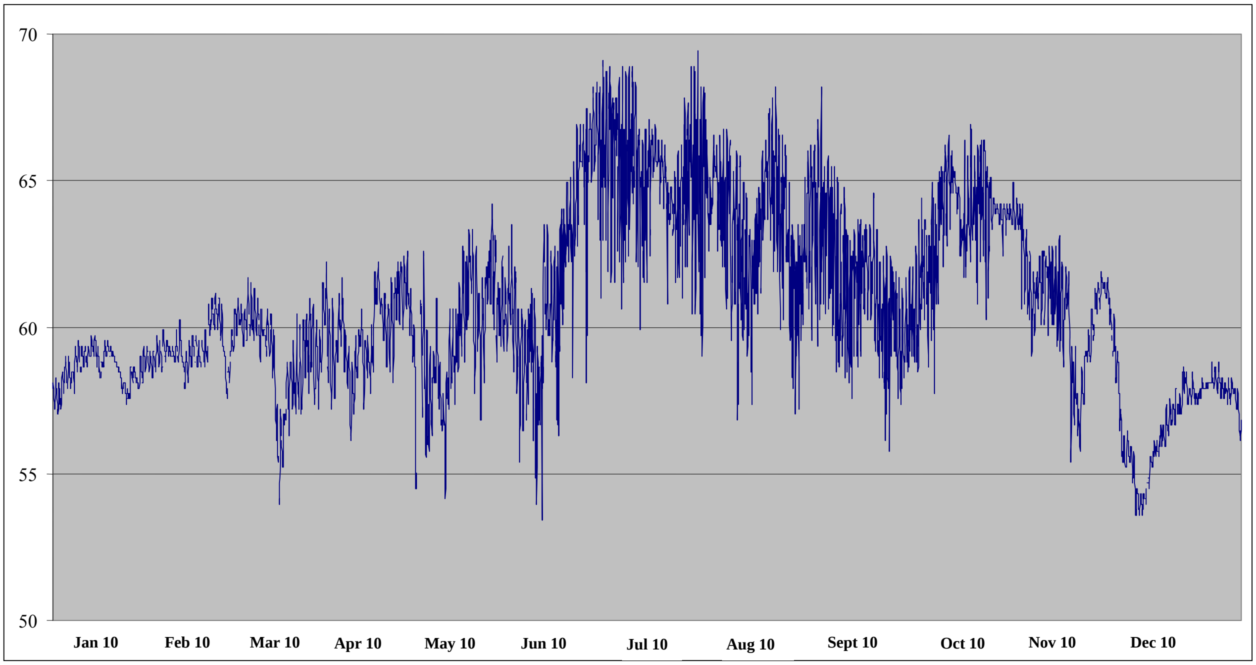

Figure 7. Hourly surface water temperatures (°F) at NOAA Station 9410840 at Santa Monica Pier, California from January through December 2010.

Beneficial Uses

The existing beneficial uses of Los Angeles County beaches and nearshore areas, as identified in the Basin Plan (RWQCB 2005) include:

- COMM: includes the uses of water for commercial or recreational collection of fish, shellfish, or other organisms;
- REC-1: includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible;
- REC-2: includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible;
- WILD: includes uses of water that support terrestrial ecosystems;
- MAR: includes uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds);
- MIGR: includes uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish;
- SPAWN: includes uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. This use is applicable only for the protection of anadromous fish;

- SHELL: Includes uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters and mussels) for human consumption, commercial, or sport purposes; and
- NAV: includes uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

It should also be noted that in 1998, Santa Monica Bay was listed on the 303(d) for coliform bacteria, preventing beaches from attaining REC-1 beneficial use status, and in 2003 the Santa Monica Bay Beaches Bacteria Total Maximum Daily Load (TMDL) for wet and dry weather became effective.

Sediment Quality

Sediment quality typically varies in relation to grain size and proximity to input sources. Trace metal and organic contaminants in coastal waters typically have strong affinities for suspended particulates that eventually settle to the bottom where they become incorporated into the bottom sediment. Because of their high surface-to-volume ratio, finer sediments (silts and clays) generally have higher contaminant concentrations than coarser sediments (sands). Once incorporated into bottom sediments, contaminants may be remobilized through current- or storm induced resuspension, bioturbation, or mechanical disturbance such as dredging.

Within Santa Monica Bay, historic discharges of DDT and PCBs have accumulated in bay sediments and caused contamination of some seafood species. In addition, the Hyperion Treatment Plant, which has been in operation since 1894, discharged raw sewage into the Santa Monica Bay. Prior to 1987, sludge was disposed into Santa Monica Bay from the plant; however, since 1988, full secondary treatment has been used and has resulted in a dramatic reduction in the discharge of solids to the bay.

As part of the National Pollutant Discharge Elimination System (NPDES) permit for the operation of the Hyperion Treatment Plant and for the discharge of stormwater and urban runoff, sediment samples are collected at 44 offshore stations in Santa Monica Bay. Sediment quality was evaluated using two statistical thresholds. The ERL (Effects Range - Low) test identifies the threshold – or concentration – of metals or organic compounds below which adverse impacts are rarely found. The ERM (Effects Range - Median) identifies the concentration above which adverse impacts are frequently found. Based on their concentrations with respect to ER-L and ER-M, metals were expected to have low biological impact on benthic organisms at the 5-Mile Outfall and other locations sampled in the bay, but total DDT and PCBs were expected to have some biological impacts (City of Los Angeles 2007).

While these findings are important to note, it is unlikely that similar sediment conditions would exist in the project area. While there are no data to support this conclusion, sediment quality in the vicinity of the project area would not be expected to have elevated levels of metals or organics, as the material is primarily courser sandy material as any fines would be expected to be resuspended and transported due to the high water motion (e.g., surf and littoral currents) present in the nearshore waters

BIOLOGICAL RESOURCES WITHIN THE PROJECT AREA

Four general marine habitat types occur in the project area, and a brief description of each habitat type is described in the following sections. The habitat types include:

- Sandy Beach and Intertidal Zone (> +7 to -2 ft MLLW)
- Unvegetated Sandy Subtidal (-2 to -16 ft MLLW)
- Wharf Pilings
- Water Column

Sandy Beach and Intertidal Zone

A portion of the Phase 4 Improvement effort occurs on the sandy beach (see Figure 4 for elevations and Figure 8 for picture), and includes the removal and replacement of existing piles, in addition to construction of the temporary trestle and site access.

Sandy beaches are relatively unstable habitats due to daily sand movement associated with waves and currents and larger-scale seasonal cycles of sand movement. The intertidal zone, also known as the littoral zone in marine aquatic environments is the area of the foreshore and seabed that is exposed to the air at low tide and submerged at high tide (i.e., the area between tide marks).

Most southern California beaches lose sand in the winter and gain sand in the summer. In addition, daily tidal fluctuations affect the distribution of marine organisms. Therefore, marine organisms common in sandy beach habitats are generally mobile and change position with changes in water level and sediment transport (Dailey et al 1993). Generally higher abundances and species diversity are found on long, gently sloping beaches, while lower abundances and diversity are present on steep, coarse-grained beaches. Common invertebrates observed on southern California sandy beaches include mole crabs (*Emerita analoga*), beach hoppers (*Megalorchestia* spp, *Orchestodea* spp.), amphipods (e.g., *Eohaustorius* spp.), isopods (e.g., *Excirolana* spp.), and other crustaceans; bean clam (e.g., *Donax gouldii*), Pismo clam (*Tivela stultorum*), and olive snail (*Olivella biplicata*); bloodworm (*Euzonus mucronata*) and other polychaete worms (e.g., *Hemipodus borealis*, *Lumbrineris* spp., *Nephtys californiensis*, *Scololepis* spp.); and nemertean ribbon worms (Dailey et al. 1993). Terrestrial insects are also an important ecological component of the sandy beach as they break down kelp wrack (i.e., kelp, algae, and marine plants washed on the shore). The wrack may harbor a variety of insects and invertebrates that are important prey items for gulls and shorebirds.

Sandy beach invertebrates are an important prey base for fish and birds. Nearshore fish forage on the invertebrates when high tides cover the beach. A variety of shorebirds probe the sand in search of worms, crustaceans, and small clams. Gulls are opportunistic feeders on invertebrates they pick from the swash zone or on wrack, as well as trash or debris left by humans. Beaches are important resting areas for shorebirds, gulls, and other seabirds such as terns and the California brown pelican. Terrestrial birds also may forage along the back beach shoreline.

California grunion (*Leuresthes tenius*) may also utilize the sandy beach habitat during certain times of the year. Grunion travel from their habitat in nearshore waters to specific sandy beaches just after certain full and new moons in conjunction with their distinctive mode of spawning. Spawning takes place during nighttime high tides between March and August. Eggs are deposited into the sand of

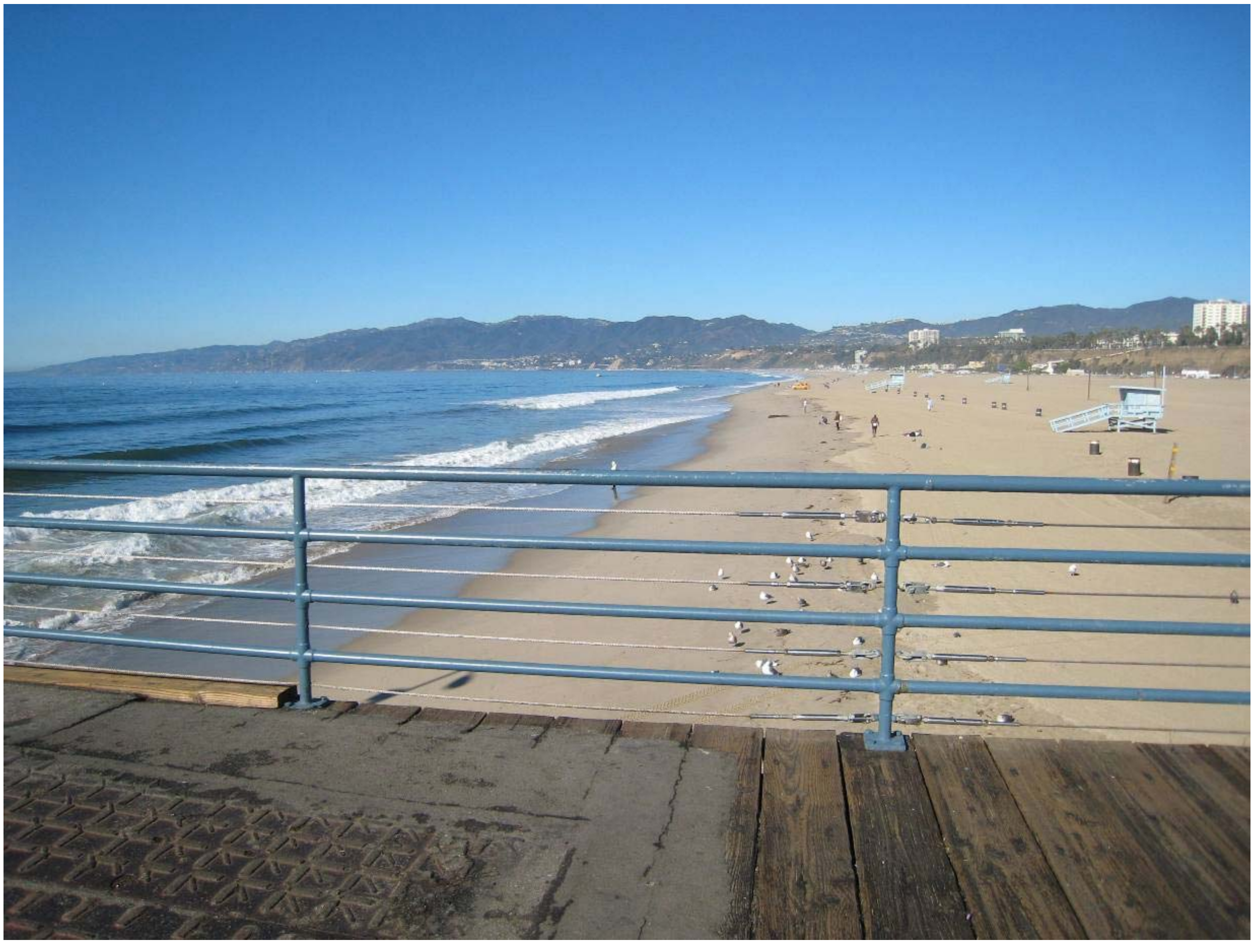

Figure 8. Nearshore Extent of Phase 4 Improvement Project includes Sandy Beach Habitat.

the upper intertidal and then hatch 10 days later following exposure during the next high tide. Given the presence of upper intertidal sandy habitat throughout the year, the beaches within Santa Monica Bay appear to be suitable grunion spawning habitat. Grunion are managed as a game species by the California Department of Fish and Game (CDFG), who post predicted spawning runs on the internet (www.dfg.ca.gov/marine/grunionschedule.asp).

Subtidal Zone

The subtidal zone is the coastal marine area below the intertidal zone. That is, the subtidal zone is the zone in the ocean below the lowest water line, below the lowest tide of the year, and can be extended to a depth of interest, which in this case would be approximately -20 feet MLLW (see Figure 4 for elevations). The site visit indicated that the nearshore waters in the vicinity of the project area are characterized by sandy substrate with wharf piling (Figure 9).

Fishes known to occur in nearshore sandy beach habitat include California corbina (*Menticirrhus undulatus*), California halibut (*Paralichthys californicus*), topsmelt (*Atherinops affinis*), guitarfish (*Rhinobatus productus*), barred sandbass (*Paralabrax nebulifer*), northern anchovy (*Engraulis*

Figure 9. Offshore Extent of Phase 4 Improvement Project.

mordax), Pacific mackerel (*Scomber japonicus*), round ray (*Urolophus halleri*), kelp bass (*Paralabrax clathratus*), walleye surfperch (*Hyperprosopon argenteum*), leopard shark (*Triakis semifasciata*), barred surfperch (*Amphistichus argenteus*), sheephead (*Semicossyphus pulcher*), scorpionfish (*Scorpaena gutatta*), zebra perch (*Hermosilla azurea*), yellowfin croaker (*Umbrina roncador*), spotfin croaker (*Roncador stearnsii*), and white croaker (*Genyonemus lineatus*).

The 2003 Regional Bight Program sampled several stations in the vicinity of the project area (Stations 4101 and 4181; SCCWRP 2007; see Figure 1). Species collected during otter trawl sampling are listed in Table 2, and benthic infauna sampling indicated a variety of infaunal species, dominated by polychaete worms (e.g., *Lumbrineris zonata*, *Mediomastus* sp, Spionidae), crustaceans (e.g., *Ericthonius brasiliensis*), amphipods (e.g., *Ampelisca* sp.), anemones (*Zaolutus actius*), and molluscs (e.g., *Caecum crebricinctum*, *Epitonium sawinae*). Other epibenthic invertebrates common in shallow subtidal sandy habitats include sand dollars (*Dendraster excentricus*), tube-dwelling polychaete worms (*Diopatra ornata*, *Pista pacifca*), sea pens (*Sylatula elongata*), sea pansies (*Renilla koellikeri*), crabs (*Heterocrypta occidentalis*, *Randallia ornata*), snails (*Olivella biplicata*), clams, burrowing anemones (*Haranactis attenuate*), and sea stars (*Astropectin armatus*).

In 2003, 16 species of macroinvertebrates were collected by otter trawl off the Scattergood Generating Station, located downcoast of the project area (City of Los Angeles 2007). The most abundant species were spiny sand star (*Astropecten armatus*), the giant bell jelly (*Scrippsia pacifica),* California sand star (*Astropecten verrilli*), and tuberculate pear crab (*Pyromaia tuberculata*). The annual NPDES monitoring report (October 2005 through September 2006) noted at least 67 distinct macroinvertebrate taxa were impinged during normal operations at the Scattergood Generating Station (City of Los Angeles. 2007). The most abundant taxa were intertidal coastal shrimp (*Heptacarpus palpator*), the opalescent nudibranch (*Hermissenda crassicornis)*, red rock shrimp (*Lysmata californica*), yellow crab (*Cancer anthonyi*), and the jelly (*Polyorchis penicillatus*), and combined accounted for 86% of annual impingement abundance.

No rocky substrata was observed within the project area, and therefore no macroalgal species associated with rocky reef habitat (e.g., kelp, surfgrass) were observed. Macroalgae were only observed on the wharf pilings (see following section).

Table 2. Species Collected during Trawl Surveys during 2003 Bight Survey in Vicinity of Project Area.

	Common Name	Scientific Name
Fish	Speckled Sanddab	*Citharichthys stigmaeus*
	California Halibut	*Paralichthys californicus*
	English Sole	*Parophrys vetulus*
	White Seaperch	*Phanerodon furcatus*
	Curlfin Turbot	*Pleuronichthys decurrens*
	Diamond Turbot	*Pleuronichthys guttulatus*
	Spotted Turbot	*Pleuronichthys ritteri*
	Hornyhead Turbot	*Pleuronichthys verticalis*
	Plainfin Midshipman	*Porichthys notatus*
	California Lizardfish	*Synodus lucioceps*
	Fantail Sole	*Xystreurys liolepis*
Megabenthic Invertebrates	Hydroid	*Aglaophenia* sp
	Armored Sea Star	*Astropecten armatus*
	Blackspotted Bay Shrimp	*Crangon nigromaculata*
	California Blade Barnacle	*Hamatoscalpellum californicum*
	Sponge	*Leucilla nuttingi*
	Hermit Crab	*Paguristes* sp
	Pea Crab	*Pinnixa franciscana*
	Hydroid	*Plumularia* sp
	Hemphill's Kelp Crab	*Podochela hemphillii*
	Xantus Swimming Crab	*Portunus xantusii*
	Bryozoan	*Thalamoporella* sp

Data from Stations 4101 and 4181 in water depths less than 45 ft.

Wharf Pilings

Wharf pilings provide a firm substrate within the water column, and the distribution of organisms can show variation that is correlated with the degree of exposure to surf and waves (Ricketts et al. 1985). In addition, the distribution of organism on pilings can mimic similar distributional or zonation patterns observed within the rocky intertidal zone.

The faunal community on pilings can be relatively diverse, and some of this diversity can be attributed to the increased habitat complexity provided by the presence of a dominant organism, mussels (*Mytilus* sp.). While the higher tidal levels generally supported barnacles (e.g., *Balanus* sp., *Chthamalus* sp., *Pollicipes* sp.), mussel beds were common features at the lower tidal level on most pilings (Figure 10). Mussel beds support a diverse assemblage of sessile and mobile invertebrates such as sea stars (*Pisaster ochraceus*), hydroids (*Obelia* sp.), purple sea urchins (*Strongylocentrotus purpuratus*), rock scallops (*Crassedoma giganteum*), aggregating anemones (*Anthopleura elegantissima*), tunicates (*Styela* spp.), crustaceans (amphipods and crabs), bryozoans (*Thalamoporella californica*, *Bugula* spp.), and sponges (*Haliclona* sp.), as well as, several species of ephemeral algae (e.g., *Ulva* sp, *Egregia menziesii*).

Figure 10. Barnacle and Mussel Community on Pilings.

Water Column

Water column habitat is defined as the water covering a submerged surface and its physical, chemical, and biological characteristics. Differences in the chemical and physical properties of the water affect the biological components of the water column, including fish distribution. Water column properties that may affect organisms include temperature, salinity, dissolved oxygen (DO), total suspended solids, nutrients (nitrogen, phosphorus), and chlorophyll a. Other factors, such as depth, pH, water velocity and movement, and water clarity, also affect the distribution of aquatic organisms.

One group of organisms that occupies the water column and that has not been discussed in the previous sections includes plankton. Plankton is a generic term that includes a broad and diverse group of microscopic plants and animals that occur in the water column, and although many have swimming capabilities they are subject to transport by currents. Typically, the smallest planktonic organisms are the phytoplankton, which are tiny plants. The most abundant components of the phytoplankton are the diatoms and dinoflagellates, which range in size from a few micrometers to a few hundred micrometers. Periodically, high concentrations of phytoplankton (plankton blooms) result in visible coloration of the water termed “red tides.” Fish larvae and eggs are referred to as ichthyoplankton. Zooplankton include animals that reside permanently in the water column (e.g., cladocerans, copepods, salps), as well as larval forms of many benthic invertebrates (e.g., clams, crabs, lobster, sea urchin). Bacteria, which play a critical role in the degradation of particulate organic matter, also occur in the plankton. Plankton generally are short-lived organisms or larvae of fish and benthic invertebrates that have relatively short planktonic stages (ranging from days to months). This as well as seasonal differences in spawning periods of fish and invertebrates, currents, nutrients, and oceanographic conditions all contribute to variability in the species composition of plankton at any particular location or time (Dailey et al. 1993).

Many of the invertebrates that inhabit sandy beaches seasonally recruit from the plankton (e.g., sand crabs, bean clams, Pismo clams, worms). This also is true for intertidal and subtidal rocky habitats (e.g., shore crabs, lobster, sea urchins, sea stars).

BIRDS

Based on surveys conducted in Santa Monica Bay between January 2006 and July 2007, a total of 6,306 individual birds were observed (Bearzi et al. 2009). The most commonly sighted seabirds were gulls (family Laridae, genus *Larus*), which comprised approximately 56% (n=3,508) of the observations. The majority of gulls were Western gulls (Lar*us occide*ntalis), California gulls (*L. californicus*), ring-billed gulls (*L. delawarensis*), Heermann’s gulls (*L. heermanni*), and Bonaparte gulls (*L. philadelphia*). Pelicans (*Pelecanus occidentalis*) were the second group most often observed (approximately 19%; n=1,736), followed by terns (approximately 7%; n=616), and Western grebes (*Aechmophorus occidentalis*), which accounted for approximately 7% (n= 412) of the observations. While endangered (state and Federal) California least terns (*Sternula antillarum browni*) were typically recorded during coastal surveys in the summer months, elegant terns (*Sterna elegans*) were observed both in coastal and offshore water. Sooty shearwaters (*Puffinus griseus*) were also more common during the summer months in the offshore waters, and comprise approximately 5% (n=339) of the observations. Xantus’s murrelet (*Synthliboramphus hypoleucus*), a state threatened species was also observed during surveys in offshore waters. Generally, the distribution of seabirds was closely correlated to prey availability, which tended to be higher in more productive areas, such as the submarine canyons (Bearzi et al. 2009).

While many seabird species use the bay on a year-round or seasonal basis, and may opportunistically use the project area for foraging or resting, few nest in the area. One important exception is the California least terns, as there is a least tern nesting area in Venice Beach (approximately 3.6 miles away; see Figure 1). Foraging surveys for the Venice Beach colony indicate that least terns are opportunistic feeders, but have higher foraging activity within 1 mile of the nesting area than further away (Atwood and Minsky 1983). As such, it would be uncommon to find least terns around the pier when young are in the nest. Terns may forage irregularly in the area prior to egg laying of while incubating.

MARINE MAMMALS

Marine mammal species known to occur within Santa Monica Bay include the California sea lion (*Zalophus californianus*), harbor seals (*Phoca vitulina rishcardsi*), northern elephant seal (Mirounga angustirostris), bottlenose dolphin (*Tursiops truncatus*), shortbeaked common dolphins (*Delphinus delphis*), long-beaked common dolphins (*D. capensis*), and gray whales (*Eschrichtius robustus*).

Given the project area, greater concern is placed on those species that occur closer to shore. Sea lions and harbor seals are regularly observed in coastal waters (< 0.3 miles from shore), but also use the entire bay with both species showing a preference for areas around submarine canyons (Bearzi et al. 2008). The project area is not considered a major seal or sea lion haul out area. Northern elephant seals were only seen in offshore waters and mostly in proximity of canyons (Bearzi et al. 2008). Bottlenose dolphins were also observed year-round in shallow waters (within 0.3 miles from shore) clearly separated from the distribution of short-beaked and long-beaked common dolphins, which were found year-round in the bay but mostly far from shore (Bearzi 2005). Gray whales may also be observed close to shore during their annual migration between the Arctic to the lagoons of Baja California, Mexico.

THREATENED, AND ENDANGERED SPECIES

California least terns (*Sternula antillarum browni*) are one of three least tern subspecies breeding in North America, and nests from April through August along the coast from the San Francisco Bay in California to lower Baja California. They have nested near Venice Beach since 1894, although colony size and reproductive success have varied widely from year to year depending on the quality of nesting habitat, predation and predator presence, prey availability, and human disturbance (Ryan and Vigallon 2009; also see Figure 1 for location of nesting area).

Xantus's murrelet (*Synthliboramphus hypoleucus*) have been observed within Santa Monica Bay, but generally in offshore waters (Bearzi et al. 2009). They breed on islands off the coast of southern California, and feed on larval fish or other small prey by diving down to depths of 70 ft and remaining underwater for up to 28 seconds.

ESSENTIAL FISH HABITAT

Under the provisions of the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Federal Register 1997), the amendments require the delineation of "essential fish habitat" for all managed species. Essential fish habitat (EFH) has been designated over all tidal marine waters in southern California. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH, and respond in writing to the NMFS's recommendations.

The entire coastal area ranging from the mean high tide line to offshore depths represents EFH, and are managed through two applicable plans, the Pacific Groundfish and Coastal Pelagic fishery management plans (FMPs). The habitat designations associated with those plans are defined below.

EFH for species in the Pacific Groundfish FMP (NMFS 2008), which applies to 89 fish species (e.g., flatfish, rockfish, sharks) is identified as all waters and substrate within the following areas:

- Depths less than or equal to 3,500 meters (1,914 fathoms) to mean higher high water (MHHW);
- Water level (MHHW) or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow;
- Seamounts in depths greater than 3,500 m as mapped in the EFH assessment GIS; and
- Areas designated as Habitat Areas of Particular Concern (HAPC) (e.g., seagrass, kelp canopy, estuaries, rocky reef).

EFH for species in the Coastal Pelagic FMP (NMFS 1998), which applies to four fish and one invertebrate species (e.g., anchovy, sardine, Pacific mackerel, jack mackerel, and market squid) is identified as all waters and substrate within the following areas:

- All marine and estuarine waters from the shoreline to the limits of the Exclusive Economic Zone (EEZ), which extends approximately 200 nautical miles offshore; and
- Water surface boundary, which is the water column between the thermoclines where temperatures range from 10 to 26 degrees Centigrade.

To support the EFH consultation process, an assessment of the project effects on EFH is provided in Appendix A. The consultation process is a separate action from the CEQA review process; however, impacts and mitigation measures are often times shared or similar between EFH consultation and environmental review and other regulatory permitting requirements. For this reason, the EFH assessment document has been incorporated into this document for completeness purposes.

IMPACT ANALYSIS

Several regulations and guidelines were considered for the assessment of existing conditions and subsequent impact analysis for marine biological resources. These included:

- CEQA
- California Department of Fish and Game Code
- California Coastal Act
- Coastal Zone Management Act
- Endangered Species Act and amendments
- Magnuson-Stevens Fishery Conservation and Management Act and amendments
- Marine Mammal Protection Act
- Migratory Bird Treaty Act

SIGNIFICANCE CRITERIA

Criteria for determining the significance of project-related impacts on biological resources are based on the resource's relative sensitivity and regional status, including the proportion of the resource that would be affected relative to its occurrence in the project region (Santa Monica Bay, Los Angeles County), the sensitivity of the resource to activities (e.g., noise or disturbance) associated with the proposed project, and the duration or ecological ramifications associated with the effect. Impacts are considered significant if they would results in:

- Degradation of critical habitat or reduction in the population size of a listed species (threatened or endangered);
- Degradation of rare or biologically valuable habitat;
- A measurable change in ecological function within the project vicinity;
- A measurable change in species composition or abundance beyond that of normal variability;
- A substantive loss of water surface area through fill or surface water coverage as a result of permanent structures such as docks, wharves, and permanently moored vessels. Small structures such as moorings, navigational aids, individual or widely spaced piles do not result in a substantive loss of water area; or
- An obstruction or alteration of circulation patterns that result in a discernable degradation of water mixing, circulation, or flushing to the extent that biota would be negatively affected in the system.

Short-term impacts were defined as those lasting less than 5 years, while long-term impacts are those that last for longer periods or are permanent. A direct impact is defined as physical modification, such as shading of a previously unshaded habitat or loss of habitat. Indirect impacts are generally more removed from the actual environmental change in both space and time. These may include changes in water circulation or littoral transport associated with the construction of an in-water structure.

Since the project will be phased (i.e., Emergency Gangway and Floating Dock and Phase 4 Structural Upgrades will occur at different times), the impacts are analyzed based on each phase. In addition, various elements are considered including impacts from operations, as well as, construction of each phase.

CONSTRUCTION

Non-Significant Impacts

Specific non-significant impacts associated with the proposed project include the following:

- Emergency Gangway and Floating Dock
  - Short-term increases in turbidity during pile removal and anchor placement may lead to reduction of water quality leading to displacement or potential mortality of benthic infauna, epifaunal, and fish. Given the substrate type (i.e., sand) and open ocean environment, this impact is considered short-term and localized, as it is expected that any resuspended sediment would quickly settle to the bottom or be dispersed by water motion. Project-related turbidity is not expected to affect foraging by least terns (see discussion regarding least tern foraging and behavior in the Phase 4 analysis).
  - Direct loss/mortality of benthic infauna and epifauna during pile removal and installation of helical anchors that support the seaflex mooring system. Assuming construction will require the insertion of 12 helical anchors with a 1 ft diameter, approximately 9 ft^2 will be disturbed from anchor installation, and assuming one, 18-inch pile will be installed; approximately 2 ft^2 of benthic habitat will be disturbed from pile driving. This impact is considered short-term and localized, with the rapid recovery of existing marine species composition and diversity expected within two years or less.
  - Short-term increases in noise during construction (e.g., pile removal, anchor driving activities) could affect the behavior of some species in the immediate vicinity. This

impact is not considered significant for waterbirds, mammals, fish, and mobile marine invertebrates that can temporarily relocate to adjacent habitats away from noise and vibration effects.

- Phase 4 Structural Upgrades
  - Pile driving activities have been conducted at a number of locations in close proximity to least tern nesting areas. For example, several projects have been implemented in San Diego Bay during the least tern nesting season (e.g. Glorietta Bay Marina, North Harbor Drive Bridge). These activities were monitored to assess affects of pile driving on least tern behavior and turbidity generation. In both pile driving and vibratory pile jetting activities, least terns were observed to forage normally within the immediate proximity of the work area, and turbidity generation at the pile placement location was either nominal or non-detectable at the surface. Similarly, piles were vibrated down and then driven to completion on the wharf extension for the National City Marine terminal. These also were conducted during the least tern nesting season. During construction, bird activities at the D Street Fill colony and in proximity were monitored and no observed adverse effects on bird behavior were noted with this work (E. Maher, Port of San Diego, pers. comm.). Given that the closest nesting area to the project (the Venice Beach nesting area is approximately 3.6 miles from the project area), pile driving activities are not expected to result in significant impacts to least tern foraging or nesting activities.
  - Direct loss/mortality of benthic infauna and epifauna during pile removal and installation. Assuming 76, 18-inch piles will be installed; approximately 170 ft^2 of benthic habitat will be disturbed. It can also be assumed that at a similar amount of area would be affected during pile removal. Therefore, approximately 340 ft^2 of benthic habitat would be directly affected from pile removal and installation. This impact is considered short-term and localized, with the rapid recovery of existing marine species composition and diversity expected within two years or less. Further, the benthic and epibenthic community complexity is expected to increase in the area as a result of detrial rain from the new pile field.
  - In addition, the construction of the temporary trestle would result in a similar level of disturbance to benthic habitat (approximately 340 ft^2) due to the installation and removal of temporary steel piling. Similar to above, the impact is considered short-term and localized with the rapid recovery of existing marine species composition and diversity expected following removal of the temporary structure.
  - Pile removal would also result in the loss of the fauna and flora associated with the piling community. Since organisms that occupy this habitat are considered opportunistic, this impact is considered short-term and minimal, with the rapid recovery of existing marine species composition and diversity expected within two to four (2-4) years or less.
  - Short-term increases in noise during construction (e.g., pile removal, pile-driving activities) could affect the behavior of some common species. This impact is not considered significant for common waterbirds, mammals, fish, and mobile marine invertebrates that can temporarily relocate to adjacent habitats.
  - Short-term increases in turbidity during pile removal may lead to reduction of water quality leading to displacement or potential mortality of benthic infauna, epifaunal, and fish. Given the substrate type (i.e., sand) and open ocean environment, this impact is considered short-term and localized, as it is expected that any resuspended sediment would quickly settle to the bottom or be dispersed by water motion. As previously noted,

there is an environmental benefit by replacing the treated wooden timber piles with inert concrete piles.
- The construction of the temporary trestle would result in a temporary alteration of approximately 8,000 ft^2 of open water habitat due to a reduction of surface coverage and increased shading impacts. While the reduction of surface coverage is a concern in enclosed bays and estuaries as it reduces foraging habitat for seabirds, given the project area (open coast), the area lost constitutes an insignificant portion of the bay. In addition, the temporary trestle is anticipated to be in place for approximately 10 months, and after completion of the Phase 4 Upgrade, would be removed. Shading impacts are not expected to have any effect, as the project area does not support any macroalgae or plants, except that algae associated with the pier itself.
- No change in water circulation due to placement of temporary trestle is anticipated, although additional piles may affect littoral transport of sediments. This is expected to be a temporary impact, as the trestle would be removed following completion of the Phase 4 Upgrade.

Significant Impacts

Specific significant impacts associated with the proposed project include the following:

- Emergency Gangway and Floating Dock
  - No significant impacts are anticipated with the construction of the emergency gangway and floating dock.

- Phase 4 Structural Upgrades
  - Disturbance to grunion spawning habitat (i.e., sandy beach habitat) may occur during the installation and removal of the temporary trestle (anticipated to occur in in December 2011 and August 2012, respectively). This impact is considered significant if construction activities that could affect grunion spawning habitat overlaps with a grunion spawning event. Grunion spawning occurs from March to August, although the peak runs occur early in the season.

OPERATIONS

Operations would consist of normal day-to-day activities that occur on the pier following construction. A variety of retail, food, and entertainment outlets, as well as a police substation and a world class amusement park are located on the pier, and attract over four million visitors a year.

Non-Significant Impacts

Specific impacts from operations of the proposed project that would be considered less than significant include:

- Emergency Gangway and Floating Dock
  - Alteration of 1,800 ft^2 of open water habitat due to placement of floating dock reduces surface coverage and increases shading impacts. While the reduction of surface coverage is a concern in enclosed bays and estuaries as it reduces foraging habitat for seabirds, given the project area (open coast), the area lost constitutes an insignificant portion of the

bay. Shading impacts are not expected to have any effect, as the project area does not support any macroalgae or plants.
    - No detectable change in water circulation or littoral transport is expected from the installation of the mooring system or floating dock.
    - No reduction or impairment to water or sediment quality is anticipated from operations of the emergency gangway and floating dock.

- Phase 4 Structural Upgrades
    - Portions of the pier have undergone structural upgrades as part of the previously completed Phase 1, Phase 2, and Phase 3 Pier Replacement Projects. The last remaining portion of the pier still supported by submerged timber piles is the portion of the pier that is the subject of the proposed Phase 4 structural upgrades. As previously noted, there is an environmental benefit by replacing the treated wooden timber piles with inert concrete piles.
    - Operational noise impacts are considered less than significant due to the current and proposed land uses and intensities in the project area.
    - No reduction or impairment to water or sediment quality is anticipated from operations following the Phase 4 Upgrade.

Significant Impacts

No potential significant operational impacts are anticipated.

MITIGATION MEASURES

This section discusses measures that would be implemented to reduce impacts of the proposed project to marine biological resources. Mitigation measures to reduce significant impacts to a less than significant level for the proposed project have been categorized as: 1) Construction Period Impact Minimization/Avoidance Measures and 2) Operational Impact Minimization Measures. The mitigation measures are based on the assumed construction schedule (see Table 1). If the construction schedule changes, the mitigation measures could be applied to offset any potential impacts.

CONSTRUCTION PERIOD IMPACT MINIMIZATION/AVOIDANCE MEASURES

- Schedule temporary trestle removal (or if the schedule were to change, any beach-disturbing activity) outside of the grunion spawning season (March to August).
- If construction overlaps the grunion spawning season, conduct grunion monitoring prior to any beach-disturbing activity (check CDFG website for spawning events as spawning events occur bi-weekly). If grunion are observed, quantify the extent and location of the run (e.g., Walker Scale) and notify CDFG regarding potential action. If no grunion are observed, it is assumed that construction can proceed.

OPERATIONAL IMPACT MINIMIZATION MEASURES

No significant impacts are anticipated from the operational aspect of the project and therefore no minimization measures are required.

UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

Based on the proposed mitigation measures outlined above, no unavoidable adverse impacts to marine habitats and/or biota would be expected.

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Appendix A
Essential Fish Habitat Assessment

ESSENTIAL FISH HABITAT ASSESSMENT

This assessment of Essential Fish Habitat (EFH) for the Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade Project is provided in accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Federal Register 1997). The amendments require the delineation of EFH for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH, and respond in writing to the NMFS's recommendations.

The EFH Guidelines (50 CFR 600.05 - 600.930) outline the process for Federal agencies, NOAA Fisheries and the Fishery Management Councils to satisfy the EFH consultation requirement under Section 305(b(2)-(4)) of the Magnuson-Stevens Act. As part of the EFH Consultation process, the guidelines require Federal action agencies to prepare a written EFH Assessment describing the effects of that action on EFH (50 CFR 600.920(e)(1)). The EFH Assessment is a necessary component for efficient and effective consultations between a Federal action agency and NOAA Fisheries.

DEFINITIONS

EFH consist of those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802(10)).

- Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate (50 CFR 600.10).
- Substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities (50 CFR 600.10).
- Necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem (50 CFR 600.10).
- Healthy ecosystem means an ecosystem where ecological productive capacity is maintained, diversity of the flora and fauna is preserved, and the ecosystem retains the ability to regulate itself. Such an ecosystem should be similar to comparable, undisturbed ecosystems with regard to standing crop, productivity, nutrient dynamics, trophic structure, species richness, stability, resilience, contamination levels, and the frequency of diseased organisms (50 CFR 600.10).

Adverse effect means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810(a)).

HABITAT AREAS OF PARTICULAR CONCERN

EFH guidelines published in Federal regulations identify habitat areas of particular concern (HAPC) as types or areas of habitat within EFH that are identified based on one or more of the following considerations:

- The importance of the ecological function provided by the habitat.
- The extent to which the habitat is sensitive to human-induced environmental degradation.
- Whether, and to what extent, development activities are or will be stressing the habitat type.
- The rarity of the habitat type. (50 CFR 600.815(a)(8))

Applicable designated HAPCs for Santa Monica Bay include rocky reefs, canopy kelp, and submarine canyons (NMFS 2008). Rocky habitats are generally categorized as either nearshore or offshore in reference to the proximity of the habitat to the coastline. Rocky habitat may be composed of bedrock, boulders, or smaller rocks, such as cobble and gravel. Hard substrates are one of the least abundant benthic habitats, yet they are among the most important habitats for groundfish. Of the habitats associated with the rocky substrate on the continental shelf, kelp forests are of primary importance to the ecosystem and serve as important groundfish habitat. Kelp forest communities are found relatively close to shore along the open coast. These subtidal communities provide vertically structured habitat throughout the water column: a canopy of tangled blades from the surface to a depth of 10 feet, a mid-water, stipe region, and the holdfast region at the seafloor. Kelp stands provide nurseries, feeding grounds, and shelter to a variety of groundfish species and their prey (NMFS 2008).

Submarine canyons are complex habitats that may provide a variety of ecological functions. Shelf-edge canyons have enhanced biomass due to onshore transport and high concentrations of zooplankton, a principal food source of juvenile and adult rockfish (NMFS 2008). Canyons may have hard and soft substrate and are high relief areas that can provide refuge for fish, and localized populations of groundfish may take advantage of the protection afforded by canyons and the structure-forming invertebrate megafauna that grow there (NMFS 2008).

EFFECTS OF THE PROPOSED ACTION ON EFH

NMFS MANAGED ICHTHYOFAUNA PRESENT ALONG LOS ANGELES COUNTY BEACHES

The ichthyofauna along southern California beaches has been previously studied (SANDAG 2000, SWRCB 1980). Of the fish species noted above that are known to inhabit sandy beach and nearshore soft bottom habitats, at least nine are managed by the NMFS under two Fishery Management Plans (FMPs) – the Coastal Pelagics and Pacific Groundfish Management Plans (NMFS 1998a; Table 1). The Coastal Pelagic Species (CPS) fishery includes four finfish (Pacific sardine, Pacific (chub) mackerel, northern anchovy, and jack mackerel) and the invertebrate, market squid. CPS finfish are pelagic (in the water column near the surface and not associated with substrate) because they generally occur above the thermocline in the upper mixed layer. For the purposes of EFH, the four CPS finfish are treated as a single species complex, because of similarities in their life histories and similarities in their habitat requirements. Market squid are also treated in this same complex because they are similarly fished during spawning aggregations. Of the species managed under the Pacific Groundfish FMP, leopard sharks have been observed along southern California beaches. In addition, the scorpionfish may likely be present in the vicinity of the pier. Other managed groundfish species that were collected during the Bight 2003 survey in the vicinity of Santa Monica Pier included curlfin turbot and English sole (SCCWRP 2007). The species list provided is not intended to be a comprehensive list of managed species that may occur within the project area. It is conceded that other managed species may be present within the project area; however, the intent of the assessment is to focus on potential impacts to habitat, as opposed to species-level impacts.

Table 1. Table of NMFS Managed Species in the Vicinity of the Project Area.

Common Name	Scientific Name
Coastal Pelagics FMP	
Northern Anchovy	*Engraulis mordax*
Pacific Sardine	*Sardinops sagax*
Pacific Mackerel	*Scomber japonicus*
Jack Mackerel	*Trachurus symmetricus*
Market Squid	*Loligo opalescens*
Pacific Groundfish FMP	
Curlfin Turbot	*Pleuronichthys decurrens*
English Sole	*Parophrys vetulus*
California Scorpionfish	*Scorpaena gutatta*
Leopard Shark	*Triakis semifasciata*

Biological Descriptions for Species of Concern

Northern Anchovy

Northern anchovy historically ranged from the Queen Charlotte Islands, British Columbia south to Cape San Lucas, Baja California. More recently, populations have moved into the Gulf of California, Mexico. Larvae and juveniles are often abundant in nearshore areas and estuaries with adults being more oceanic. However, adults can be abundant in shallow nearshore areas and estuaries and eggs and larvae have been found offshore. Northern anchovy are non-migratory but do make extensive inshore-offshore and along-shore movements. In some populations, juveniles and adults are observed moving into estuaries during spring and summer and then back out during the fall. Spawning occurs throughout the year dependent upon the population. In southern California, spawning occurs between January and May. Larvae consume copepod eggs and nauplii, naked dinoflagellates, rotifers, ciliates, and foraminiferans. Adults and juveniles typically consume phytoplankton, planktonic crustaceans, and fish larvae. Northern anchovy are one of the most abundant fish in the California current and are important prey for a variety of fish, birds, and marine mammals. Finally, they are used as indicator of environmental stress, being affected by low dissolved oxygen and water-soluble fractions of crude oil (Emmett et al. 1991).

Pacific Sardine

Pacific sardine is a pelagic species. Individuals can be found in estuaries, but are most common in open coastal habitats and offshore. The Pacific sardine is wide ranging with sardines in the Alguhas, Benguela, California, Kuroshio, and Peru currents, and off New Zealand and Australia being considered the same species. Changes in distribution are common and linked to environmental conditions. In California, sardines are highly mobile and move seasonally. Older adults move from southern California and northern Baja spawning grounds to feeding grounds off the Pacific Northwest and Canada. Younger individuals (two to four years old) migrate to feeding grounds in central and northern California. Juveniles occur in nearshore habitats off northern Baja and southern California. Although numbers vary greatly, at times sardines are the most abundant fish species in the California current. In southern populations spawning occurs year-round with a peak from April to August between Point Conception and Magdalena Bay. Eggs and larva are found everywhere adults are found. Sardines are planktivores consuming both phytoplankton and zooplankton. They are themselves prey for a variety of predators. Eggs and larvae are consumed by numerous planktivores with juvenile and adults being consumed by a variety of fish, birds, and mammals (NMFS 1998b).

Pacific Mackerel

Pacific mackerel is a pelagic species. In the northeastern Pacific, Pacific mackerel range from southeastern Alaska to Banderas Bay, Mexico. As a group they are the same species as mackerel of a variety of names occurring elsewhere in the Pacific, Atlantic, and Indian oceans. Pacific mackerel usually occur within 20 miles of shore. Local populations spawn from Eureka, California south to Cabo San Lucas, Baja California between 3 and 320 km from shore with peak spawning occurring between late April and July. However, fecundity is more closely tied to sufficient food and environmental conditions than to season. Pacific mackerel larvae eat zooplankton including copepods and fish larvae. Juveniles and adults consume small fishes, fish larvae, squid and pelagic crustaceans. Pacific mackerel larvae are predated by numerous invertebrate and vertebrate planktivores. Juveniles and adults are important prey for many large fishes, marine mammals, and birds. Due to their larger size, they are likely less important as forage than Pacific sardine or northern anchovy which are available to a wider variety of predators and are more abundant (NMFS 1998b).

Jack Mackerel

Jack mackerel is a schooling fish that ranges widely throughout the northeastern Pacific. Individuals are found along the mainland coasts to an offshore limit approximated by a line running from the eastern Aleutian Islands, Alaska to Cabo San Lucas, Baja California. Typically, small jack mackerel (< 6 years of age) are most abundant near the mainland coast and islands in the Southern California Bight. Older individuals fill out the geographic range and are generally found offshore in deep water and along the coastline north of Point Conception, California. Jack mackerel spawn between February and October in California, with peak spawning activity between March and July. Larvae eat primarily copepods with the small jack mackerel found off southern California consuming large zooplankton, juvenile squid and anchovy. Jack mackerel are prey items for large predators such as tuna and billfish. They are likely only of minor significance as prey for marine birds because of the large size of adults and their deep schooling (NMFS 1998b).

Market Squid

Adult and juvenile market squid are distributed throughout the California and Alaska current systems from the southern tip of Baja California, Mexico (23° N latitude) to southeastern Alaska (55° N latitude). They feed on copepods as juveniles gradually changing to euphausiids, other small crustaceans, small fish, and other squid. Market squid are harvested near the surface and generally considered pelagic, but are actually found over the continental shelf from the surface to depths of at least 800 meters. They prefer oceanic salinities and are rarely found in bays, estuaries, or near river mouths. Spawning squid concentrate in dense schools near spawning grounds, which occurs over a wide depth range. Known major spawning areas are shallow semi-protected near shore areas with sandy or mud bottoms adjacent to submarine canyons. Spawning occurs year-round, with the peak spawning usually beginning during the fall-spring season in southern California.

Curlfin Turbot

Curlfin turbot) are moderately important in the California trawl fishery. They are found along the Pacific coast of North America from the Bering Sea south to Punta San Juanico, Baja California (Miller and Lea 1972). They generally occur on soft bottom habitat at depths shallower than 90 m, but have been taken between 7 and 349 m (Miller and Lea 1972). Curlfin turbot feed primarily on polychaete worms, nudibranchs, echiurid proboscises, crustacean (possibly crab) eggs, and brittle star fragments (NMFS 2005). They spawn from late April to August.

English Sole

English sole range from central Baja California to Unimak Island, Alaska. They occur in greatest numbers north of Point Conception, California. Juveniles are found in all Pacific coast estuaries from San Pedro Bay, California, to Puget Sound with Elkhorn Slough, California, being the southernmost estuary where they are abundant. Adults make limited movements with a northward migration in the spring to summer feeding grounds, returning in the fall. Spawning occurs over soft-bottom substrates at depths of 50-70 m. Spawning occurs between December and April for southern stocks. Eggs are bouyant and larvae are pelagic. Adults and juveniles prefer soft sand and mud bottoms, generally in less than 12 m of water. Larvae are planktivorous, eating different life stages of copepods and other small planktonic organisms. Juveniles feed on copepods, gammaridian amphipods, cumaceans, mysids, polychaetes, small bivalves, clam siphons, and other benthic invertebrates. Adults eat a variety of benthic organisms, but particularly polychaetes, amphipods, molluscs, ophiouroids, and crustaceans. Larvae are likely eaten by larger fishes, with juveniles falling prey to larger fishes, marine mammals, and birds. Adults may be eaten by marine mammals, sharks, and other large fishes. English sole are an indicator of environmental stress, accumulating contaminants and developing cancerous tumors as a result (Emmett et al. 1991).

California Scorpionfish

The California scorpionfish ranges from Santa Cruz, California south to Uncle Sam Bank, Baja California. It is a benthic species found in both sandy and rocky habitats. Individuals are predominantly solitary, but are known to aggregate near prominent features both natural and human-made. Young fish live in shallow habitats typically hidden within dense algae and bottom-encrusting organisms. Spawning occurs between May and September and peaks in July. Eggs are laid in a gelatinous mass that floats near the surface. The primary food items include juvenile crabs, small fishes (e.g. northern anchovy), octopus, isopods, and shrimps (Core Team 1998).

Leopard Shark

The leopard shark is most commonly found in sandy or muddy bays and estuaries either at or near the bottom. The shark is most commonly encountered in 20 feet (6.1 meters) of water or less, but has been sighted up to 300 feet (91.4 meters) deep. Leopard sharks feed primarily on benthic invertebrates and small fish. Their diet includes invertebrates such as crabs, shrimp, octopi, fat innkeeper worms (*Urechis caupo*), clam siphons, and fish such as midshipmen, sanddabs, shiner perch, bat rays, smoothhounds, and a variety of fish eggs. Female leopard sharks are ovoviviparous and can produce litters of 4 to 33 pups. The gestation period of the shark is between ten and twelve months, and birth usually occurs between April and May. During the summer months - June, July and August – leopard sharks gather together in the shallow water off southern California beaches.

POTENTIAL IMPACTS TO EFH AND FISHES OF CONCERN

The analysis focuses on stressors associated with the proposed project and their potential impact to EFH (i.e., water column, sandy beach and intertidal habitat, subtidal [non-vegetated] habitat) within the project area. Pursuant to 50 CFR 600.910(a), an "adverse effect" on EFH is defined as any impact that reduces the quality and/or quantity of EFH. Factors that were considered in the analysis included the duration, frequency, intensity, and spatial extent of the impact; the sensitivity/vulnerability of the habitat; the habitat functions that might be altered by the impact; and the timing of the impact relative to when the species or life stages may use or need the habitat.

Pile Driving

Pile driving may also have potential impacts on EFH and managed species, both by disturbing the habitat and from sound. A number of studies have examined the effects of sound on fish, and are reviewed in detail in Hastings and Popper (2005). A problem with these studies is that they are highly variable and extrapolation from one study to another or to other sources is not possible. While many of these studies show that fish die if they are near the source, and there are some suggestions there is a correlation between size of the fish and death (Yelverton et al. 1975), little is known about important issues of nonmortality damage in the short- and long-term, and nothing is known about effects on fish behavior.

Several factors determine a fish's susceptibility to injury and death from shock wave effects, like pile driving. Most blast injuries in fish and other marine animals involve damage to air or gas containing organs (Yelverton 1981). Many species of fish have a swim bladder, which is a gas filled organ used to control buoyancy. Fish with swim bladders are vulnerable to effects of underwater explosions or intense pressure, whereas fish without swim bladders, like most species of invertebrates, are much more resistant (Yelverton 1981, Young 1991). During exposure to shock waves, the differential speed of shock waves through the body of the fish (which has a density close to water) versus the gas-filled space of the swim bladder causes the bladder to oscillate. If the swim bladder ruptures, it may cause hemorrhages in nearby organs. In the extreme case, the oscillating swim bladder may rupture the body wall of the fish (Yelverton 1981). Some fish have a swim bladder that is ducted to the intestinal tract and some do not, but there is no difference in susceptibility between fish with these two types of bladders (Yelverton et al. 1973, Yelverton 1981). After a nearby underwater blast, most fish (with or without swim bladders) that die do so within 1 to 4 hours, and almost all do so within 24 hours (Yelverton et al. 1973, Yelverton 1981).

Therefore, pile driving could result in temporary impacts on managed species due to the unavoidable direct loss/mortality of fishes and larvae, and potential prey items, in addition to behavioral modification such as avoidance, and increased turbidity. However, given the random distribution of juvenile and adult fish species, planktonic eggs and larvae, and prey items, and the relatively small area affected (a few square meters at each location), recovery is expected to occur quickly. Therefore, temporary and minimal adverse impacts on EFH or managed species are anticipated from pile driving.

Open Water and Water Quality

Effects from pile removal and installation, and installation of helical anchors would include temporary and localized increases in turbidity and sedimentation. It is anticipated that most species of demersal and pelagic species would avoid construction areas, and that potential impacts would be temporary and minor resulting in the displacement of, followed by post-construction re-colonization by these species. Sedentary demersal fishes may be affected by the temporary increase in sediment loads within the water column during construction. This elevated turbidity could temporarily decrease the foraging efficiency of these fishes; however, these effects are likely to be offset by the provision of additional food resources as invertebrates are released from the bottom during construction. Regarding pile-removal and driving, it is anticipated that the affected area would be relatively small and that any turbidity would quickly dissipate with tidal/water movement.

Sandy Beach and Intertidal Habitat

The construction of the temporary trestle, and Phase 4 pile removal and installation would result in potential impacts to marine infaunal organisms within the project footprint. The loss of benthic organisms within the beach footprint is an unavoidable impact during construction projects. Due to the widespread occurrence and rapid recovery rates of these types of organisms, direct impacts to marine life within the beach construction footprint are expected to be adverse, but minimal. It is anticipated that once construction is completed the beach will be rapidly colonized, mirroring the invertebrate communities on the existing beach within a relatively short time period (City of Encinitas 2005).

Subtidal Habitat

Direct impacts on the benthic community will occur and would include the loss or mortality of any benthic infauna and epifauna within the pile driving/removal footprints. Given the relatively small affected area (approximately 680 ft^2 based on construction assumptions), and that recovery of the disturbed area would occur relatively quickly, impacts are considered adverse, but temporary and minimal.

In addition, the emergency dock would result in the alteration of 1,800 ft^2 of open water habitat and increase shading impacts. While the reduction of surface coverage is a concern in enclosed bays and estuaries as it reduces foraging habitat for seabirds, given the project area (open coast), the area lost constitutes an insignificant portion of the bay. Shading impacts are not expected to have any effect on EFH, as the project area does not support any macroalgae or plants.

Fishes of Concern

Potential impacts to managed fish species are expected to be minimal and temporary. Project activities that could directly affect the identified FMP species include pile removal/installation and anchor installation, which would result in localized increases in turbidity and noise impacts. Increases in turbidity could decrease the foraging efficiency of fishes; however, these effects are likely to be offset by the provision of additional food resources as invertebrates are released from the bottom during construction.

Impacts from the project would be minor for the pelagic fish species in Table 1. The coastal pelagics by nature have low site fidelity. Given the small area affected, interruptions causing pelagics to move into other areas would not cause biologically significant increases in competition due to habitat loss. The project would not impede the spawning success of the coastal pelagics nor cause disturbances that increase predation.

Although California scorpionfish are rare compared to the pelagics listed in Table 1, this species' high fidelity to structured habitats such as pile fields and reefs means it is likely under represented in most fish sampling efforts. From the information available and the habitat characteristics of this species, impacts to California scorpionfish would be probable but minimal. Construction could cause fish to flee the immediate disturbance. Yet the fish will likely remain in the area to capitalize on the exposure of forage resources by construction disturbance. Prey species would be exposed when the bottom is disturbed and others would fall to the bottom due to abrasion and disruption during the removal of the timber piles. Spawning success would not be affected due to the pelagic spawning and buoyancy of the eggs.

Although grunion are not a NMFS-managed fish species, they are managed as a game species by the California Department of Fish and Game (CDFG) and are considered a species of interest. Because a portion of the construction area is sandy beach, it provides suitable grunion spawning habitat. Efforts are recommended to minimize impacts to this fish species.

PROPOSED PROTECTIVE MEASURES

To minimize potential impacts to grunion, schedule temporary trestle installation or removal (or if the schedule were to change, any beach-disturbing activity) outside of the grunion spawning season (March to August). If construction overlaps the grunion spawning season, conduct grunion monitoring prior to any beach-disturbing activity (check CDFG website for spawning events as spawning events occur bi-weekly). If grunion are observed, quantify the extent and location of the run (e.g., Walker Scale) and notify CDFG regarding potential action. If no grunion are observed, it is assumed that construction can proceed.

SUMMARY AND CONCLUSIONS

The proposed project would result in direct, adverse impacts to water column, sandy beach habitat, and non-vegetated subtidal habitat; however, the impacts are considered temporary and minimal, and are not expected to have permanent or population-level impact to EFH or managed species. Potential indirect adverse impacts include turbidity and sedimentation due to the resuspension of sediments from pile removal and installation; however, potential impacts are expected to be temporary and localized.

Impacts from the project would be minor for the pelagic fish species in Table 1. The coastal pelagics by nature have low site fidelity. Given the small area affected, interruptions causing pelagics to move into other areas would not cause biologically significant increases in competition due to habitat loss. The project would not impede the spawning success of the coastal pelagics, nor cause disturbances that increase predation. Although California scorpionfish are rare compared to the pelagics listed in Table 1, this species' high fidelity to structured habitats such as pile fields and reefs means it is likely under represented in most fish sampling efforts. From the information available and the habitat characteristics of this species, impacts to California scorpionfish would be probable but minimal. Construction could cause fish to flee the immediate disturbance, yet the fish will likely remain in the area to capitalize on the exposure of forage resources by construction disturbance. Prey species could be released when the old piles are removed. Spawning success would not be affected due to the pelagic spawning and buoyancy of the eggs. Other project-related impacts would result in only temporary impacts to other local biota in the project footprints. Given the anticipated recovery of resources by reestablishment of similar communities and the temporary nature of the potential impacts to the associated community, the project as proposed would not be anticipated to result in permanent adverse impacts to water column, sandy beach or subtidal habitats.

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Appendix C

Historic Resources Appendix

ATTACHMENTS

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Current Tax Assessor Map

1918 Sanborn Map

1950 Sanborn Map

Historic Images

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Assessor's Map

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SCALE 1" = 400'

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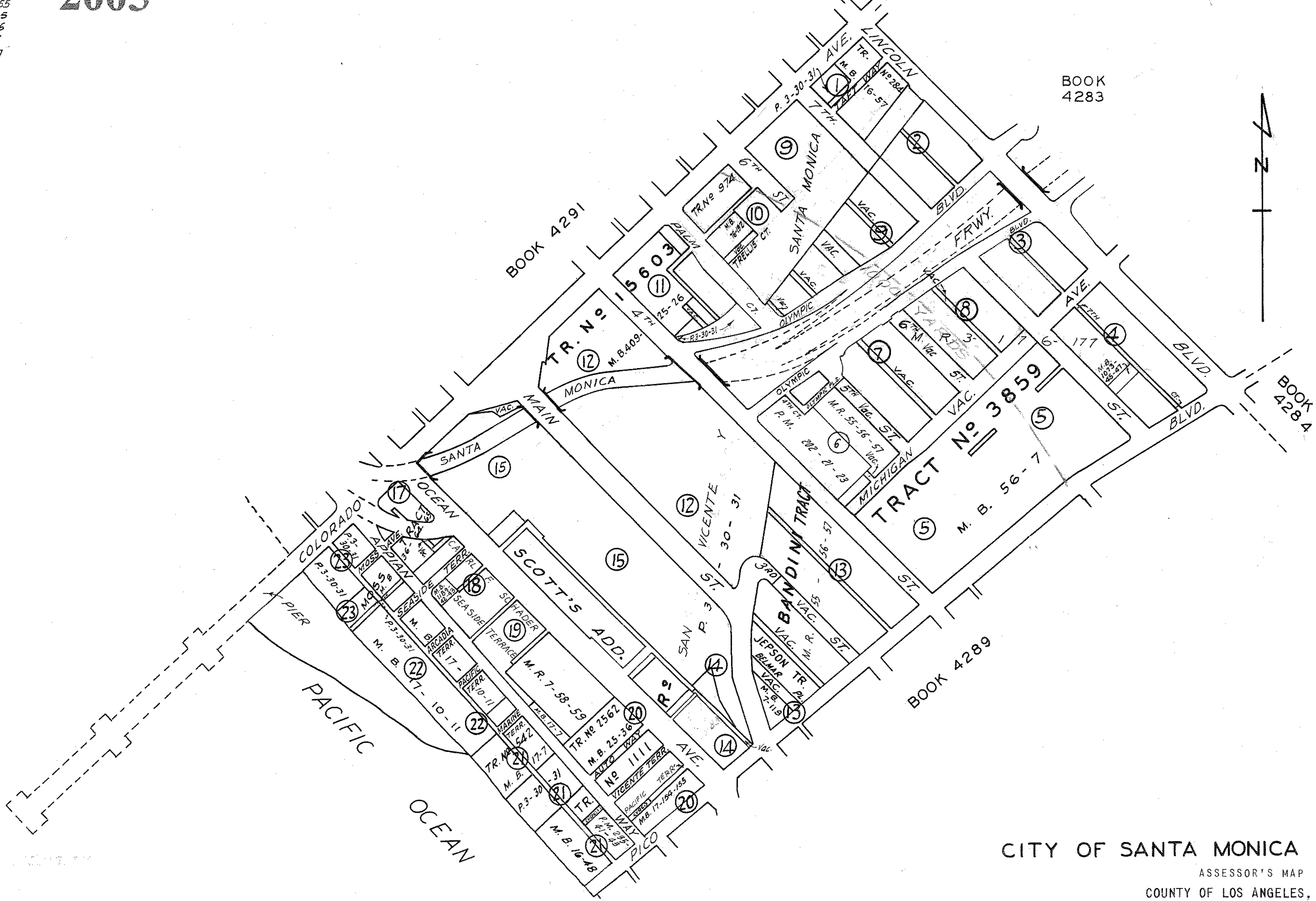

CITY OF SANTA MONICA

ASSESSOR'S MAP

COUNTY OF LOS ANGELES, CALIF.

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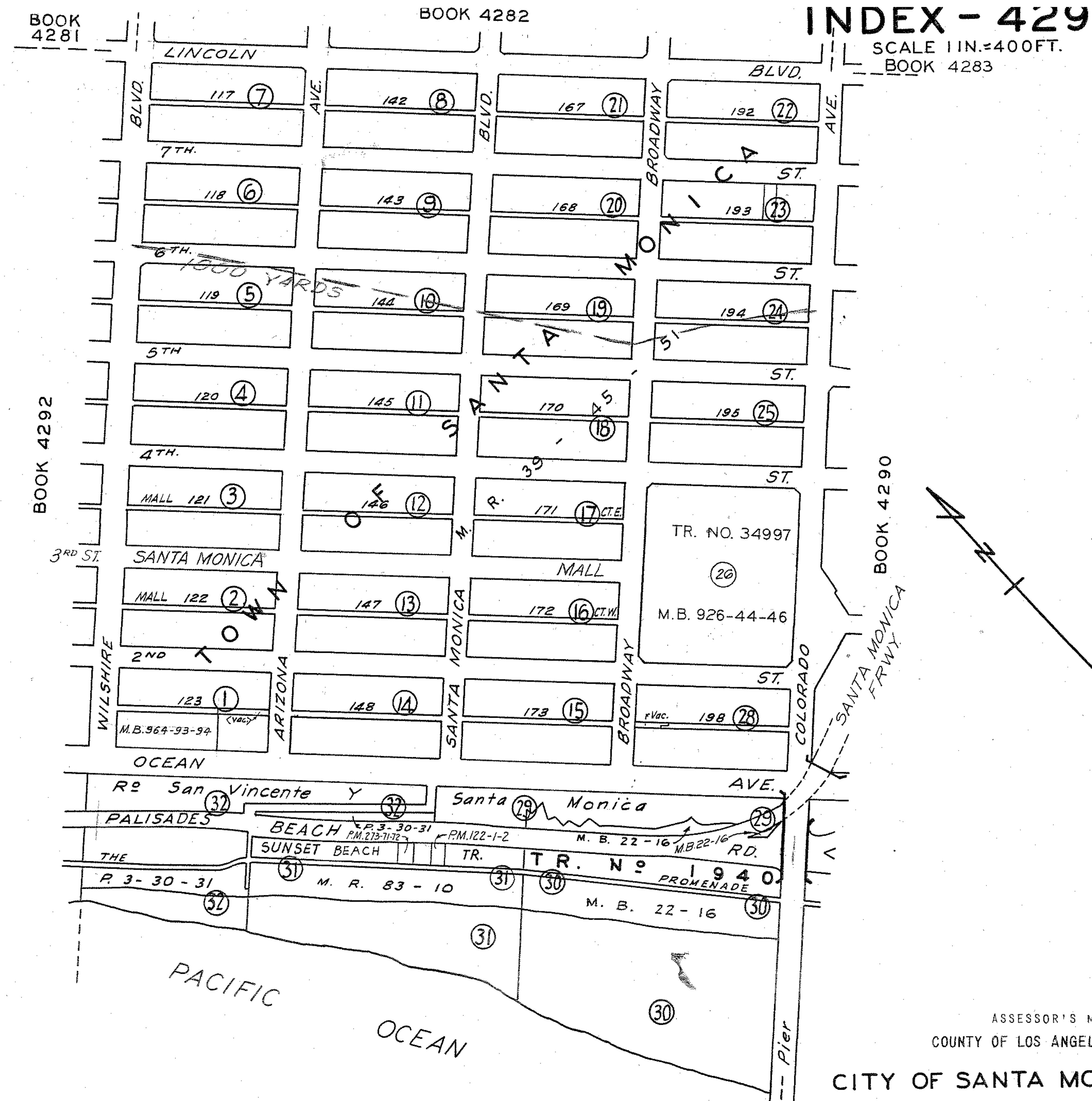
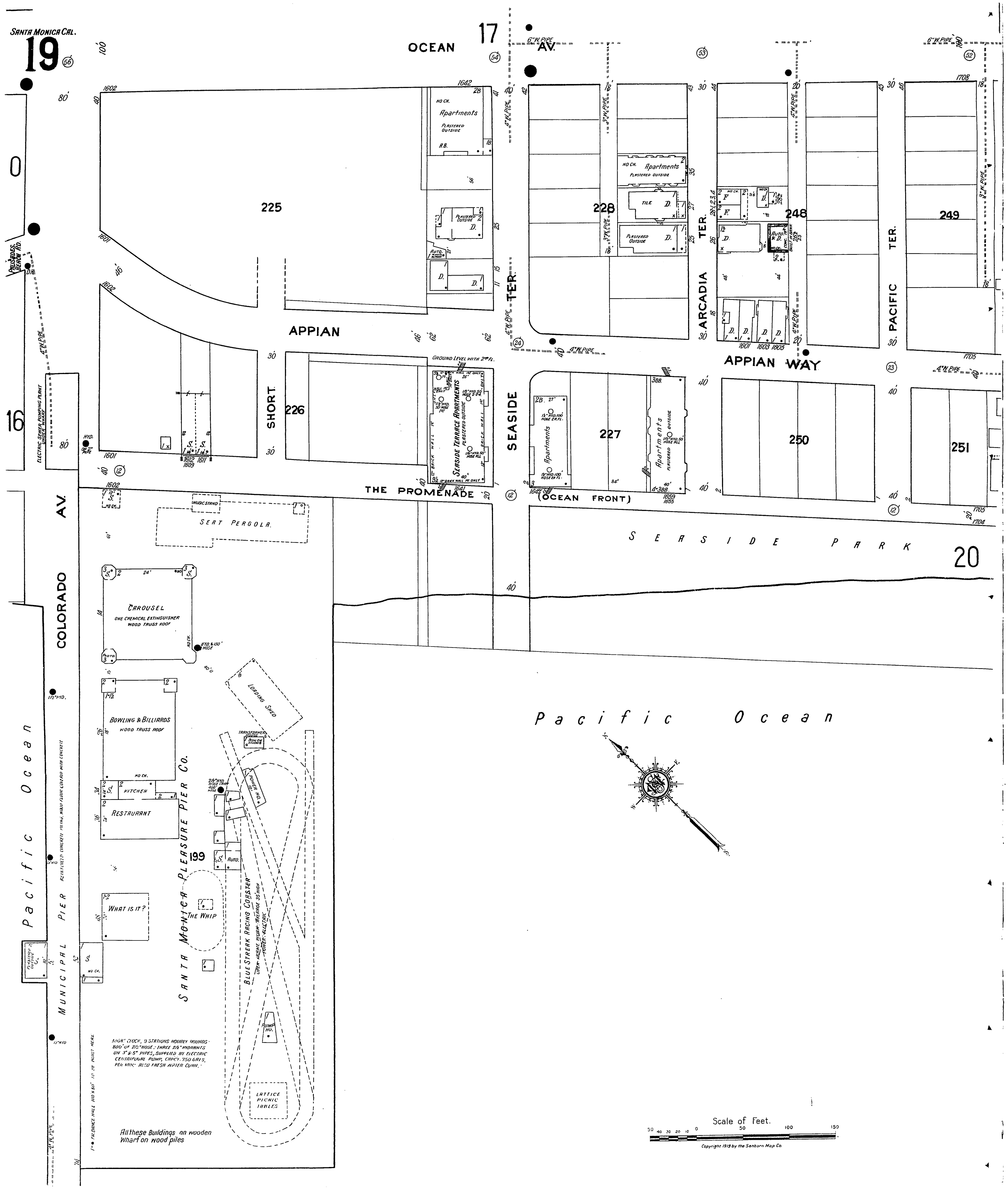


ASSESSOR'S MAP
COUNTY OF LOS ANGELES, CALIF.

CITY OF SANTA MONICA

1918 Sanborn Map



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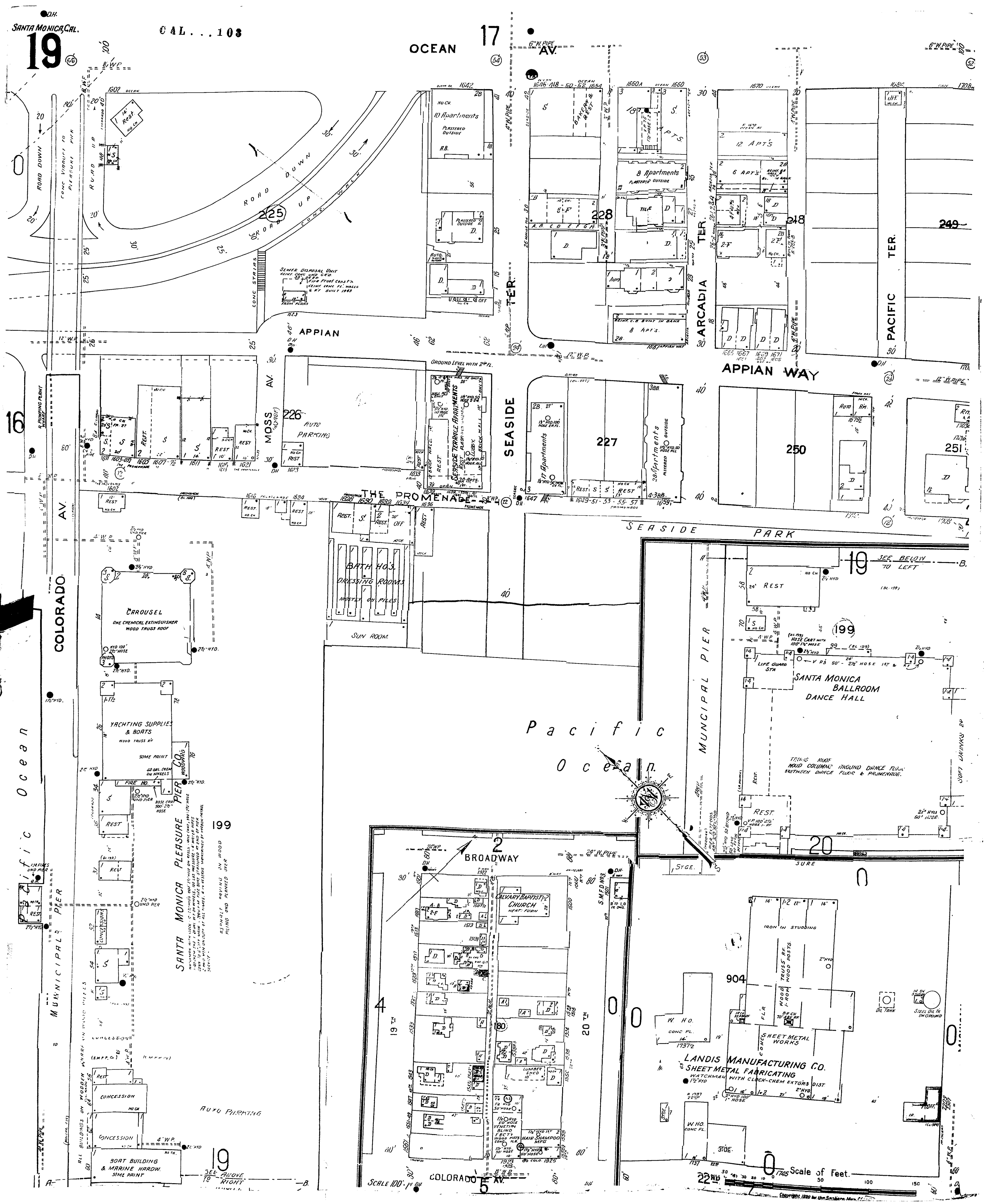
COLORADO AV.
THE PROMENADE
(OCEAN FRONT)
SEASIDE PARK
Pacific Ocean
Apartments
Plastered Outside
Seaside Terrace Apartments
Ground Level with 2nd Fl.
Music Stand
Seat Pergola
Carousel
One chemical extinguisher wood truss roof
Bowling & Billiards
Wood truss roof
Kitchen
Restaurant
What is it?
The Whip
Loading Shed
Transformer House
Santa Monica Pleasure Pier Co.
Blue Streak Racing Coaster
Pump Ho.
Lattice Picnic Tables
Municipal Pier
Electric Sewer Pumping Plant
All these Buildings on wooden Wharf on wood piles
Scale of Feet.
Copyright 1918 by the Sanborn Map Co.

1950 Sanborn Map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COLORADO AV.
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ROAD UP
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CONC. STAIRS
SEWER DISPOSAL UNIT
AUTO PARKING
10 Apartments
12 APTS
8 Apartments
8 APTS
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Apartments
SEASIDE TERRACE APARTMENTS
CAROUSEL
ONE CHEMICAL EXTINGUISHER
WOOD TRUSS ROOF
YACHTING SUPPLIES & BOATS
BATH HO'S. DRESSING ROOMS MOSTLY ON PILES
SUN ROOM
SANTA MONICA BALLROOM DANCE HALL
LIFE GUARD STA.
CALVARY BAPTIST CHURCH
LANDIS MANUFACTURING CO.
SHEET METAL FABRICATING
SHEET METAL WORKS
WATCHMAN WITH CLOCK-CHEM EXTGRS DIST
IRON IN STUDDING
CONCESSION
CONCESSION
BOAT BUILDING & MARINE HARDW.
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Scale of Feet.
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Historic Photographs

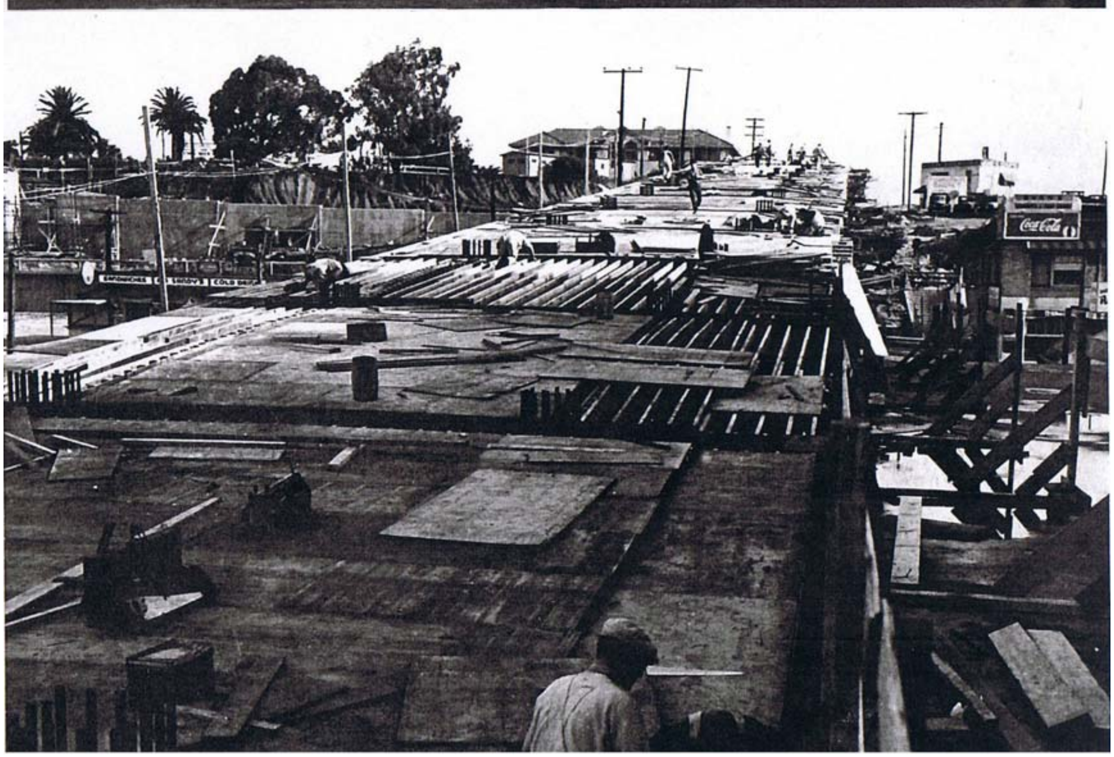
Opening Day at Santa Monica Pier, September 9, 1909
(James Harris's *Santa Monica Pier: a century on the last great pleasure pier*, Santa Monica: Angel City Press, 2009, pg. 16.)

Opening Day at Santa Monica Pier, September 9, 1909
(Santa Monica Public Library Image Archives)

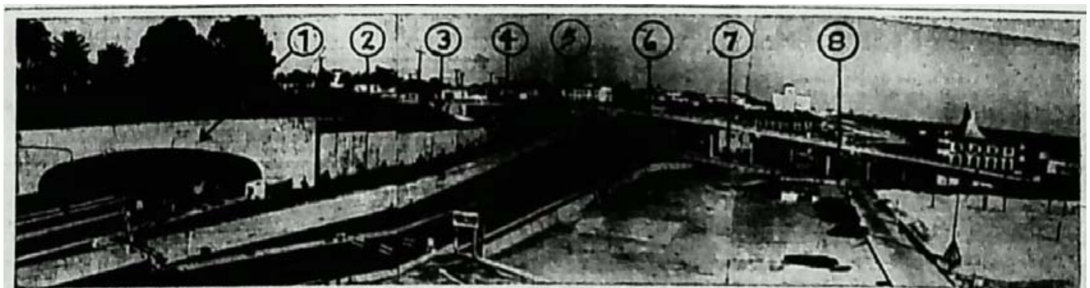
Santa Monica Pier and Surrounding Area, 1924
(Los Angeles Public Library Images)

Santa Monica Pier and Surrounding Area, 1924
(Los Angeles Public Library Images)

Santa Monica Pier, circa 1939-1940
(Los Angeles Public Library Images)



Construction of Colorado Avenue Viaduct, circa 1939
(Jeffrey Stanton's *Santa Monica Pier: a history from 1875 to 1990*, Santa Monica: Donahue Publishing, 1990.)



Here is a general view of the $500,000 mystic maze opened to the motoring public today, the photograph showing the state highway overpass project looking South from near the junction of Olympic blvd. and the coast highway. Arrows indicate the following: (1) Entrance to the Olympic blvd. tunnel. (2) Palisades Beach Road (North), for Northbound travel from Ocean ave. (3) Colorado ave. (North), for Westbound traffic from Ocean ave. (4) Colorado ave. (South), for Eastbound traffic to Ocean ave. (5) Palisades Beach Road (South), for Southbound traffic from the beach highway to Ocean ave. (6) Appian Way, for Southbound travel only. (7) Road from Appian Way to the beach. Those desiring to haul boats from Colorado ave. to the beach should drive West on Colorado ave. (North), turn right on Palisades Beach Road (North), drive Northwest to a point North of the Olympic blvd. intersection with the Palisades Beach Road, make a U turn and drive Southeast to the intersection of Appian Way and Palisades Beach Road (South), follow Appian Way back to the prolongation of Colorado ave., turn right and across the promenade to the beach. (8) The Ocean Front Promenade. The bridge crossing over the beach road carries traffic in both directions to and from the municipal pier. No arrow indicates this portion of the structure, the only part open to two way travel.

Newly constructed Viaduct and associated transportation infrastructure, Colorado Grade Separation Project
(Santa Monica Evening Outlook, "Opening of Overpass Marks Completion of Half Million Dollar Highway Link," June 27, 1940, p. 1.)

Ad for the formal opening day of the Viaduct
(Santa Monica Evening Outlook, "Santa Monica Pier in Gala Celebration Tomorrow," June 12, 1940, p. 13.)

Appendix D

Geotechnical Report

REPORT

GEOTECHNICAL INVESTIGATION
EMERGENCY EVACUATION GANGWAY
SANTA MONICA PIER STRUCTURAL
UPGRADES AND GANGWAY PROJECT
SANTA MONICA, CALIFORNIA

PREPARED FOR:
CITY OF SANTA MONICA

URS PROJECT NO. 30990244

AUGUST 26, 2010

REPORT
GEOTECHNICAL INVESTIGATION

EMERGENCY EVACUATION GANGWAY
SANTA MONICA PIER STRUCTURAL UPGRADES AND GANGWAY PROJECT
SANTA MONICA, CALIFORNIA

Prepared for:

City of Santa Monica

URS Project No. 30990244

August 26, 2010

URS

915 Wilshire Boulevard, Suite 700
Los Angeles, CA 90017
Tel: (213) 996-2200 Fax: (213) 996-2374

August 26, 2010

City of Santa Monica
1437 4th Street, Suite 300
Santa Monica, CA 90401

Attention: Mr. Mark Cuneo, P.E.
Principal Civil Engineer/Project Manager

Subject: Report
Geotechnical Investigation
Emergency Evacuation Gangway
Santa Monica Pier Structural Upgrades and Gangway Project
Santa Monica, California
URS Project No. 30990244

Dear Mr. Cuneo:

URS Corporation (URS) is pleased to present the results of our geotechnical investigation performed for proposed emergency evacuation gangway as part of the Santa Monica Pier Structural Upgrades and Gangway Project, Santa Monica, California. This report summarizes the results of our investigation/desktop study and contains our geotechnical recommendations to provide geotechnical design input and recommendations for the gangway foundation support design.

URS prepared this report exclusively for the City of Santa Monica for its use in project planning and design. If you have any questions regarding this report, or if we can be of further service, please contact us at 714-895-2072.

Sincerely,

URS CORPORATION

Blake Eckerle, P.E.
Project Manager

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FIGURES

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SECTION 1 INTRODUCTION

1.1 GENERAL

This report presents the results of URS Corporation's (URS) geotechnical engineering study performed for the Santa Monica Pier Structural Upgrades and Gangway Project at Santa Monica, California, as shown in Figure 1. The report provides our findings based on a review of available soil information provided by the City of Santa Monica (City), and evaluations of the geotechnical performance for the proposed anchoring elements of the subject improvement.

Conclusions and recommendations presented in this report are based on the previous data collected for the projects near the subject improvement. No additional subsurface exploration program was performed during the subject study. As subsurface conditions may vary at different locations, these conclusions and recommendations should not be extrapolated to other areas, or used for other facilities, without our prior review.

1.2 PROJECT DESCRIPTION

The proposed emergency evacuation gangway is part of the Santa Monica Pier Structural Upgrade Project. The proposed gangway will be located near the Western end of the existing Santa Monica Pier to serve the needs of the Pier, Santa Monica Police, and Santa Monica Fire Department. Based on the conceptual design, a floating dock secured by the Seaflex flexible-hawser type anchoring system is considered for the subject improvement. The loads on Seaflex anchors are applied at angles of 16 to 30 degrees from horizontal and each Seaflex hawser will be secured to the bottom by soil anchors embedded underneath the existing seafloor. The configuration of the proposed improvement is designed to minimize clearance issues for vessels using the dock for transient mooring. The anchor cables are confined to the footprint of the new floating dock, as presented in Figure 2.

1.3 PURPOSE AND SCOPE OF WORK

The purpose of this geotechnical investigation was to evaluate the existing sub-seafloor conditions at the project site based on the relevant information from the previous geotechnical studies in the project vicinity (Leighton and Associates, 1988; Fugro 2005 and 2006) and to provide geotechnical design recommendations for the proposed emergency evacuation gangway project. The geotechnical scope of services is in accordance with our proposal dated April 26, 2010, and includes the following tasks:

- Review the existing soil data to characterize the subsurface conditions and to develop design soil profile and engineering parameters.
- Perform engineering analyses for geotechnical evaluation and develop recommendations for foundation elements of the proposed floating dock.
- Preparation of a geotechnical investigation report for the Gangway Project to summarize our findings and recommendations including:

- A brief description of the project background and proposed site improvement.
- A summary of the previous field and laboratory programs based on document review.
- Discussion of the subsurface geotechnical conditions, material characteristics, and design soil parameters.
- Seismic design criteria.
- Anchoring considerations for micro piles or helical anchors.
- Geotechnical recommendations for construction.
- Geotechnical construction monitoring recommendations.

➢ Review the design-build plans and specifications for conformance to recommendations presented in the geotechnical investigation report.

SECTION 2 DATA REVIEW

Available geologic and geotechnical documents are listed in Section 7. We have reviewed the following reports provided to us by the City:

- Fugro West, Inc. (Fugro), 2005, Pile Capacity, Proposed Boat Launch and Emergency Access Ramp, Santa Monica Pier, Santa Monica, California, February 2, 2005.
- Fugro, 2006, Santa Monica Pier, 18" Diameter Piles at Bent 38, Point of Fixity, January 25, 2006.
- Leighton and Associates (Leighton), 1988, Review of Soil Borings and Laboratory Test Data, Pile Jetting/Driving Operation, Santa Monica Pier Reconstruction, Santa Monica, California, September 6, 1988.

It should be noted that subsurface/sub-seafloor data from Converse Consultants (Converse, 1984) and McClelland Engineers Inc. (McClelland, 1988) were adopted in the aforementioned studies and are reviewed as part of the subject investigation. However, the complete reports and the detailed boring logs were not available to us while preparing this report.

Pertinent information from these researches was incorporated into the preparation of this report. Relevant field data and previous studies within the project vicinity are attached in Appendix A.

SECTION 3 SITE CONDITIONS

URS' knowledge of the site geology and subsurface conditions has been developed from a review of the area's geology, historical information, and field and laboratory programs previously conducted in the project vicinity by others (Converse, 1984; Leighton, 1988; McClelland, 1988; and Fugro, 2005).

3.1 REGIONAL GEOLOGY

The site is located within the northern portion of the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges Province is characterized by a series of generally northwest-trending mountain ranges and intervening valleys. A broad sediment-filled trough generally referred to as the Los Angeles Basin characterizes the northern portion of the Peninsular Ranges Province.

The geologic materials at the site within the near shore ocean zone are described as Quaternary beach sand.

3.2 FAULTS AND SEISMICITY

The site lies within the Coastal Plain of the Los Angeles basin south of the Santa Monica fault and west of the northern portion of the onshore segment of the northwest trending Newport/Inglewood fault zone (NIFZ). As is most of southern California, the site is located within an active seismic area. Due to its location, the site may experience strong seismic shaking in the future. Examples of past earthquakes that have produced significant seismic shaking at the site include the magnitude 6.4 (Mw) San Fernando earthquake of 1971 and the magnitude 6.7 (Mw) Northridge earthquake of 1994.

According to the California Geological Survey (CGS), the site is not currently located within a designated Alquist-Priolo (A-P) Earthquake Fault Zone[1]. The nearest active fault is the Santa Monica fault located approximately 2 miles north of the site. The characteristics of nearby seismic sources are summarized in Table 1.

1 Alquist-Priolo (A-P) Earthquake Fault Zones are established by the State of California to restrict development of structures intended for human occupancy to mitigate the hazard of surface fault rupture. In short, the A-P law reads that construction of no new structure for human occupancy is permitted on the trace of an active fault. The law stipulates that a geologic investigation and report demonstrating what portions of the site are not threatened by surface displacement from faulting are required before an area within an earthquake fault zone can be developed with structures for human occupancy. It is the responsibility of the local city or county to review the geologic fault report for adequacy before issuing a building permit for any proposed project.

Table 1 - MAJOR SEISMIC SOURCE CHARACTERIZATION

FAULT	APPROXIMATE DISTANCE[1] (miles)	TYPE OF FAULT[1]	MAXIMUM EARTQUAKE MAGNITUDE[1] (Mw)
Santa Monica	1.7	Right lateral, reverse, oblique	6.6
Malibu Coast	2.5	Left lateral, reverse, oblique	6.7
Palos Verdes	6.0	Right lateral, strike slip	7.3
Newport-Inglewood (L.A. Basin)	6.8	Right lateral, strike slip	7.1
Hollywood	7.5	Left lateral, reverse, oblique	6.4
Anacapa-Dume	11.2	Left lateral, reverse, oblique	7.5
Puente Hills Blind Thrust	12.5	Reverse, blind thrust	7.1
Upper Elysian Park Blind Thrust	13.8	Reverse, blind thrust	6.4
Northridge (E. Oak Ridge)	15.5	Reverse, blind thrust	7.0
Verdugo	16.7	Reverse	6.9
Sierra Madre	22.0	Reverse	7.2
San Andreas	43.3	Right lateral, strike slip	8.0

Note:
1. Fault characterization based on CGS database (Cao, 2003), compiled by the computer program EQFault (Blake, 2000 and 2004). Distance, which is defined as the closest distance to rupture surface, is computed using the EQFault program with the relationship by Sadigh et al. (1997).

3.3 SUBSURFACE SOIL CONDITIONS

Based on the offshore investigation performed by McClelland (1988), the project site consisted of about 35 feet of dense sands to silty sands with more gravelly materials at the lower 10 to 20 feet of the layer. Stiff to very stiff silts and sandy silts with occasional clayey seams underlie the upper sandy layers to the maximum explored depths of approximately 100 feet. For design purposes, the site conditions were characterized into an idealized profile. The geotechnical parameters of the idealized profile are presented in Table 2. In addition, scour depth of 5 feet is considered in the analyses.

Table 2 - IDEALIZED SOIL PROFILE

SUBSURFACE MATERIAL TYPE[1]	DEPTH/ ELEVATION (feet/ feet MLLW)	TOTAL UNIT WEIGHT (pcf)[2]	SHEAR STRENGTH PARAMETERS	
			FRICTION ANGLE (degree)	COHESION (psf)[3]
Sand or Silty Sand	0 to 35/ -20 to -55	125	35	0
Silt to Sandy Silt	>35/ < -55	121	30	0

Notes:
1. Simplified soil types.
2. pcf = pounds per cubic foot.
3. psf = pounds per square foot.

SECTION 4 GEOLOGICAL AND SEISMIC HAZARDS EVALUATION

Geological and seismic hazards are those hazards that could impact a site due to the surrounding geologic and seismic conditions. Geological hazards include landsliding, erosion, subsidence, volcanic eruptions, and poor soil conditions. Seismic hazards include phenomena that occur during an earthquake such as ground shaking, ground rupture, and liquefaction. The potential impact of these potential hazards to the site has been assessed and is summarized in the following sections.

4.1 GROUND MOTIONS

The site, like most of southern California, is located within a seismically active region and will be subject to strong ground shaking during major earthquakes. The subject site can be classified as Site Class D and seismic design can be performed in accordance with the criteria listed in Table 3 based on the current California Building Code (CBC).

Table 3 - CBC SEISMIC DESIGN CRITERIA

Site Class	D
Mapped Spectral Accelerations for Short Periods per Figure 1613.5(3), S_S	1.65 g
Mapped Spectral Accelerations for One Second Period per Figure 1613.5(4), S_1	0.60 g
Site Coefficient per Table 1613.5.3(1), F_a	1.0
Site Coefficient per Table 1613.5.3(2), F_v	1.5
Maximum Considered Earthquake Spectral Response Accelerations for Short Period, S_{MS}	1.65 g
Maximum Considered Earthquake Spectral Response Accelerations for One Second Period, S_{M1}	0.90 g
5% Damped Design Spectral Response Acceleration at Short Periods, S_{DS}	1.10 g
5% Damped Design Spectral Response Acceleration at One Second Periods, S_{D1}	0.60 g

4.2 GROUND RUPTURE

The site is not located within a currently established Alquist-Priolo Earthquake Fault Zone, therefore, the potential for ground surface rupture was considered low because no known active faults were mapped on the site. The CGS defines an active fault as one that has experienced surface rupture within the last 11,000 years (Holocene time). However, ground rupture or cracking can occur due to earthquakes at locations where faults have not been mapped.

4.3 SEISMICALLY INDUCED SUBMARINE LANDSLIDES

The CGS has designated certain areas within California as having the potential for earthquake-induced landsliding. These are areas where previous occurrence of landslide movement, or local topographic, geologic, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement during a seismic event. The site is below water in a gently sloping area; therefore, the potential hazard of seismically induced submarine landsliding at the site is considered to be low.

4.4 OTHER SEISMIC HAZARDS

Other seismic flood hazards include tsunamis and seiches. A tsunami is a great sea wave (commonly called a tidal wave) produced by a significant undersea disturbance such as tectonic displacement of the sea floor associated with large, shallow earthquakes, volcanic eruptions, or landslides. The most likely causes for tsunamis in Santa Monica are moderate magnitude earthquakes off the California coast or large magnitude earthquakes occurring in the subduction zone that ring the Pacific Ocean. A less likely cause is a sub-marine landslide on the continental shelf off the Sothern California Coast. A seiche is an oscillation of a body of water in an enclosed or semi-enclosed basin (such as a reservoir, harbor, lake or storage tank) resulting from earthquakes or other large environmental disturbances. Being located in a large body of water, the site is not subject to seiches.

SECTION 5 CONCLUSIONS AND RECOMMENDATIONS

The primary geotechnical considerations for the proposed improvements are the potentially difficult anchor installation due to the existing dense to very dense sands present at the sea floor, for the relatively small quantity of anchors to be constructed. Instead of regular impact-driven piles, which would result in costly mobilizations among others, more cost-effective alternative anchor systems, such as helical anchors and micropiles, are considered suitable for the subject project.

5.1 SOIL ANCHOR ALTERNATIVES

Generally the type of the foundation system used for the proposed improvements will depend on several factors, such as level of vibration and noise from the construction, proximity of the construction to the existing improvements, available construction space and accessibility, construction time windows, and cost. Several potential anchor system alternatives are listed in Table 4. These alternatives are listed in the general order of preference based on geotechnical concerns.

Table 4 - SOIL ANCHOR ALTERNATIVES

FOUNDATION TYPE	ADVANTAGES	DISADVANTAGES
Grouted Micropiles [1, 2]	• Relatively high capacities. • Separate reinforcing not required. • Small equipment available. • Relatively lower noise and vibration.	• Spoils from pile drilling • Casing required. • Limited number of specialty contractors. • Requires careful construction monitoring, control and post-construction pull-test.
Helical Anchors	• Least amount of structural elements. • No spoils generated • Small equipment available. • Relatively lower noise and vibration.	• Mainly for axial (tensile) resistance. • Potential installation challenge in dense substrate. • Limited number of specialty contractors. • Requires careful construction monitoring, control and post-construction pull-test.
Jacked Micropiles [3]	• Separate reinforcing not required. • No spoils generated. • Small equipment available.	• Unlikely to penetrate the site materials. • Limited capacity (depth limited). • Limited number of specialty contractors. • May have adverse impact to adjacent existing piles.
Driven Piles	• Conventional design/construction. • No spoils generated.	• Limited capacity (depth limited). • Installation vibrations may have adverse impact to the adjacent existing piles. • Significant noise. • Limited number of specialty contractors. • Small equipment is not readily available. • Significant mobilization cost.

Notes:
1. Mircopiles are piles with diameters between 1 and 12 inches; also called minipiles.
2. Include jet grouted, post grouted, and pressure grouted piles.
3. Jacked micropiles are addressed separately above because they will likely be depth (and capacity) limited.

5.1.1 Grouted Micropiles

Based on our understanding of the project, grouted micropiles are judged a feasible alternative to support the Seaflex anchor system. A micropile is a small diameter pile that usually consists of a form of steel reinforcement (any types of steel bars) inside grouted drilled holes, and can be installed in many different types of ground where piles are required, with design loads as small as three tons and as high as 500 tons. Also known as mini piles, pin piles, needle piles or root piles, micro piles can offer a viable alternative to conventional piling techniques, particularly in situations where vibration and noise from pile driving is prohibited, and where access or low headroom are limited.

Micropiles installation usually involves jet grouting, post grouting, or pressure grouting techniques. Load is mainly (and initially) resisted by the strength of the steel and transferred via the grout to the surrounding soil by high values of interfacial friction with minimal or no end bearing component.

5.1.2 Helical Anchors

Helical anchors are designed to generate its axial capacity through bearing of the helix blades against the soil. The helix blades are typically spaced at least three diameters apart along the anchor shaft to prevent one blade from contributing significant stress to the bearing soil of the adjacent blade. Significant stress influence is limited to a bulb of soil within about two helix diameters from the bearing surface in the axial direction and one helix diameter from the center of the anchor shaft in the lateral direction. Each helix blade therefore acts independently in bearing along the anchor shaft. Proper spacing needs to be maintained between anchors, as well as an embedment depth of at least twelve helix diameters in the direction of loading.

Generally helical anchor consists of three elements welded or fixed together: termination at uppermost end to collect the applied load from the loaded structural member, intermediate shaft to transmit the installing torque to the helical plate during installation and to transmit the imposed load to the bearing plate in service, and helical shaped plates to transfer the load to the bearing stratum at the lower end. Typically the helical anchors are installed using hydraulically driven gearbox to screw the components into the bearing stratum and readings from torque indicator are used to determine whether the anchor reaches its design capacity.

5.1.3 Design-Build Anchor System

Both micropile and helical anchor are proprietary systems and it is our understanding that the system will be constructed in a design-build package. Therefore, detailed design is not provided. Instead, the design-builder should utilize the engineering design parameters from Table 2 and pertinent soil conditions provided in Appendix A for its own design. The system should be designed and installed by a qualified design-builder who has at least 5 years of successful prior experience in constructing systems of similar size under similar soil conditions. Difficult drilling into the dense sub-seafloor materials at the site should be anticipated.

Anchor axial capacity is generally more realistically evaluated from load tests in the field, as the actual capacity depends on various site-specific, equipment- and method-related factors. Consequently, load tests should be part of the project specifications, and the load tests should be performed under the observation of the geotechnical engineer.

It is recommended that one (1) 'non-production' anchor be installed near the subject improvement. As the test program is for verification of capacity, it is recommended that the test procedures be in accordance with ASTM D3689, and the test should be performed under the observation of the Geotechnical Engineer.

Production anchors should be tested to 150 percent of the design load and a minimum of 5 percent of the micropiles tested to 200 percent of the design load. Structural elements should be designed with sufficient capacity to safely sustain the test loads. Details of QA/QC testing of anchors should follow applicable guidelines and building code requirements, and should be submitted to the Geotechnical Engineer for review by the design-builder.

5.2 RESISTANCE TO LATERAL LOADS

Lateral loads can be resisted by the proposed vertical anchors. Analyses for lateral capacity of vertical anchors were performed using the computer program LPILE^{PLUS}5.0 for Windows (Ensoft, 2004). Sample lateral capacity results based on configuration and associated loads as shown in Figure 2 are summarized in Table 5. Detailed sample analyses are provided in Appendix B. It should be noted that both anchors are considered to have relatively low lateral capacities due to the small cross-sections. Structural capacities should be checked during design under the lateral loading conditions. The design should minimize the lateral displacement at the joints of soil anchor-to-Seaflex member. The anchor top should be buried under the potential scour depth (3 to 5 feet) to avoid excessive shaft deflections.

5.3 SOIL CORROSION POTENTIAL

Laboratory corrosion potential results are not available to us; however, the project site is exposed in seawater. Therefore, we judged sulfate exposure to concrete to be severe, and that Type V cement can be used with a maximum water/cement materials ratio in accordance with American Concrete Institute (ACI) 318, Section 4.3. Similarly, the onsite soils are classified as corrosive to buried metals. Therefore, proper sacrificial steel loss should be considered. All steel members used in soil anchor system shall be hot-dipped galvanized per ASTM 123. If micropiles are used, the reinforcement steel shall be epoxy-coated per ASTM 775.

Service life for the helical anchors shall be defined as the estimated time required for 1/8 inch of material loss to occur on the anchor shaft, anchor disk, the ovaleye adapter shaft, or the ¾ inch (minimum) diameter coupling bolt which connects the ovaleye adapter to the anchor shaft, and other components of the helical or micropile bottom anchors. This amount of loss is strictly arbitary, but is common for driven pipe and sheetpile evaluation. The helical anchor design calculations shall account for the load capacity after 1/8 inch material loss on outer surfaces of the hot-dip galvanized anchor components. For this corrosion evaluation, 1.8 oz/ft^2 minimum zinc coating should be assumed to be missing. For the purposes of this evaluation, a corrosion rate of 0.6 – 1.0 mills/year (0.385 – 0.642 oz/ft^2) should be assumed.

Table 5 - SUMMARY OF ANTICIPATED ANCHOR LOADS

TYPE	BOUNDARY CONDITION	AXIAL LOAD (kips)	LATERAL LOAD (kips)	APPLIED MOMENT (kips-inches)	PILE HEAD DEFLECTION (inches)	MAXIMUM MOMENT (kips-inches)/ Depth[1] (inches)	MAXIMUM SHEAR (kips)/ Depth[1] (inches)
Micropile: 130/60 bar, nominal grouted section of 12 inches, 30-foot long	Pinned Head, Full Embedded	-4.1[2]	14.4[2]	0	2.2	730/72	14.4/0
		-7.5[3]	13[3]	0	1.8	630/68	13.0/0
	Pinned Head, 5-foot Scour	-4.1[2]	14.4[2]	0	11.1	1,559/130	-28/180
		-7.5[3]	13[3]	0	9.3	1,355/126	-25/176
Helical Anchor: 7-inch diameter steel tubular section (wall thickness of 0.5 inches), 30-foot long	Pinned Head, Full Embedded	-4.1[2]	14.4[2]	0	2.8	774/76	-16/108
		-7.5[3]	13[3]	0	2.3	668/72	-13.8/108
	Pinned Head, 5-foot Scour	-4.1[2]	14.4[2]	0	14.1	1,596/133	-31/180
		-7.5[3]	13[3]	0	11.7	1,382/130	-27/176

Notes:

- Loading conditions based on sample anchor layout configuration shown in Figure 2

1. Depth below anchor top.
2. Loading in tension at 16 degrees from horizontal.
3. Loading in tension at 30 degrees from horizontal.

SECTION 6 PLAN REVIEW, CONSTRUCTION OBSERVATION, AND TESTING

URS should be retained to review the finished anchor system plans and specifications for conformance with the intent of our recommendations. URS will retain the right to modify the recommendations if the conditions encountered in the field are different than presently understood.

During construction, URS should provide field observation to check that the anchor system installation conforms to the intent of these recommendations, project plans, and specifications. URS may develop supplemental recommendations as appropriate for the actual soil conditions encountered and the specific construction techniques proposed by the contractor.

As needed during construction, URS should be retained to consult on geotechnical questions, construction problems, and unanticipated site conditions.

SECTION 7 REFERENCES

1) American Concrete Institute, 2005, ACI 318-05, Building Code Requirements for Structure Concrete and Commentary.

2) American Society for Testing and Materials (ASTM), 2004, Annual Book of Standards, Vols. 4.08 and 4.09, Soil and Rock.

3) American Society for Testing and Materials, 2009a, ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Steel Reinforcing Bars

4) American Society for Testing and Materials, 2009b, ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

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6) Blake, T.F., 2004, Updated CGS 2002 Fault Database for EQFAULT and FRISKSP computer programs.

7) California Geological Survey, 1998, Seismic Hazard Report 23, Seismic Hazard Zone Report for the Beverly Hills 7.5-minute Quadrangle, Los Angeles County, California.

8) California Geological Survey, 1999, Seismic Hazard Zones, Beverly Hills Quadrangle, March 25, 1999.

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11) California Seismic Safety Commission, 2005, The Tsunami Threat to California, Findings and Recommendations on Tsunami Hazards and Risks, CSSC 05-03, December 2005.

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14) Converse Consultants, 1984, Preliminary Geotechnical Investigation, Santa Monica Pier Reconstruction, Santa Monica, California, unpublished report prepared for DMJM, Project No. 83-1251-01, March 21, 1984.

15) Ensoft Inc., 2004, LPILE Plus 5.0, Users Manual, July 2004.

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17) Fugro West, Inc., 2006, Santa Monica Pier, 18” Diameter Piles at Bent 38, Point of Fixity, January 25, 2006.

18) International Conference of Building Officials, 2007, California Building Code, Code of Regulations, Title 24, Part 2.

19) Leighton and Associates, 1988, Review of Soil Borings and Laboratory Test Data, Pile Jetting/Driving Operation, Santa Monica Pier Reconstruction, Santa Monica, California, September 6, 1988.

20) McClelland Engineers Inc., 1988, Geotechnical Study Report, Santa Monica Municipal Pier Extension, Santa Monica, California, unpublished report prepared for the City of Santa Monica, Santa Monica, California, Project No. 0588-1005, August 8, 1988.

21) United States Geological Survey, 2009, Earthquake Ground Motion Tool computer program.

SECTION 8 UNCERTAINTIES AND LIMITATIONS

This report is intended for the use for the design and construction of the proposed floating dock anchoring system for the Santa Monica Pier Structural Upgrades and Gangway Project in Santa Monica, California. This report is based on the project as described and the information obtained from the previous investigation program within the project vicinity. The findings and recommendations contained in this report are based on limited engineering analyses. In addition, soils and subsurface conditions encountered in the previous field investigations are presumed to be representative of the project site.

Services performed by URS have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty or guarantee is included or intended.

- o0o -

It has been a pleasure to assist you with this Project. We look forward to being of further assistance as construction begins. Should you have any questions regarding this report, please contact us.

Very truly yours,

URS

S. Neville Su, P.E., G.E.
Senior Geotechnical Engineer

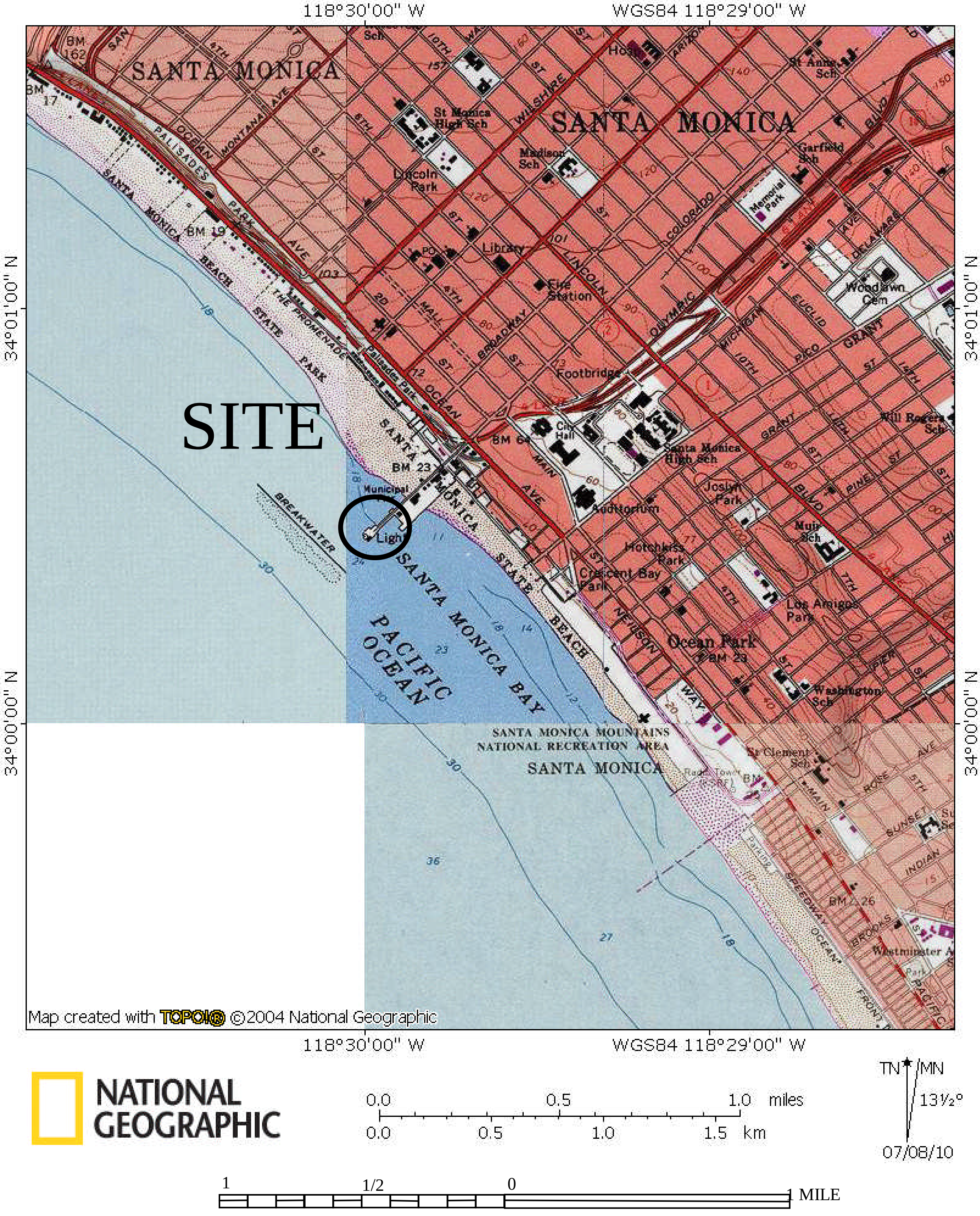
Casey Lee Jensen, P.G., C.E.G.
Senior Engineering Geologist

Reviewed by:

Arnel M Bicol, P.E., G.E.
Principal Engineer

FIGURES

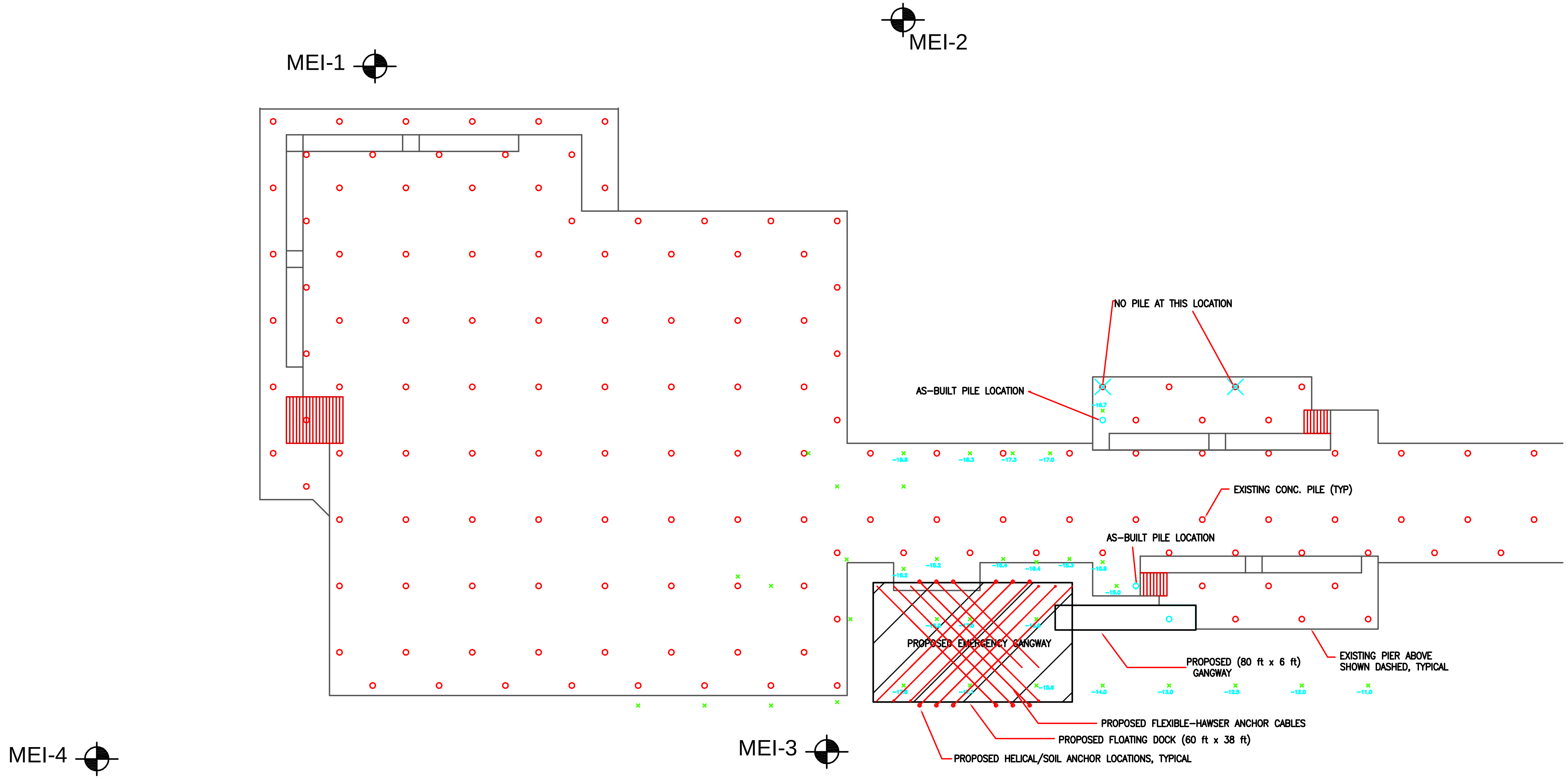
TOPO! map printed on 07/08/10



VICINITY MAP

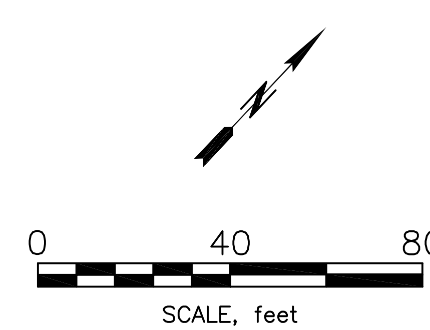
EMERGENCY EVACUATION GANGWAY
SANTA MONICA PIER
STRUCTURAL UPGRADES AND GANGWAY PROJECT
SANTA MONICA, CALIFORNIA
FOR: CITY OF SANTA MONICA

URS
FIGURE 1



EXPLANATION

MEI-4 ⊕ Previous Boring Location



URS

EMERGENCY EVACUATION GANGWAY
SANTA MONICA PIER STRUCTURAL
UPGRADES AND GANGWAY PROJECT
SANTA MONICA, CALIFORNIA

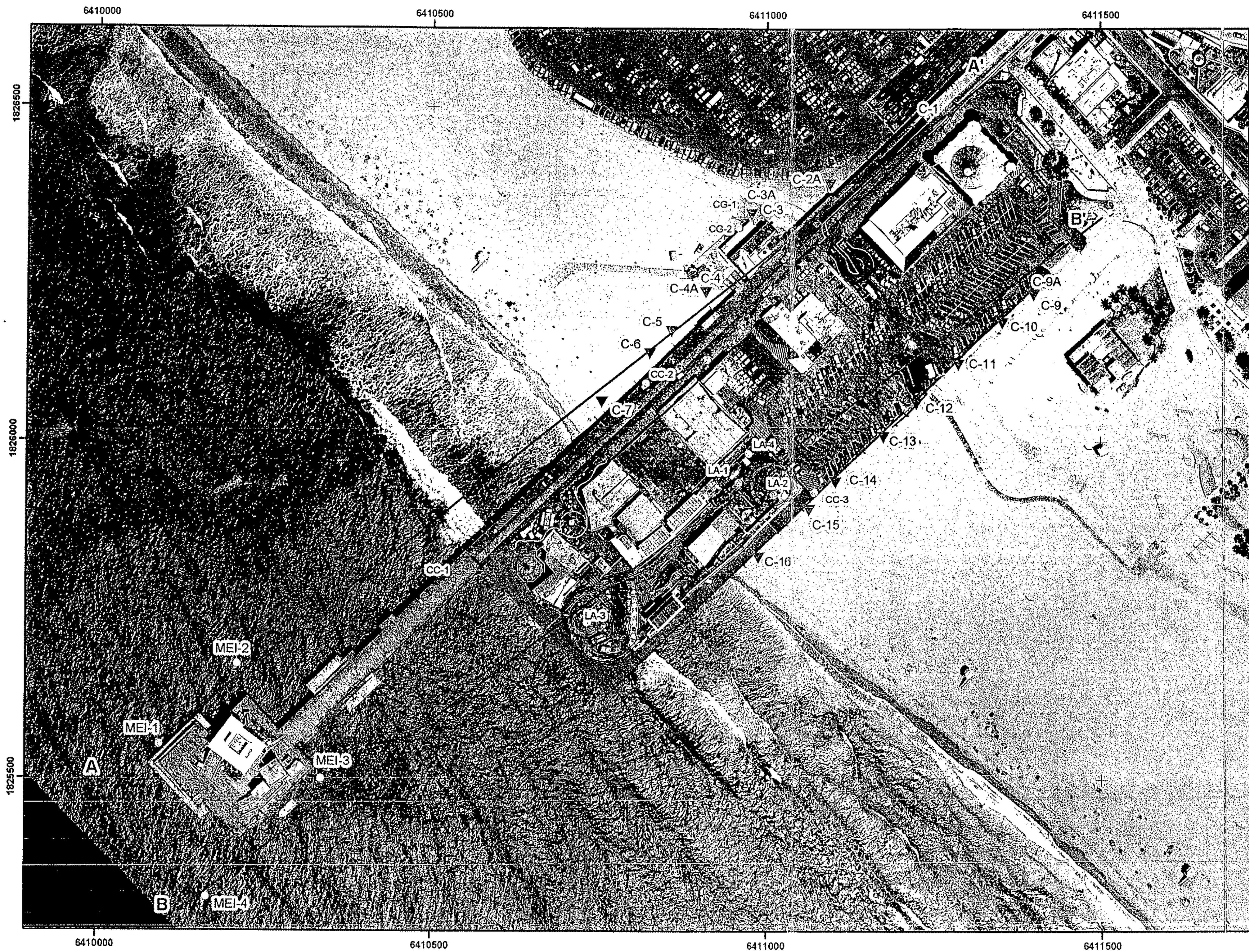
PLOT PLAN

Proj. No.: 30990244	Date: MAY 2010
Project: SANTA MONICA PIER	Figure: 2

FURGO, 2005

Moffatt & Nichol Engineers
Project No. 1206.015

FUGRO



Legend

- ▼ 2004 Fugro CPTs
- 1988 McClelland Engineers Borings
- Previous Consultant Borings

CC= Converse Consultants
CG= Coastline Geotechnical
LA= Leighton & Associates

A —— A' Cross Section Profiles

N

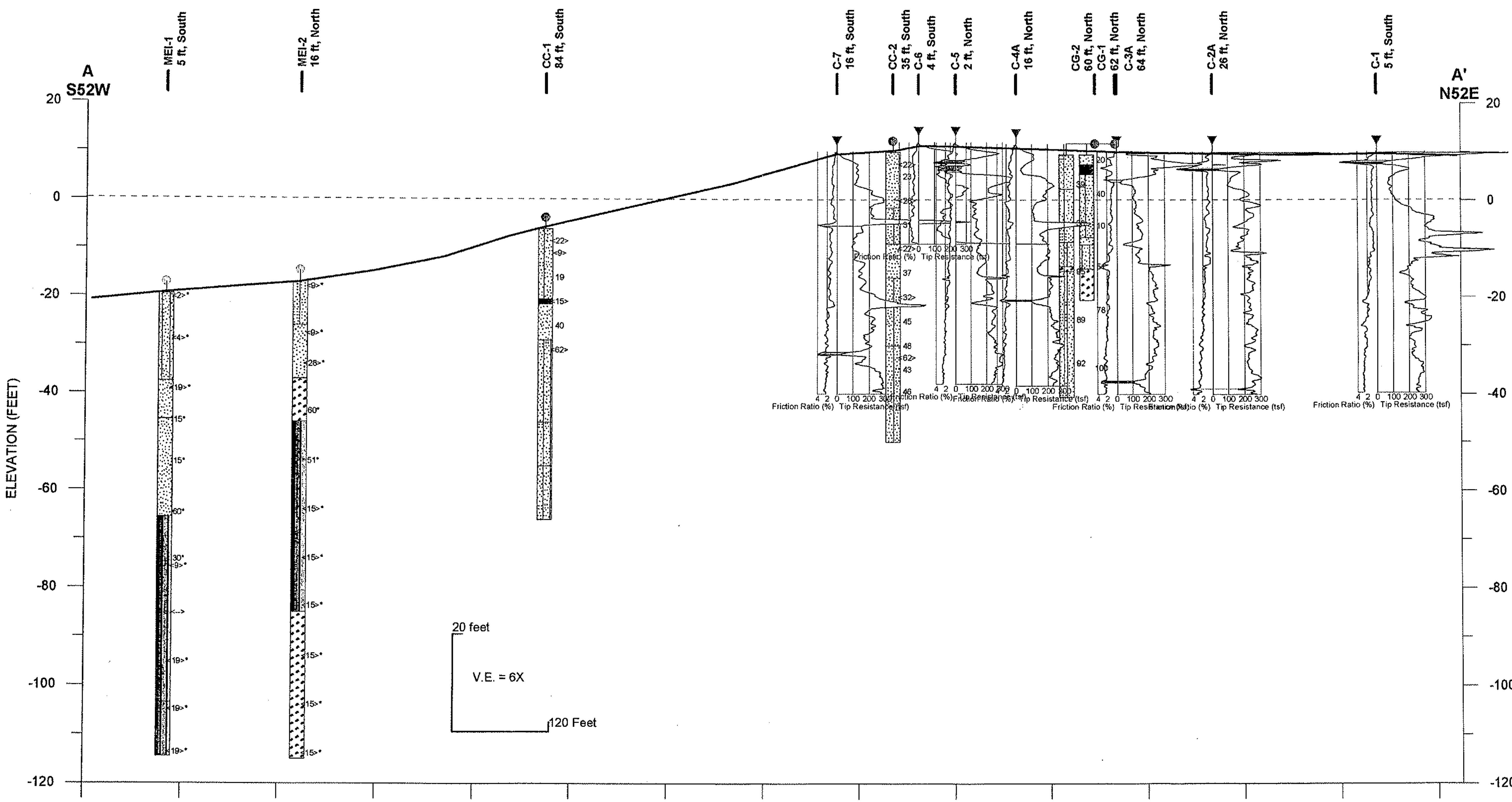
Scale: 1:1,800

0 75 150 300 Feet

Cross Section Location Map
Boat Launch and Emergency Access Ramp
Santa Monica Pier
Santa Monica, California

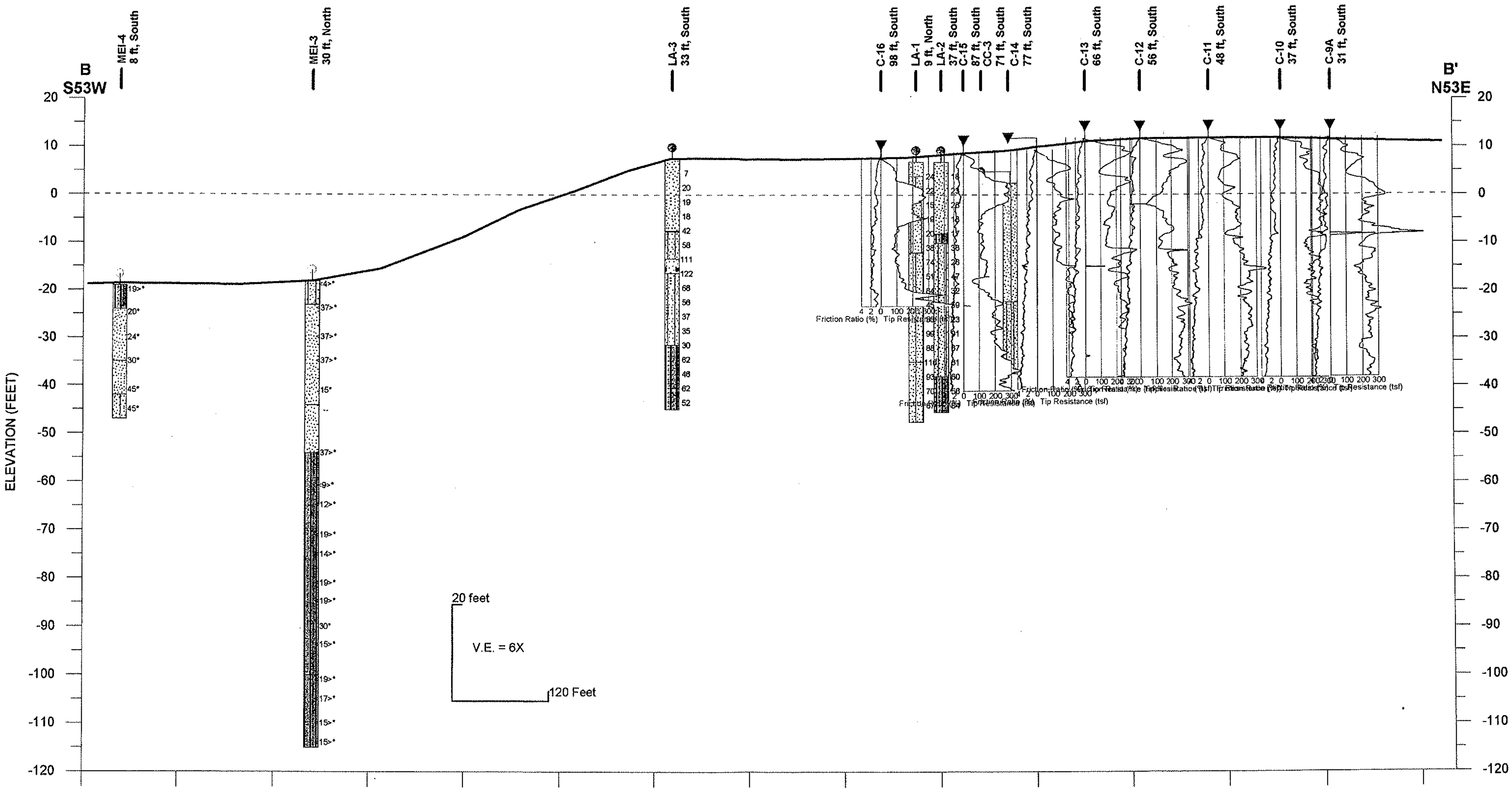
PLATE 1

FUGRO



Cross Section A-A'
Boat Launch and Emergency Access Ramp
Santa Monica Pier
Santa Monica, California

PLATE 2

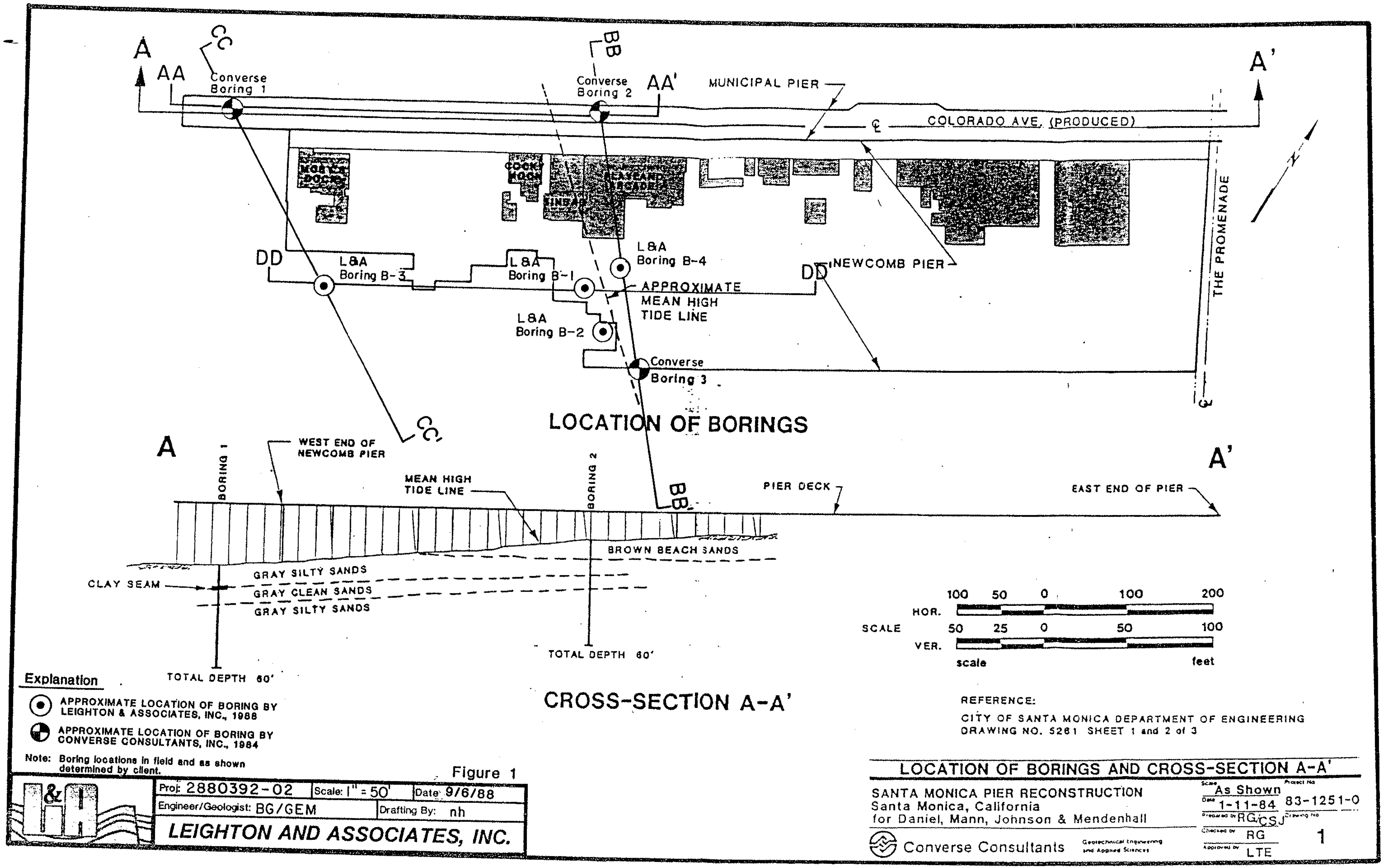


Cross Section B-B'

Boat Launch and Emergency Access Ramp
Santa Monica Pier
Santa Monica, California

PLATE 3

LEIGHTON AND ASSOCIATES, 1988



LOCATION OF BORINGS
A
A'
AA
AA'
BB
CC
CC'
DD
Converse Boring 1
Converse Boring 2
Converse Boring 3
L&A Boring B-1
L&A Boring B-2
L&A Boring B-3
L&A Boring B-4
MUNICIPAL PIER
COLORADO AVE. (PRODUCED)
NEWCOMB PIER
APPROXIMATE MEAN HIGH TIDE LINE
THE PROMENADE
N
CROSS-SECTION A-A'
BORING 1
BORING 2
WEST END OF NEWCOMB PIER
MEAN HIGH TIDE LINE
PIER DECK
EAST END OF PIER
BROWN BEACH SANDS
GRAY SILTY SANDS
CLAY SEAM
GRAY CLEAN SANDS
GRAY SILTY SANDS
TOTAL DEPTH 60'
TOTAL DEPTH 60'
SCALE
HOR. 100 50 0 100 200
VER. 50 25 0 50 100
scale feet
Explanation
APPROXIMATE LOCATION OF BORING BY LEIGHTON & ASSOCIATES, INC., 1988
APPROXIMATE LOCATION OF BORING BY CONVERSE CONSULTANTS, INC., 1984
Note: Boring locations in field and as shown determined by client.
REFERENCE:
CITY OF SANTA MONICA DEPARTMENT OF ENGINEERING DRAWING NO. 5261 SHEET 1 and 2 of 3
Figure 1
Proj: 2880392-02
Scale: 1" = 50'
Date: 9/6/88
Engineer/Geologist: BG/GEM
Drafting By: nh
LEIGHTON AND ASSOCIATES, INC.
LOCATION OF BORINGS AND CROSS-SECTION A-A'
SANTA MONICA PIER RECONSTRUCTION
Santa Monica, California
for Daniel, Mann, Johnson & Mendenhall
Converse Consultants
As Shown
1-11-84
83-1251-0
RG CSJ
RG
LTE
1

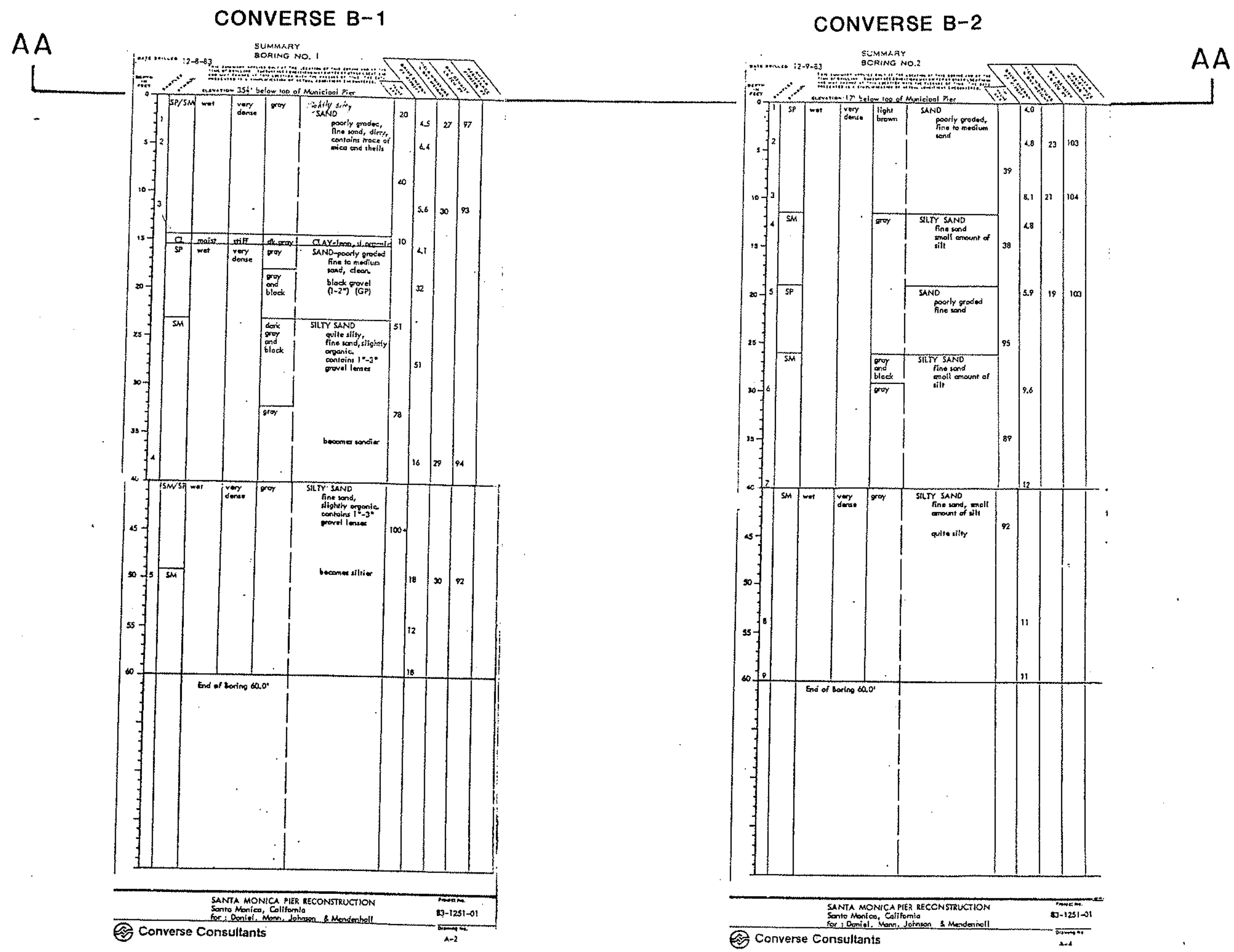


Figure 2

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LEIGHTON and ASSOCIATES, INC.		

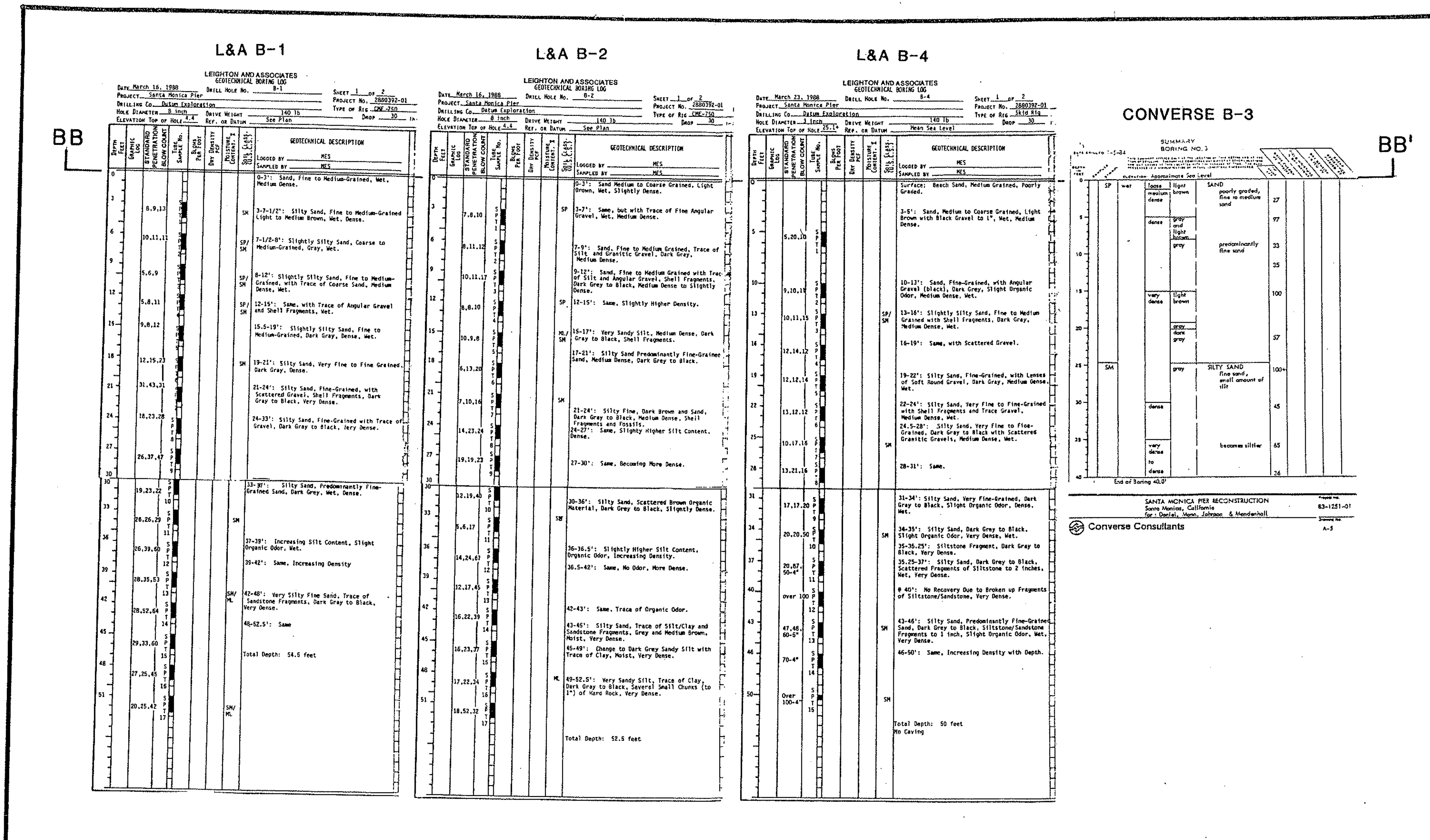

Figure 3

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LEIGHTON and ASSOCIATES, INC.

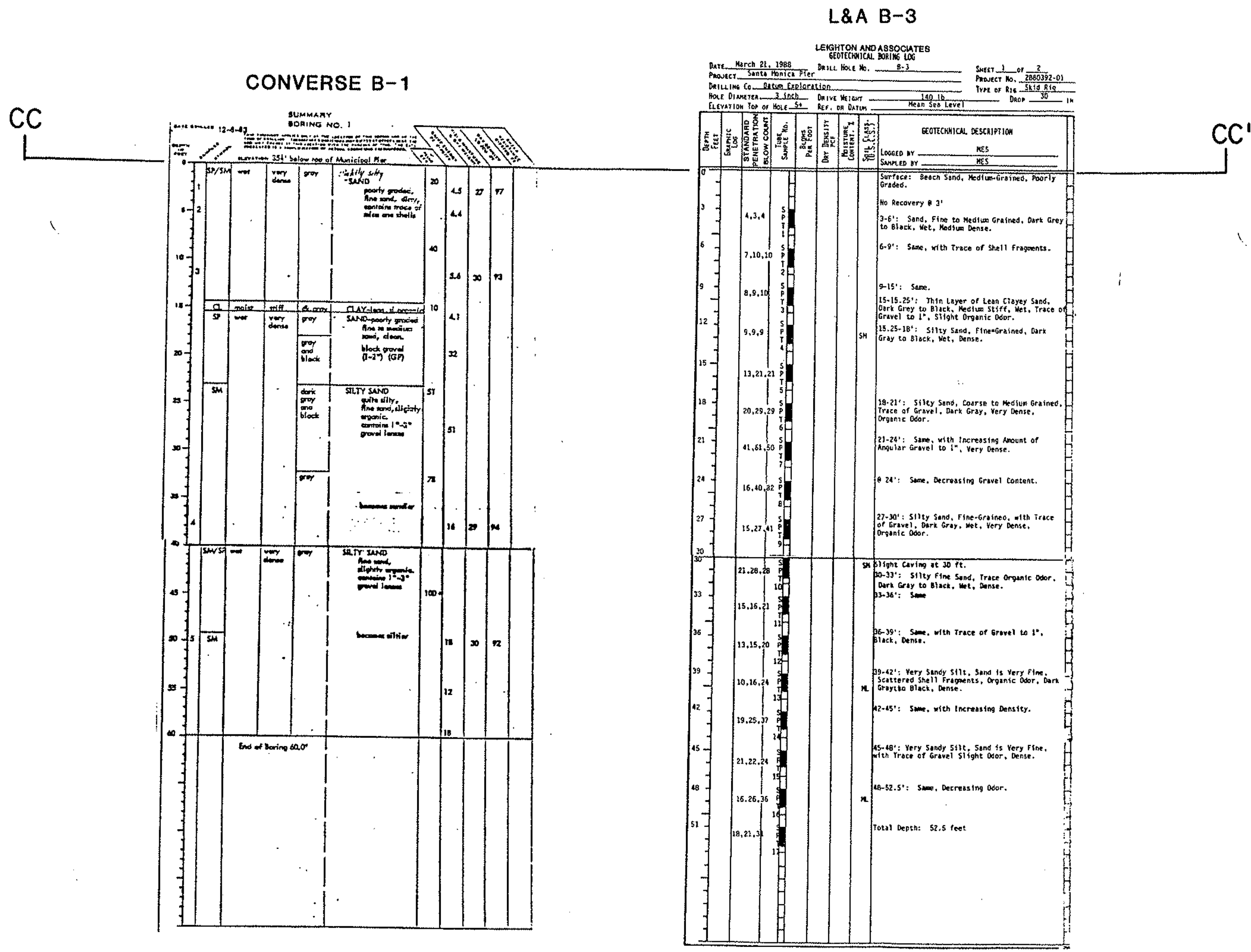

Figure 4

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LEIGHTON and ASSOCIATES, INC.

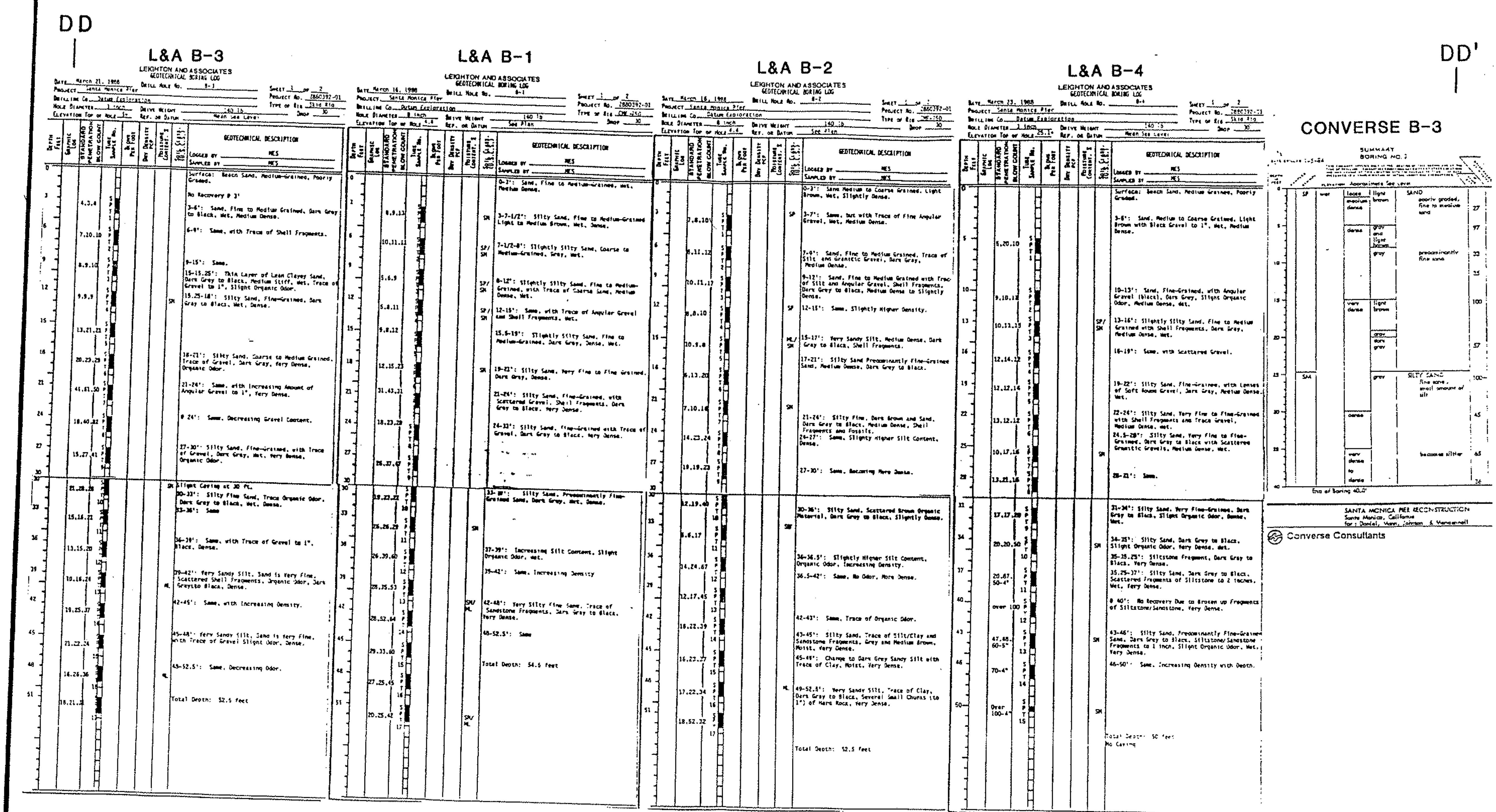

Figure 5

Proj: 2880392-02	Scale: none	Date: 9/6/88
Engineer/Geologist: BG/GEM	Drafting By: nh	

LEIGHTON and ASSOCIATES, INC.

APPENDIX B - LATERAL ANCHOR ANALYSES

Lateral performances for the vertical anchors were estimated using the p-y curve approach.

BACKGROUND

Lateral anchor analyses were performed using the computer program LPILE ^{PLUS} 5.0 for Windows (Ensoft, 2004). The program computes deflection, shear, and bending moments of laterally loaded anchors. The program uses nonlinear p-y (lateral load-deflection) curves to model the soil behavior. These p-y curves can be either input or generated by the program. For sloping ground surfaces, a reduction factor is applied to the resisting soil force (p) based on the ratio of the difference between the passive and active earth pressures for a sloping ground surface to the difference between the passive and active earth pressure for a level surface.

Input parameters for the program include applied moments, lateral forces, axial load, head condition (free or fixed), anchor geometry and stiffness, initial soil movement along the anchor, and soil geometry and strength parameters. The soil parameters include soil type for internal p-y curve generation, unit weight, friction angle, shear strength, initial stiffness, and soil strain at 50 percent of maximum strength.

LATERAL CAPACITY ANALYSES

Lateral analyses were performed for reinforced grouted body and steel tubular bar to simulate the micropile and helical anchor, respectively. Soil profiles and analyses parameters are provided in Tables B1 and B2 for full embedded and 5-foot scour conditions, respectively. The detailed analysis results are included at the end of this appendix. The lateral analyses consider a single anchor, and a group reduction factor is judged not needed since the center-to-center spacing is greater than 6 to 8 times of the foundation element diameter.

Table B1 - SOIL INPUT PARAMETERS - FULL EMBEDMENT

SOIL TYPE	DEPTH (inches)	LPILE MODEL	EFFECTIVE UNIT WEIGHT (lb/inch^3)	K (lb/inch^3)	INTERNAL FRICTION ANGLE (degrees)	UNDRAINED SHEAR STRENGTH (lb/inch^2)	e_{50}	NOTE
Sand	0 to 420	Sand	0.0347	100	35	--	--	--

Notes:

- Very gentle site slope; therefore, level ground condition assumed.
- Cyclic loading condition assumed due to wave action.
- Nominal grouted section of 12 inches assumed for micro-pile analysis.
- Tubular section (7-inch OD with 0.5-inch wall thickness) assumed for helical anchor analysis.

Table B2 - SOIL INPUT PARAMETERS - FULL EMBEDMENT

SOIL TYPE	DEPTH (inches)	LPILE MODEL	EFFECTIVE UNIT WEIGHT (lb/inch^3)	K (lb/inch^3)	INTERNAL FRICTION ANGLE (degrees)	UNDRAINED SHEAR STRENGTH (lb/inch^2)	e_{50}	NOTE
Sand	60 to 420	Sand	0.0347	100	35	--	--	--

Notes:

- Very gentle site slope; therefore, level ground condition assumed.
- Cyclic loading condition assumed due to wave action.
- Nominal grouted section of 12 inches assumed for micro-pile analysis.
- Tubular section (7-inch OD with 0.5-inch wall thickness) assumed for helical anchor analysis.

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Neville Su
URS

```
Path to file locations:      C:\URS\Santa Monica Pier\LPILE\
Name of input data file:     Micropile full.lpd
Name of output file:         Micropile full.lpo
Name of plot output file:    Micropile full.lpp
Name of runtime file:        Micropile full.lpr
```

Time and Date of Analysis

Date: July 12, 2010   Time: 1:42:19

Problem Title

SM Pier - Gangway - Micropile - Full Embedment

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100

- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 360.00 in

Depth of ground surface below top of pile = .00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	12.00000000	509.0000	113.0000	3800000.
2	360.0000	12.00000000	509.0000	113.0000	3800000.

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = .000 in
Distance from top of pile to bottom of layer = 420.000 in
p-y subgrade modulus k for top of soil layer = 100.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 100.000 lbs/in**3

(Depth of lowest layer extends 60.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 2 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	.00	.03470
2	420.00	.03470

Shear Strength of Soils

Shear strength parameters with depth defined using 2 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	.000	.00000	35.00	------	------
2	420.000	.00000	35.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Cyclic loading criteria was used for computation of p-y curves.

Number of cycles of loading = 50.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 14400.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = -4100.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 13000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = -7500.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 14400.000 lbs
Specified moment at pile head = .000 in-lbs
Specified axial load at pile head = -4100.000 lbs

(Zero moment for this load indicates free-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	2.204	1.1267E-06	14400.0000	-.0319177	36.2832	0.0000	0.0000
3.600	2.089	51368.8951	14390.0211	-.0318699	641.8104	-5.5438	9.5534
7.200	1.975	102667.	14353.1511	-.0317265	1246.5074	-14.9395	27.2379
10.800	1.861	153775.	14274.8702	-.0314879	1848.9553	-28.5500	55.2385
14.400	1.748	204517.	14141.6217	-.0311544	2447.0914	-45.4770	93.6695
18.000	1.636	254675.	13941.8335	-.0307271	3038.3462	-65.5165	144.1379
21.600	1.527	303991.	13673.1862	-.0302072	3619.6745	-83.7320	197.4579
25.200	1.419	352230.	13336.4169	-.0295965	4188.3096	-103.3620	262.2564
28.800	1.313	399140.	12924.9448	-.0288973	4741.2680	-125.2336	343.2402
32.400	1.211	444437.	12431.7245	-.0281122	5275.2238	-148.7776	442.3544
36.000	1.111	487818.	11851.1749	-.0272447	5786.5947	-173.7499	562.9668
39.600	1.015	528961.	11174.2464	-.0262984	6271.5797	-202.3215	717.8542
43.200	.921729	567496.	10391.4886	-.0252780	6725.8274	-232.5440	908.2478
46.800	.832629	603033.	9497.1309	-.0241887	7144.7331	-264.3214	1142.8337
50.400	.747570	635162.	8483.3474	-.0230364	7523.4536	-298.8917	1439.3433
54.000	.666767	663434.	7340.6677	-.0218279	7856.7181	-335.9304	1813.7511
57.600	.590409	687370.	6061.3449	-.0205709	8138.8774	-374.8045	2285.3582
61.200	.518657	706468.	4637.1547	-.0192737	8364.0002	-416.4123	2890.3206
64.800	.451638	720189.	3055.8915	-.0179461	8525.7365	-462.0673	3683.1303
68.400	.389445	727941.	1389.4382	-.0165984	8617.1160	-463.7401	4286.7769
72.000	.332130	729703.	-275.7083	-.0152419	8637.8855	-461.3413	5000.5434
75.600	.279703	725506.	-1927.8475	-.0138877	8588.4122	-456.5138	5875.6865
79.200	.232138	715412.	-3559.2747	-.0125467	8469.4321	-449.8346	6976.0279
82.800	.189367	699508.	-5164.1571	-.0112300	8281.9624	-441.7667	8398.2916
86.400	.151283	677899.	-6732.0718	-.0099481	8027.2304	-429.2970	10215.7671
90.000	.117741	650744.	-8244.1271	-.0087117	7707.1342	-410.7337	12558.4656
93.600	.088559	618284.	-9677.3499	-.0075307	7324.5010	-385.5012	15671.0019
97.200	.063520	580845.	-11006.1895	-.0064148	6883.1748	-352.7431	19991.8464
100.800	.042372	538850.	-12200.8726	-.0053728	6388.1482	-310.9697	26420.2415
104.400	.024836	492840.	-13223.3201	-.0044126	5845.7891	-257.0567	37260.8370
108.000	.010601	443512.	-13892.1141	-.0035413	5264.3191	-114.4956	38880.0000
111.600	-.000661	392712.	-14084.9234	-.0027631	4665.5012	7.3793	40176.0000
115.200	-.009293	342019.	-13878.9503	-.0020793	4067.9378	107.0502	41472.0000
118.800	-.015632	292722.	-13351.9810	-.0014886	3486.8392	185.7105	42768.0000
122.400	-.020010	245840.	-12576.8313	-.0009874	2934.2065	244.9282	44064.0000
126.000	-.022742	202140.	-11620.1830	-.0005705	2419.0711	286.5431	45360.0000
129.600	-.024118	162158.	-10541.7780	-.0002315	1947.7763	312.5709	46656.0000
133.200	-.024408	126232.	-9393.9395	3.6897E-05	1524.2856	325.1172	47952.0000
136.800	-.023852	94523.0584	-8221.3854	.0002423	1150.5039	326.3017	49248.0000
140.400	-.022663	67045.3814	-7061.2932	.0003927	826.6020	318.1939	50544.0000
144.000	-.021025	43693.3393	-5943.5744	.0004957	551.3324	302.7610	51840.0000
147.600	-.019094	24266.2800	-4891.3156	.0005590	322.3297	281.8273	53136.0000
151.200	-.017000	8492.3688	-3921.3459	.0005895	136.3897	257.0447	54432.0000
154.800	-.014850	-3950.0092	-3044.8923	.0005937	82.8452	229.8739	55728.0000
158.400	-.012726	-13413.3296	-2268.2862	.0005775	194.3971	201.5739	57024.0000
162.000	-.010691	-20264.6204	-1593.6922	.0005462	275.1589	173.2005	58320.0000
165.600	-.008793	-24871.7891	-1019.8313	.0005042	329.4673	145.6110	59616.0000
169.200	-.007061	-27592.5218	-542.6774	.0004554	361.5388	119.4744	60912.0000
172.800	-.005514	-28765.6240	-156.1093	.0004029	375.3672	95.2857	62208.0000
176.400	-.004160	-28704.6140	147.4946	.0003494	374.6480	73.3831	63504.0000
180.000	-.002998	-27693.3473	376.7258	.0002970	362.7274	53.9676	64800.0000
183.600	-.002022	-25983.4219	540.6876	.0002470	342.5711	37.1223	66096.0000
187.200	-.001220	-23793.1050	648.6077	.0002007	316.7520	22.8333	67392.0000
190.800	-.000577	-21307.5220	709.5230	.0001587	287.4524	11.0085	68688.0000
194.400	-7.70E-05	-18679.8537	732.0320	.0001215	256.4779	1.4964	69984.0000
198.000	.000298	-16033.3048	724.1102	8.9198E-05	225.2809	-5.8974	71280.0000

201.600	.000565	-13463.6270	692.9832	6.1747E-05	194.9900	-11.3954	72576.0000
205.200	.000742	-11042.0031	645.0491	3.8942E-05	166.4443	-15.2347	73872.0000
208.800	.000846	-8818.1241	585.8445	2.0460E-05	140.2296	-17.6567	75168.0000
212.400	.000890	-6823.3188	520.0457	5.9037E-06	116.7152	-18.8981	76464.0000
216.000	.000888	-5073.6207	451.4983	-5.1678E-06	96.0901	-19.1837	77760.0000
219.600	.000853	-3572.6832	383.2686	-1.3214E-05	78.3973	-18.7217	79056.0000
223.200	.000793	-2314.4765	317.7104	-1.8693E-05	63.5658	-17.6996	80352.0000
226.800	.000718	-1285.7204	256.5417	-2.2043E-05	51.4390	-16.2830	81648.0000
230.400	.000634	-468.0273	200.9273	-2.3675E-05	41.8002	-14.6139	82944.0000
234.000	.000547	160.2574	151.5624	-2.3962E-05	38.1723	-12.8111	84240.0000
237.600	.000462	622.5148	108.7540	-2.3233E-05	43.6213	-10.9713	85536.0000
241.200	.000380	942.6007	72.4988	-2.1777E-05	47.3944	-9.1705	86832.0000
244.800	.000305	1143.8631	42.5540	-1.9835E-05	49.7668	-7.4655	88128.0000
248.400	.000237	1248.4038	18.5019	-1.7609E-05	50.9991	-5.8968	89424.0000
252.000	.000178	1276.5568	-.1945335	-1.5259E-05	51.3310	-4.4901	90720.0000
255.600	.000128	1246.5527	-14.1439	-1.2911E-05	50.9773	-3.2595	92016.0000
259.200	8.52E-05	1174.3394	-23.9871	-1.0658E-05	50.1261	-2.2089	93312.0000
262.800	5.08E-05	1073.5307	-30.3656	-8.5662E-06	48.9378	-1.3347	94608.0000
266.400	2.35E-05	955.4542	-33.8970	-6.6780E-06	47.5459	-.6272248	95904.0000
270.000	2.70E-06	829.2752	-35.1574	-5.0171E-06	46.0585	-.0730288	97200.0000
273.600	-1.26E-05	702.1725	-34.6694	-3.5919E-06	44.5603	.3441457	98496.0000
277.200	-2.32E-05	579.5493	-32.8945	-2.3991E-06	43.1148	.6419051	99792.0000
280.800	-2.99E-05	465.2610	-30.2303	-1.4268E-06	41.7676	.8382395	101088.
284.400	-3.34E-05	361.8491	-27.0101	-6.5704E-07	40.5486	.9507341	102384.
288.000	-3.46E-05	270.7687	-23.5061	-6.8319E-08	39.4750	.9959774	103680.
291.600	-3.39E-05	192.6035	-19.9328	3.6290E-07	38.5536	.9891469	104976.
295.200	-3.20E-05	127.2630	-16.4536	6.6058E-07	37.7833	.9437439	106272.
298.800	-2.92E-05	74.1569	-13.1863	8.4802E-07	37.1573	.8714564	107568.
302.400	-2.59E-05	32.3470	-10.2098	9.4714E-07	36.6645	.7821239	108864.
306.000	-2.23E-05	.6742010	-7.5712	9.7787E-07	36.2911	.6837823	110160.
309.600	-1.88E-05	-22.1367	-5.2914	9.5789E-07	36.5441	.5827678	111456.
313.200	-1.54E-05	-37.3956	-3.3715	9.0249E-07	36.7240	.4838627	112752.
316.800	-1.23E-05	-46.3846	-1.7977	8.2452E-07	36.8300	.3904660	114048.
320.400	-9.51E-06	-50.3145	-.5462305	7.3453E-07	36.8763	.3047782	115344.
324.000	-7.04E-06	-50.2958	.4127489	6.4090E-07	36.8761	.2279881	116640.
327.600	-4.90E-06	-47.3237	1.1119	5.5006E-07	36.8410	.1604558	117936.
331.200	-3.08E-06	-42.2735	1.5842	4.6668E-07	36.7815	.1018855	119232.
334.800	-1.54E-06	-35.9040	1.8602	3.9392E-07	36.7064	.0514869	120528.
338.400	-2.40E-07	-28.8682	1.9675	3.3365E-07	36.6235	.0081217	121824.
342.000	8.64E-07	-21.7280	1.9289	2.8656E-07	36.5393	-.0295627	123120.
345.600	1.82E-06	-14.9714	1.7623	2.5241E-07	36.4597	-.0630108	124416.
349.200	2.68E-06	-9.0319	1.4803	2.3007E-07	36.3897	-.0936462	125712.
352.800	3.48E-06	-4.3063	1.0908	2.1766E-07	36.3339	-.1227647	127008.
356.400	4.25E-06	-1.1719	.5972302	2.1256E-07	36.2970	-.1514294	128304.
360.000	5.01E-06	0.0000	0.0000	2.1147E-07	36.2832	-.1803652	64800.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     2.20399149 in
Computed slope at pile head      =     -.03191767
Maximum bending moment           =   729702.59579 lbs-in
Maximum shear force              =    14400.00000 lbs
Depth of maximum bending moment  =    72.00000000 in
Depth of maximum shear force     =        0.00000 in
Number of iterations             =             23
Number of zero deflection points =              4
```

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

```
Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head  =      13000.000 lbs
Specified moment at pile head       =           .000 in-lbs
Specified axial load at pile head   =      -7500.000 lbs
```

(Zero moment for this load indicates free-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	1.832	7.9533E-07	13000.0000	-.0271395	66.3717	0.0000	0.0000
3.600	1.734	46067.2347	12990.0211	-.0270966	609.4039	-5.5438	11.5083
7.200	1.637	92064.9361	12953.1511	-.0269680	1151.6165	-14.9395	32.8578
10.800	1.540	137874.	12874.8702	-.0267541	1691.6013	-28.5499	66.7386
14.400	1.444	183319.	12741.6218	-.0264551	2227.3063	-45.4769	113.3630
18.000	1.350	228185.	12541.8337	-.0260722	2756.1722	-65.5164	174.7675
21.600	1.256	272213.	12273.1866	-.0256065	3275.1645	-83.7320	239.9075
25.200	1.165	315169.	11936.4174	-.0250599	3781.5262	-103.3620	319.3490
28.800	1.076	356802.	11524.9454	-.0244345	4272.2840	-125.2336	418.9843
32.400	.989264	396829.	11031.7254	-.0237332	4744.1212	-148.7776	541.4119
36.000	.905154	434948.	10451.1761	-.0229591	5193.4647	-173.7499	691.0422
39.600	.823958	470838.	9774.2479	-.0221162	5616.5220	-202.3214	883.9732
43.200	.745917	504129.	8991.4905	-.0212089	6008.9497	-232.5439	1122.3201
46.800	.671254	534431.	8097.1334	-.0202424	6366.1502	-264.3212	1417.5796
50.400	.600172	561335.	7083.3504	-.0192226	6683.2869	-298.8915	1792.8348
54.000	.532851	584393.	5940.6714	-.0181564	6955.0944	-335.9302	2269.5799
57.600	.469446	603127.	4661.3494	-.0170513	7175.9280	-374.8042	2874.2281
61.200	.410082	617034.	3282.0428	-.0159158	7339.8600	-391.4772	3436.6719
64.800	.354853	625899.	1864.3700	-.0147591	7444.3515	-396.1188	4018.6475
68.400	.303817	629661.	434.5504	-.0135906	7488.6986	-398.2254	4718.6697
72.000	.257000	628293.	-998.9871	-.0124199	7472.5817	-398.1843	5577.6762
75.600	.214393	621797.	-2429.3250	-.0112566	7396.0064	-396.4478	6656.9826
79.200	.175953	610194.	-3849.8211	-.0101101	7259.2341	-392.7167	8035.0024
82.800	.141601	593533.	-5248.3359	-.0089899	7062.8278	-384.2359	9768.6644
86.400	.111226	571921.	-6606.6286	-.0079053	6808.0733	-370.3711	11987.6716
90.000	.084683	545538.	-7904.4420	-.0068654	6497.0760	-350.6363	14906.1322
93.600	.061795	514638.	-9119.4152	-.0058787	6132.8350	-324.3488	18895.6158
97.200	.042356	479561.	-10225.9438	-.0049535	5719.3482	-290.3893	24681.4451
100.800	.026130	440744.	-11192.4735	-.0040971	5261.7826	-246.5716	33971.1604
104.400	.012857	398754.	-11877.9094	-.0033158	4766.8093	-134.2261	37584.0000
108.000	.002256	355044.	-12163.3709	-.0026143	4251.5664	-24.3637	38880.0000
111.600	-.005966	311036.	-12087.3772	-.0019944	3732.8119	66.5824	40176.0000
115.200	-.012104	267907.	-11716.5373	-.0014557	3224.4134	139.4397	41472.0000
118.800	-.016447	226599.	-11113.8427	-.0009955	2737.4758	195.3906	42768.0000
122.400	-.019272	187834.	-10337.5479	-.0006098	2280.5224	235.8843	44064.0000
126.000	-.020838	152135.	-9440.3597	-.0002934	1859.7162	262.5536	45360.0000
129.600	-.021384	119847.	-8468.9122	-4.0308E-05	1479.1106	277.1394	46656.0000
133.200	-.021128	91157.0502	-7463.5011	.0001561	1140.9145	281.4224	47952.0000
136.800	-.020261	66118.5674	-6458.0436	.0003024	845.7654	277.1651	49248.0000
140.400	-.018950	44675.4667	-5480.2324	.0004055	592.9980	266.0634	50544.0000
144.000	-.017341	26682.7924	-4551.8445	.0004719	380.9036	249.7077	51840.0000
147.600	-.015552	11927.6709	-3689.1729	.0005079	206.9729	229.5543	53136.0000
151.200	-.013684	148.1721	-2903.5465	.0005191	68.1183	206.9048	54432.0000
154.800	-.011815	-8949.8327	-2201.9072	.0005109	171.8707	182.8948	55728.0000
158.400	-.010006	-15677.9702	-1587.4165	.0004880	251.1808	158.4889	57024.0000

162.000	-.008301	-20352.8797	-1060.0689	.0004545	306.2877	134.4820	58320.0000
165.600	-.006733	-23285.9251	-617.2897	.0004139	340.8620	111.5064	59616.0000
169.200	-.005322	-24775.0174	-254.5026	.0003691	358.4151	90.0419	60912.0000
172.800	-.004076	-25098.4112	34.3459	.0003227	362.2272	70.4295	62208.0000
176.400	-.002998	-24510.3004	256.3146	.0002765	355.2947	52.8865	63504.0000
180.000	-.002085	-23238.0125	419.0530	.0002321	340.2972	37.5237	64800.0000
183.600	-.001327	-21480.5847	530.4474	.0001905	319.5809	24.3620	66096.0000
187.200	-.000713	-19408.5043	598.3275	.0001524	295.1556	13.3491	67392.0000
190.800	-.000229	-17164.3946	630.2319	.0001184	268.7025	4.3755	68688.0000
194.400	.000139	-14864.4404	633.2289	8.8600E-05	241.5910	-2.7106	69984.0000
198.000	.000409	-12600.3624	613.7875	6.3041E-05	214.9025	-8.0902	71280.0000
201.600	.000593	-10441.7660	577.6946	4.1597E-05	189.4573	-11.9615	72576.0000
205.200	.000708	-8438.7151	530.0097	2.4027E-05	165.8457	-14.5301	73872.0000
208.800	.000766	-6624.3986	475.0541	1.0009E-05	144.4589	-16.0008	75168.0000
212.400	.000780	-5017.7851	416.4256	-8.2550E-07	125.5204	-16.5706	76464.0000
216.000	.000760	-3626.1786	357.0351	-8.8697E-06	109.1164	-16.4241	77760.0000
219.600	.000716	-2447.6112	299.1578	-1.4522E-05	95.2237	-15.7299	79056.0000
223.200	.000656	-1473.0263	244.4959	-1.8171E-05	83.7354	-14.6379	80352.0000
226.800	.000585	-688.2220	194.2466	-2.0182E-05	74.4843	-13.2784	81648.0000
230.400	.000511	-75.5408	149.1736	-2.0893E-05	67.2621	-11.7621	82944.0000
234.000	.000435	384.7000	109.6780	-2.0605E-05	70.9065	-10.1799	84240.0000
237.600	.000362	713.0279	75.8656	-1.9584E-05	74.7767	-8.6047	85536.0000
241.200	.000294	929.8747	47.6111	-1.8055E-05	77.3329	-7.0922	86832.0000
244.800	.000232	1054.8530	24.6153	-1.6208E-05	78.8061	-5.6832	88128.0000
248.400	.000177	1106.2296	6.4560	-1.4196E-05	79.4117	-4.4052	89424.0000
252.000	.000130	1100.5699	-7.3676	-1.2143E-05	79.3450	-3.2746	90720.0000
255.600	8.99E-05	1052.5270	-17.3988	-1.0139E-05	78.7787	-2.2983	92016.0000
259.200	5.69E-05	974.7512	-24.1924	-8.2524E-06	77.8619	-1.4760	93312.0000
262.800	3.05E-05	877.8961	-28.2919	-6.5283E-06	76.7202	-.8015285	94608.0000
266.400	9.94E-06	770.6973	-30.2112	-4.9941E-06	75.4565	-.2647696	95904.0000
270.000	-5.46E-06	660.1058	-30.4225	-3.6626E-06	74.1529	.1473647	97200.0000
273.600	-1.64E-05	551.4574	-29.3480	-2.5351E-06	72.8722	.4495713	98496.0000
277.200	-2.37E-05	448.6631	-27.3558	-1.6043E-06	71.6604	.6572533	99792.0000
280.800	-2.80E-05	354.4093	-24.7583	-8.5698E-07	70.5494	.7857608	101088.
284.400	-2.99E-05	270.3569	-21.8143	-2.7557E-07	69.5586	.8498079	102384.
288.000	-3.00E-05	197.3315	-18.7312	1.5967E-07	68.6978	.8630500	103680.
291.600	-2.87E-05	135.5011	-15.6696	4.6941E-07	67.9689	.8377985	104976.
295.200	-2.66E-05	84.5355	-12.7489	6.7418E-07	67.3682	.7848555	106272.
298.800	-2.39E-05	43.7458	-10.0519	7.9356E-07	66.8873	.7134441	107568.
302.400	-2.09E-05	12.2045	-7.6315	8.4563E-07	66.5155	.6312175	108864.
306.000	-1.78E-05	-11.1555	-5.5155	8.4661E-07	66.5032	.5443261	110160.
309.600	-1.48E-05	-27.4617	-3.7122	8.1067E-07	66.6954	.4575275	111456.
313.200	-1.20E-05	-37.8397	-2.2149	7.4990E-07	66.8177	.3743245	112752.
316.800	-9.38E-06	-43.3683	-1.0063	6.7433E-07	66.8829	.2971187	114048.
320.400	-7.10E-06	-45.0484	-.0621967	5.9204E-07	66.9027	.2273709	115344.
324.000	-5.12E-06	-43.7841	.6454382	5.0937E-07	66.8878	.1657596	116640.
327.600	-3.43E-06	-40.3738	1.1460	4.3106E-07	66.8476	.1123333	117936.
331.200	-2.01E-06	-35.5096	1.4682	3.6044E-07	66.7903	.0666519	119232.
334.800	-8.34E-07	-29.7834	1.6384	2.9967E-07	66.7228	.0279166	120528.
338.400	1.45E-07	-23.6969	1.6798	2.4990E-07	66.6510	-.0049141	121824.
342.000	9.65E-07	-17.6753	1.6115	2.1140E-07	66.5800	-.0330195	123120.
345.600	1.67E-06	-12.0825	1.4484	1.8371E-07	66.5141	-.0576224	124416.
349.200	2.29E-06	-7.2371	1.2008	1.6573E-07	66.4570	-.0799036	125712.
352.800	2.86E-06	-3.4277	.8753400	1.5581E-07	66.4121	-.1009210	127008.
356.400	3.41E-06	-.9262759	.4749247	1.5175E-07	66.3826	-.1215320	128304.
360.000	3.95E-06	0.0000	0.0000	1.5089E-07	66.3717	-.1423151	64800.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:


```
Pile-head deflection               =     1.83190838 in
Computed slope at pile head        =     -.02713946
Maximum bending moment             =   629660.73173 lbs-in
Maximum shear force                =    13000.00000 lbs
Depth of maximum bending moment    =    68.40000000 in
Depth of maximum shear force       =        0.00000 in
Number of iterations               =             22
Number of zero deflection points   =              4
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

```
Type 1 = Shear and Moment,          y = pile-head displacment in
Type 2 = Shear and Slope,           M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness,  V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment,     S = Pile-head Slope, radians
Type 5 = Deflection and Slope,      R = Rot. Stiffness of Pile-head in-lbs/rad
```

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 14400.	M= 0.000	-4100.0000	2.2040	729703.	14400.0000
1	V= 13000.	M= 0.000	-7500.0000	1.8319	629661.	13000.0000

The analysis ended normally.

==

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==

This program is licensed to:

Neville Su
URS

Path to file locations: C:\URS\Santa Monica Pier\LPILE\
Name of input data file: Micropile scour.lpd
Name of output file: Micropile scour.lpo
Name of plot output file: Micropile scour.lpp
Name of runtime file: Micropile scour.lpr

Time and Date of Analysis

Date: July 12, 2010 Time: 2:12:36

Problem Title

SM Pier - Gangway - Micropile - 5-foot Scour

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100

- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 360.00 in

Depth of ground surface below top of pile = 60.00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	12.00000000	509.0000	113.0000	3800000.
2	360.0000	12.00000000	509.0000	113.0000	3800000.

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 60.000 in
Distance from top of pile to bottom of layer = 420.000 in
p-y subgrade modulus k for top of soil layer = 100.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 100.000 lbs/in**3

(Depth of lowest layer extends 60.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 2 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	60.00	.03470
2	420.00	.03470

Shear Strength of Soils

Shear strength parameters with depth defined using 2 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	60.000	.00000	35.00	------	------
2	420.000	.00000	35.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Cyclic loading criteria was used for computation of p-y curves.

Number of cycles of loading = 50.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 14400.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = -4100.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 13000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = -7500.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 14400.000 lbs
Specified moment at pile head = .000 in-lbs
Specified axial load at pile head = -4100.000 lbs

(Zero moment for this load indicates free-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	11.096	-6.0975E-06	14400.0000	-.0978357	36.2832	0.0000	0.0000
3.600	10.744	50395.9458	14400.0000	-.0977888	630.3415	0.0000	0.0000
7.200	10.392	100793.	14400.0000	-.0976481	1224.4161	0.0000	0.0000
10.800	10.041	151193.	14400.0000	-.0974135	1818.5234	0.0000	0.0000
14.400	9.691	201598.	14400.0000	-.0970852	2412.6796	0.0000	0.0000
18.000	9.342	252007.	14400.0000	-.0966631	3006.9011	0.0000	0.0000
21.600	8.995	302424.	14400.0000	-.0961471	3601.2042	0.0000	0.0000
25.200	8.650	352849.	14400.0000	-.0955373	4195.6053	0.0000	0.0000
28.800	8.307	403284.	14400.0000	-.0948337	4790.1206	0.0000	0.0000
32.400	7.967	453730.	14400.0000	-.0940361	5384.7665	0.0000	0.0000
36.000	7.630	504188.	14400.0000	-.0931447	5979.5593	0.0000	0.0000
39.600	7.296	554660.	14400.0000	-.0921593	6574.5154	0.0000	0.0000
43.200	6.967	605147.	14400.0000	-.0910799	7169.6512	0.0000	0.0000
46.800	6.641	655651.	14400.0000	-.0899066	7764.9829	0.0000	0.0000
50.400	6.319	706173.	14400.0000	-.0886393	8360.5269	0.0000	0.0000
54.000	6.002	756715.	14400.0000	-.0872779	8956.2996	0.0000	0.0000
57.600	5.691	807277.	14400.0000	-.0858224	9552.3173	0.0000	0.0000
61.200	5.385	857861.	14397.3728	-.0842728	10148.5965	-1.4595	.9758163
64.800	5.084	908450.	14379.9268	-.0826290	10744.9305	-8.2327	5.8295
68.400	4.790	958958.	14330.9742	-.0808912	11340.3010	-18.9632	14.2531
72.000	4.502	1009245.	14235.3476	-.0790596	11933.0850	-34.1627	27.3201
75.600	4.220	1059118.	14080.7220	-.0771347	12520.9768	-51.7404	44.1344
79.200	3.946	1108350.	13858.9347	-.0751176	13101.3072	-71.4748	65.2029
82.800	3.680	1156685.	13568.2768	-.0730097	13671.0773	-90.0018	88.0555
86.400	3.421	1203886.	13207.3373	-.0708130	14227.4724	-110.5201	116.3162
90.000	3.170	1249687.	12769.4149	-.0685296	14767.3731	-132.7701	150.7933
93.600	2.927	1293803.	12247.8645	-.0661626	15287.3953	-156.9801	193.0611
97.200	2.693	1335919.	11635.7495	-.0637153	15783.8545	-183.0838	244.7146
100.800	2.468	1375699.	10924.2096	-.0611919	16252.7766	-212.2162	309.4973
104.400	2.253	1412767.	10104.8788	-.0585969	16689.7240	-242.9675	388.2706
108.000	2.047	1446725.	9172.1023	-.0559358	17090.0106	-275.2417	484.1656
111.600	1.850	1477155.	8116.8137	-.0532148	17448.7171	-311.0298	605.2375
115.200	1.663	1503595.	6929.3263	-.0504408	17760.3858	-348.6854	754.6371
118.800	1.487	1525557.	5603.0039	-.0476218	18019.2727	-388.1604	939.8204
122.400	1.321	1542531.	4127.8539	-.0447666	18219.3543	-431.3674	1175.9861
126.000	1.165	1553956.	2491.3423	-.0418850	18354.0354	-477.8057	1477.0694
129.600	1.019	1559232.	683.4207	-.0389878	18416.2253	-526.5952	1860.4749
133.200	.883824	1557726.	-1304.3748	-.0360871	18398.4721	-577.7357	2353.2383
136.800	.759129	1548775.	-3480.5084	-.0331961	18292.9625	-631.2274	2993.4543
140.400	.644812	1531686.	-5853.4439	-.0303294	18091.5218	-687.0702	3835.9291
144.000	.540757	1505735.	-8431.6456	-.0275027	17785.6134	-745.2641	4961.4675
147.600	.446792	1470166.	-11216.5955	-.0247333	17366.3384	-801.9303	6461.5022
151.200	.362678	1424245.	-14018.9222	-.0220397	16825.0285	-754.9179	7493.4414
154.800	.288106	1368579.	-16650.6440	-.0194407	16168.8510	-707.1498	8836.1106
158.400	.222705	1303787.	-19111.6553	-.0169537	15405.0852	-660.0787	10670.0947
162.000	.166040	1230475.	-21402.2284	-.0145953	14540.9013	-612.4619	13279.1385
165.600	.117619	1149260.	-23501.9865	-.0123807	13583.5501	-554.0703	16958.6029
169.200	.076899	1060895.	-25365.6930	-.0103239	12541.9256	-481.3222	22532.9713
172.800	.043287	966322.	-26931.1646	-.0084373	11427.1129	-388.3843	32300.1316
176.400	.016150	866742.	-27968.6394	-.0067314	10253.2797	-187.9906	41904.0000
180.000	-.005179	764749.	-28195.1586	-.0052131	9051.0079	62.1466	43200.0000
183.600	-.021384	663583.	-27607.5431	-.0038839	7858.4778	264.3064	44496.0000
187.200	-.033143	565860.	-26372.9533	-.0027397	6706.5407	421.5769	45792.0000
190.800	-.041110	473617.	-24710.8786	-.0017724	5619.1912	501.7980	43942.2617
194.400	-.045904	387890.	-22804.7253	-.0009707	4608.6549	557.1761	43696.2685
198.000	-.048099	309394.	-20723.1001	-.0003217	3683.3640	599.2824	44853.8111

201.600	-.048221	238674.	-18509.9199	.0001883	2849.7258	630.2621	47053.4098
205.200	-.046743	176128.	-16202.8332	.0005743	2112.4501	651.4527	50172.7084
208.800	-.044086	122030.	-13849.4312	.0008518	1474.7539	655.9928	53568.0000
212.400	-.040610	76437.3991	-11554.6230	.0010365	937.3134	618.9007	54864.0000
216.000	-.036623	38867.5812	-9412.2319	.0011438	494.4472	571.3166	56160.0000
219.600	-.032375	8703.0941	-7453.7929	.0011881	138.8737	516.7051	57456.0000
223.200	-.028069	-14764.6559	-5699.1734	.0011824	210.3263	458.0835	58752.0000
226.800	-.023862	-32296.0498	-4158.2024	.0011386	416.9832	398.0115	60048.0000
230.400	-.019871	-44670.1014	-2832.3056	.0010670	562.8463	338.5978	61344.0000
234.000	-.016179	-52657.1524	-1716.0959	.0009764	656.9962	281.5187	62640.0000
237.600	-.012841	-56997.1680	-798.8762	.0008744	708.1555	228.0478	63936.0000
241.200	-.009884	-58383.2494	-66.0222	.0007670	724.4944	179.0933	65232.0000
244.800	-.007318	-57449.8858	499.7760	.0006592	713.4921	135.2391	66528.0000
248.400	-.005137	-54765.4021	917.4282	.0005548	681.8478	96.7899	67824.0000
252.000	-.003324	-50828.0258	1206.5191	.0004565	635.4348	63.8162	69120.0000
255.600	-.001851	-46064.9884	1386.5447	.0003663	579.2889	36.1981	70416.0000
259.200	-.000686	-40834.0894	1476.3033	.0002855	517.6281	13.6678	71712.0000
262.800	.000205	-35427.1779	1493.4313	.0002145	453.8924	-4.1522	73008.0000
266.400	.000858	-30075.0524	1454.0718	.0001535	390.8025	-17.7142	74304.0000
270.000	.001310	-24953.3287	1372.6596	.0001023	330.4285	-27.5148	75600.0000
273.600	.001595	-20188.8823	1261.8079	6.0319E-05	274.2661	-34.0695	76896.0000
277.200	.001745	-15866.5312	1132.2789	2.6765E-05	223.3150	-37.8911	78192.0000
280.800	.001788	-12035.6843	993.0237	7.9885E-07	178.1577	-39.4729	79488.0000
284.400	.001750	-8716.7370	851.2753	-1.8514E-05	139.0345	-39.2762	80784.0000
288.000	.001654	-5907.0488	712.6806	-3.2123E-05	105.9144	-37.7209	82080.0000
291.600	.001519	-3586.3852	581.4593	-4.0958E-05	78.5588	-35.1798	83376.0000
295.200	.001360	-1721.7510	460.5785	-4.5897E-05	56.5789	-31.9761	84672.0000
298.800	.001189	-271.5746	351.9337	-4.7752E-05	39.4845	-28.3821	85968.0000
302.400	.001016	810.7623	256.5285	-4.7251E-05	45.8403	-24.6208	87264.0000
306.000	.000848	1574.0355	174.6471	-4.5031E-05	54.8376	-20.8688	88560.0000
309.600	.000691	2066.8924	106.0163	-4.1643E-05	60.6473	-17.2595	89856.0000
313.200	.000548	2336.1233	49.9510	-3.7546E-05	63.8210	-13.8879	91152.0000
316.800	.000421	2425.4314	5.4852	-3.3114E-05	64.8737	-10.8153	92448.0000
320.400	.000310	2374.6395	-28.5160	-2.8647E-05	64.2750	-8.0743	93744.0000
324.000	.000215	2219.2705	-53.2616	-2.4372E-05	62.4435	-5.6733	95040.0000
327.600	.000135	1990.4368	-69.9565	-2.0455E-05	59.7461	-3.6017	96336.0000
331.200	6.76E-05	1714.9801	-79.7406	-1.7006E-05	56.4991	-1.8340	97632.0000
334.800	1.21E-05	1415.8023	-83.6426	-1.4093E-05	52.9724	-.3338057	98928.0000
338.400	-3.38E-05	1112.3373	-82.5475	-1.1740E-05	49.3952	.9421902	100224.
342.000	-7.24E-05	821.1137	-77.1776	-9.9406E-06	45.9623	2.0411	101520.
345.600	-.000105	556.3655	-68.0843	-8.6587E-06	42.8415	3.0107	102816.
349.200	-.000135	330.6508	-55.6520	-7.8332E-06	40.1808	3.8962	104112.
352.800	-.000162	155.4397	-40.1106	-7.3809E-06	38.1155	4.7379	105408.
356.400	-.000188	41.6366	-21.5593	-7.1975E-06	36.7740	5.5683	106704.
360.000	-.000214	0.0000	0.0000	-7.1587E-06	36.2832	6.4091	54000.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =    11.09646817 in
Computed slope at pile head      =     -.09783565
Maximum bending moment           =       1559232. lbs-in
Maximum shear force              =   -28195.15856 lbs
Depth of maximum bending moment  =      129.60000 in
Depth of maximum shear force     =      180.00000 in
Number of iterations             =             27
Number of zero deflection points =              3
```

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

```
Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head  =       13000.000 lbs
Specified moment at pile head       =            .000 in-lbs
Specified axial load at pile head   =       -7500.000 lbs
```

(Zero moment for this load indicates free-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	9.281	1.8558E-06	13000.0000	-.0833956	66.3717	0.0000	0.0000
3.600	8.980	44548.3192	13000.0000	-.0833541	591.4992	0.0000	0.0000
7.200	8.680	89098.8772	13000.0000	-.0832298	1116.6531	0.0000	0.0000
10.800	8.381	133654.	13000.0000	-.0830225	1641.8598	0.0000	0.0000
14.400	8.083	178216.	13000.0000	-.0827322	2167.1457	0.0000	0.0000
18.000	7.785	222786.	13000.0000	-.0823590	2692.5372	0.0000	0.0000
21.600	7.490	267368.	13000.0000	-.0819029	3218.0606	0.0000	0.0000
25.200	7.196	311964.	13000.0000	-.0813638	3743.7424	0.0000	0.0000
28.800	6.904	356575.	13000.0000	-.0807416	4269.6090	0.0000	0.0000
32.400	6.614	401204.	13000.0000	-.0800364	4795.6868	0.0000	0.0000
36.000	6.328	445853.	13000.0000	-.0792481	5322.0023	0.0000	0.0000
39.600	6.044	490524.	13000.0000	-.0783767	5848.5819	0.0000	0.0000
43.200	5.763	535220.	13000.0000	-.0774221	6375.4521	0.0000	0.0000
46.800	5.486	579943.	13000.0000	-.0763843	6902.6394	0.0000	0.0000
50.400	5.213	624696.	13000.0000	-.0752633	7430.1701	0.0000	0.0000
54.000	4.944	669479.	13000.0000	-.0740589	7958.0710	0.0000	0.0000
57.600	4.680	714296.	13000.0000	-.0727711	8486.3684	0.0000	0.0000
61.200	4.420	759150.	12997.3728	-.0713999	9015.0890	-1.4595	1.1886
64.800	4.166	804022.	12979.9268	-.0699452	9544.0362	-8.2327	7.1142
68.400	3.917	848828.	12930.9742	-.0684070	10072.2021	-18.9632	17.4290
72.000	3.673	893431.	12835.3477	-.0667857	10597.9738	-34.1627	33.4795
75.600	3.436	937636.	12680.7221	-.0650816	11119.0557	-51.7404	54.2096
79.200	3.205	981218.	12458.9347	-.0632959	11632.7886	-71.4748	80.2868
82.800	2.980	1023922.	12168.2769	-.0614299	12136.1836	-90.0018	108.7162
86.400	2.763	1065512.	11807.3374	-.0594854	12626.4355	-110.5201	144.0221
90.000	2.552	1105723.	11369.4151	-.0574649	13100.4344	-132.7701	187.2931
93.600	2.349	1144269.	10847.8647	-.0553710	13554.8051	-156.9801	240.5997
97.200	2.153	1180838.	10235.7498	-.0532072	13985.8717	-183.0838	306.0847
100.800	1.966	1215093.	9524.2099	-.0509775	14389.6681	-212.2162	388.6464
104.400	1.786	1246659.	8704.8793	-.0486865	14761.7639	-242.9675	489.6639
108.000	1.615	1275139.	7772.1028	-.0463397	15097.4801	-275.2416	613.4666
111.600	1.453	1300116.	6716.8143	-.0439431	15391.9030	-311.0298	770.8048
115.200	1.299	1321127.	5529.3271	-.0415038	15639.5799	-348.6854	966.4770
118.800	1.154	1337686.	4203.0049	-.0390294	15834.7708	-388.1603	1211.0880
122.400	1.018	1349281.	2727.8550	-.0365289	15971.4547	-431.3674	1525.7709
126.000	.890812	1355354.	1091.3436	-.0340119	16043.0379	-477.8057	1930.9360
129.600	.772910	1355302.	-716.5778	-.0314893	16042.4296	-526.5951	2452.7350
133.200	.664089	1348494.	-2704.3732	-.0289731	15962.1760	-577.7356	3131.8840
136.800	.564303	1334266.	-4880.5065	-.0264765	15794.4606	-631.2273	4026.9467
140.400	.473458	1311925.	-7253.4419	-.0240139	15531.1028	-687.0701	5224.2306
144.000	.391403	1280745.	-9713.7314	-.0216011	15163.5584	-679.7574	6252.1934
147.600	.317930	1240819.	-12100.4055	-.0192545	14692.9261	-646.1727	7316.7824
151.200	.252770	1192582.	-14364.5812	-.0169900	14124.3129	-611.7026	8711.9770
154.800	.195602	1136477.	-16505.1866	-.0148225	13462.9562	-577.5226	10629.1442
158.400	.146048	1072944.	-18513.6499	-.0127664	12714.0446	-538.2904	13268.5131

162.000	.103684	1002489.	-20361.9837	-.0108349	11883.5339	-488.5617	16963.2758
165.600	.068037	925753.	-22008.2723	-.0090405	10978.9794	-426.0430	22542.9765
169.200	.038593	843542.	-23397.4354	-.0073939	10009.8866	-345.7143	32248.8857
172.800	.014801	756892.	-24320.2318	-.0059045	8988.4787	-166.9504	40608.0000
176.400	-.003920	668117.	-24538.6096	-.0045784	7942.0141	45.6294	41904.0000
180.000	-.018164	579967.	-24064.1347	-.0034169	6902.9161	217.9678	43200.0000
183.600	-.028522	494671.	-23037.2379	-.0024168	5897.4607	352.5305	44496.0000
187.200	-.035565	413968.	-21603.7147	-.0015712	4946.1544	443.8713	44929.7021
190.800	-.039835	339039.	-19915.0686	-.0008705	4062.9036	494.2654	44668.2740
194.400	-.041833	270533.	-18066.2004	-.0003032	3255.3626	532.8837	45858.3236
198.000	-.042018	208946.	-16096.0626	.0001430	2529.3906	561.6373	48119.7263
201.600	-.040803	154649.	-14045.1243	.0004814	1889.3438	577.7729	50976.0000
205.200	-.038552	107847.	-11997.5345	.0007257	1337.6550	559.7770	52272.0000
208.800	-.035578	68305.7383	-10037.0021	.0008896	871.5474	529.4077	53568.0000
212.400	-.032147	35628.8274	-8202.2081	.0009863	486.3579	489.9223	54864.0000
216.000	-.028477	9303.1002	-6520.7120	.0010281	176.0349	444.2422	56160.0000
219.600	-.024745	-11264.7804	-5010.2114	.0010263	199.1589	394.9248	57456.0000
223.200	-.021088	-26715.0017	-3679.8734	.0009910	381.2833	344.1519	58752.0000
226.800	-.017610	-37706.3573	-2531.6829	.0009310	510.8474	293.7317	60048.0000
230.400	-.014385	-44892.8447	-1561.7631	.0008541	595.5604	245.1126	61344.0000
234.000	-.011460	-48904.9288	-761.6310	.0007668	642.8541	199.4052	62640.0000
237.600	-.008863	-50335.1785	-119.3600	.0006745	659.7137	157.4120	63936.0000
241.200	-.006604	-49727.8988	379.3700	.0005814	652.5552	119.6603	65232.0000
244.800	-.004677	-47572.3208	750.3492	.0004908	627.1456	86.4393	66528.0000
248.400	-.003070	-44298.8807	1010.0458	.0004053	588.5589	57.8367	67824.0000
252.000	-.001759	-40278.1036	1174.9479	.0003266	541.1627	33.7756	69120.0000
255.600	-.000718	-35821.6191	1261.0333	.0002558	488.6305	14.0497	70416.0000
259.200	8.26E-05	-31184.8510	1283.3627	.0001934	433.9731	-1.6445	71712.0000
262.800	.000674	-26570.9622	1255.7829	.0001397	379.5854	-13.6776	73008.0000
266.400	.001088	-22135.6709	1190.7311	9.4358E-05	327.3030	-22.4623	74304.0000
270.000	.001354	-17992.6033	1099.1246	5.7014E-05	278.4652	-28.4302	75600.0000
273.600	.001499	-14218.8954	990.3246	2.7038E-05	233.9814	-32.0142	76896.0000
277.200	.001548	-10860.8058	872.1593	3.6980E-06	194.3969	-33.6332	78192.0000
280.800	.001525	-7939.1486	750.9933	-1.3798E-05	159.9569	-33.6812	79488.0000
284.400	.001449	-5454.3988	631.8331	-2.6262E-05	130.6671	-32.5189	80784.0000
288.000	.001336	-3391.3680	518.4561	-3.4494E-05	106.3485	-30.4684	82080.0000
291.600	.001201	-1723.3779	413.5543	-3.9254E-05	86.6865	-27.8104	83376.0000
295.200	.001054	-415.8967	318.8859	-4.1245E-05	71.2742	-24.7832	84672.0000
298.800	.000904	570.3737	235.4259	-4.1101E-05	73.0951	-21.5835	85968.0000
302.400	.000758	1276.9504	163.5121	-3.9382E-05	81.4241	-18.3686	87264.0000
306.000	.000620	1745.5343	102.9824	-3.6569E-05	86.9477	-15.2590	88560.0000
309.600	.000494	2016.4491	53.3000	-3.3068E-05	90.1412	-12.3423	89856.0000
313.200	.000382	2127.5084	13.6648	-2.9211E-05	91.4504	-9.6772	91152.0000
316.800	.000284	2113.2581	-16.8893	-2.5265E-05	91.2824	-7.2973	92448.0000
320.400	.000200	2004.5411	-39.4124	-2.1433E-05	90.0008	-5.2155	93744.0000
324.000	.000130	1828.3316	-54.9706	-1.7866E-05	87.9237	-3.4279	95040.0000
327.600	7.17E-05	1607.7878	-64.5924	-1.4668E-05	85.3240	-1.9175	96336.0000
331.200	2.42E-05	1362.4744	-69.2269	-1.1904E-05	82.4323	-.6572708	97632.0000
334.800	-1.41E-05	1108.7112	-69.7148	-9.6043E-06	79.4410	.3862063	98928.0000
338.400	-4.49E-05	860.0089	-66.7689	-7.7721E-06	76.5093	1.2504	100224.
342.000	-7.00E-05	627.5555	-60.9642	-6.3878E-06	73.7692	1.9744	101520.
345.600	-9.09E-05	420.7215	-52.7370	-5.4122E-06	71.3311	2.5963	102816.
349.200	-.000109	247.5567	-42.3905	-4.7903E-06	69.2898	3.1517	104112.
352.800	-.000125	115.2510	-30.1085	-4.4527E-06	67.7302	3.6716	105408.
356.400	-.000141	30.5354	-15.9747	-4.3170E-06	66.7316	4.1804	106704.
360.000	-.000156	0.0000	0.0000	-4.2886E-06	66.3717	4.6944	54000.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:


```
Pile-head deflection              =     9.28055450 in
Computed slope at pile head       =     -.08339558
Maximum bending moment            =       1355354. lbs-in
Maximum shear force               =   -24538.60964 lbs
Depth of maximum bending moment   =      126.00000 in
Depth of maximum shear force      =      176.40000 in
Number of iterations              =             27
Number of zero deflection points  =              3
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

```
Type 1 = Shear and Moment,          y = pile-head displacment in
Type 2 = Shear and Slope,           M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness,  V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment,     S = Pile-head Slope, radians
Type 5 = Deflection and Slope,      R = Rot. Stiffness of Pile-head in-lbs/rad
```

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 14400.	M= 0.000	-4100.0000	11.0965	1559232.	-28195.1586
1	V= 13000.	M= 0.000	-7500.0000	9.2806	1355354.	-24538.6096

The analysis ended normally.

LPILE Plus for Windows, Version 5.0 (5.0.45)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Neville Su
URS

Files Used for Analysis

Path to file locations: L:\Neville\Project\Santa Monica Pier\Calcs\LPILE\
Name of input data file: Helical full rev.lpd
Name of output file: Helical full rev.lpo
Name of plot output file: Helical full rev.lpp
Name of runtime file: Helical full rev.lpr

Time and Date of Analysis

Date: July 12, 2010 Time: 9:03:19

Problem Title

SM Pier - Gangway - Helical Anchor - Full Embedment

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 1000
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 360.00 in

Depth of ground surface below top of pile = 0.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	7.00000000	54.2000	10.2000	29000000.
2	360.0000	7.00000000	54.2000	10.2000	29000000.

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 0.000 in
Distance from top of pile to bottom of layer = 420.000 in
p-y subgrade modulus k for top of soil layer = 100.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 100.000 lbs/in**3

(Depth of lowest layer extends 60.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 2 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	0.00	0.03470
2	420.00	0.03470

Shear Strength of Soils

Shear strength parameters with depth defined using 2 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	0.000	0.00000	35.00	------	------
2	420.000	0.00000	35.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Cyclic loading criteria was used for computation of p-y curves.

Number of cycles of loading = 50.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 14400.000 lbs
Bending moment at pile head = 0.000 in-lbs
Axial load at pile head = -4100.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 13000.000 lbs
Bending moment at pile head = 0.000 in-lbs
Axial load at pile head = -7500.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)

Specified shear force at pile head = 14400.000 lbs
Specified moment at pile head = 0.000 in-lbs
Specified axial load at pile head = -4100.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	2.779	5.3860E-08	14400.0000	-0.0403785	401.9608	0.0000	0.0000
3.600	2.634	51244.0132	14392.7276	-0.0403198	3711.0760	-4.0402	5.5222
7.200	2.489	102437.	14363.6002	-0.0401438	7016.9219	-12.1417	17.5617
10.800	2.345	153477.	14300.0616	-0.0398508	10312.8300	-23.1575	35.5534
14.400	2.202	204221.	14196.9213	-0.0394411	13589.6926	-34.1427	55.8189
18.000	2.061	254530.	14050.6800	-0.0389158	16838.4270	-47.1025	82.2806
21.600	1.922	304238.	13854.5804	-0.0382759	20048.2970	-61.8418	115.8438
25.200	1.785	353153.	13600.8321	-0.0375231	23207.0757	-79.1295	159.5642
28.800	1.652	401056.	13281.5992	-0.0366593	26300.4019	-98.2221	214.0889
32.400	1.521	447699.	12888.9739	-0.0356874	29312.4015	-119.9031	283.7330
36.000	1.395	492803.	12414.1896	-0.0346103	32225.0315	-143.8660	371.3469
39.600	1.272	536059.	11847.1003	-0.0334321	35018.3358	-171.1836	484.4309
43.200	1.154	577115.	11177.4354	-0.0321573	37669.5467	-200.8524	626.5821
46.800	1.041	615588.	10396.7309	-0.0307914	40153.9240	-232.8723	805.6304
50.400	0.932290	651063.	9496.5226	-0.0293409	42444.7542	-267.2434	1031.9489
54.000	0.829347	683096.	8468.3466	-0.0278130	44513.3497	-303.9655	1319.4421
57.600	0.732037	711214.	7303.7389	-0.0262163	46329.0475	-343.0388	1686.9915
61.200	0.640590	734909.	5994.2352	-0.0245602	47859.2086	-384.4632	2160.6133
64.800	0.555203	753647.	4531.3714	-0.0228555	49069.2166	-428.2388	2776.7485
68.400	0.476030	766861.	2906.6834	-0.0211143	49922.4766	-474.3656	3587.4101
72.000	0.403181	773952.	1111.7070	-0.0193498	50380.4139	-522.8435	4668.4716
75.600	0.336712	774294.	-862.0222	-0.0175767	50402.4729	-573.6727	6133.4938
79.200	0.276628	767227.	-3022.9686	-0.0158114	49946.1153	-626.8531	8157.7816
82.800	0.222870	752062.	-5254.4197	-0.0140715	48966.8190	-612.8419	9899.1838
86.400	0.175313	728979.	-7391.2744	-0.0123755	47476.2768	-574.2996	11793.0742
90.000	0.133767	698479.	-9388.9308	-0.0107408	45506.6944	-535.5096	14411.9325
93.600	0.097979	661062.	-11245.7732	-0.0091839	43090.4688	-496.0696	18226.8058
97.200	0.067643	617238.	-12942.3756	-0.0077200	40260.5255	-446.4873	23762.3838
100.800	0.042396	567649.	-14434.8481	-0.0063630	37058.2641	-382.6640	32493.7036
104.400	0.021829	513120.	-15533.8512	-0.0051254	33536.9904	-227.8933	37584.0000
108.000	0.005493	455654.	-16050.8421	-0.0040159	29826.1128	-59.3238	38880.0000
111.600	-0.007086	397435.	-16015.2824	-0.0030390	26066.5817	79.0792	40176.0000
115.200	-0.016388	340254.	-15533.1210	-0.0021942	22374.0997	188.7882	41472.0000
118.800	-0.022884	285532.	-14703.9447	-0.0014776	18840.3575	271.8653	42768.0000
122.400	-0.027026	234342.	-13619.1418	-0.0008822	15534.7626	330.8030	44064.0000
126.000	-0.029236	187448.	-12360.6177	-0.0003992	12506.5286	368.3770	45360.0000
129.600	-0.029901	145334.	-11000.0182	-1.8097E-05	9786.9986	387.5116	46656.0000
133.200	-0.029367	108247.	-9598.4043	0.0002723	7392.0945	391.1628	47952.0000
136.800	-0.027940	76233.5412	-8206.3161	0.0004836	5324.7909	382.2196	49248.0000
140.400	-0.025885	49176.0120	-6864.1574	0.0006272	3577.5335	363.4242	50544.0000
144.000	-0.023424	26830.1225	-5602.8354	0.0007142	2134.5333	337.3103	51840.0000
147.600	-0.020743	8856.6811	-4444.5898	0.0007551	973.8867	306.1595	53136.0000
151.200	-0.017988	-5148.6338	-3403.9501	0.0007593	734.4371	271.9737	54432.0000
154.800	-0.015275	-15629.3442	-2488.7668	0.0007355	1411.2358	236.4615	55728.0000
158.400	-0.012692	-23046.0419	-1701.2683	0.0006913	1890.1738	201.0377	57024.0000
162.000	-0.010298	-27858.0699	-1039.1025	0.0006330	2200.9136	166.8321	58320.0000
165.600	-0.008134	-30508.8951	-496.3319	0.0005661	2372.0924	134.7071	59616.0000
169.200	-0.006222	-31414.9480	-64.3545	0.0004952	2430.6013	105.2804	60912.0000
172.800	-0.004569	-30957.6289	267.2655	0.0004238	2401.0697	78.9529	62208.0000
176.400	-0.003171	-29478.1269	510.0686	0.0003546	2305.5299	55.9378	63504.0000
180.000	-0.002016	-27274.6679	676.0807	0.0002896	2163.2401	36.2911	64800.0000
183.600	-0.001086	-24601.7978	777.3002	0.0002302	1990.6378	19.9419	66096.0000
187.200	-0.000359	-21671.3118	825.2926	0.0001772	1801.3997	6.7205	67392.0000
190.800	0.000189	-18654.4610	830.8821	0.0001310	1606.5847	-3.6152	68688.0000
194.400	0.000584	-15685.0938	803.9346	9.1666E-05	1414.8358	-11.3557	69984.0000

198.000	0.000849	-12863.4261	753.2191	5.8973E-05	1232.6248	-16.8196	71280.0000
201.600	0.001009	-10260.1751	686.3386	3.2492E-05	1064.5182	-20.3363	72576.0000
205.200	0.001083	-7920.8294	609.7161	1.1672E-05	913.4535	-22.2317	73872.0000
208.800	0.001093	-5869.8749	528.6278	-4.1212E-06	781.0117	-22.8173	75168.0000
212.400	0.001054	-4114.8308	447.2699	-1.5555E-05	667.6786	-22.3816	76464.0000
216.000	0.000981	-2649.9909	368.8502	-2.3302E-05	573.0857	-21.1849	77760.0000
219.600	0.000886	-1459.7969	295.6969	-2.8009E-05	496.2281	-19.4559	79056.0000
223.200	0.000779	-521.8002	229.3745	-3.0278E-05	435.6564	-17.3899	80352.0000
226.800	0.000668	190.8055	170.8036	-3.0657E-05	414.2822	-15.1495	81648.0000
230.400	0.000558	707.0807	120.3772	-2.9629E-05	447.6210	-12.8652	82944.0000
234.000	0.000455	1056.6466	78.0705	-2.7609E-05	470.1944	-10.6385	84240.0000
237.600	0.000360	1268.3734	43.5419	-2.4947E-05	483.8668	-8.5441	85536.0000
241.200	0.000275	1369.4117	16.2222	-2.1926E-05	490.3914	-6.6335	86832.0000
244.800	0.000202	1384.5262	-4.6072	-1.8772E-05	491.3675	-4.9384	88128.0000
248.400	0.000140	1335.6855	-19.7499	-1.5657E-05	488.2135	-3.4742	89424.0000
252.000	8.90E-05	1241.8648	-30.0405	-1.2705E-05	482.1550	-2.2429	90720.0000
255.600	4.84E-05	1119.0185	-36.3038	-1.0002E-05	474.2221	-1.2367	92016.0000
259.200	1.70E-05	980.1825	-39.3226	-7.5976E-06	465.2567	-0.4404212	93312.0000
262.800	-6.32E-06	835.6718	-39.8164	-5.5181E-06	455.9248	0.1660589	94608.0000
266.400	-2.27E-05	693.3414	-38.4271	-3.7671E-06	446.7338	0.6057627	95904.0000
270.000	-3.34E-05	558.8852	-35.7115	-2.3331E-06	438.0512	0.9029346	97200.0000
273.600	-3.95E-05	436.1499	-32.1391	-1.1936E-06	430.1254	1.0817	98496.0000
277.200	-4.20E-05	327.4486	-28.0945	-3.1912E-07	423.1060	1.1652	99792.0000
280.800	-4.18E-05	233.8597	-23.8826	3.2368E-07	417.0624	1.1747	101088.
284.400	-3.97E-05	155.5032	-19.7355	7.6957E-07	412.0025	1.1292	102384.
288.000	-3.63E-05	91.7866	-15.8215	1.0528E-06	407.8880	1.0453	103680.
291.600	-3.21E-05	41.6196	-12.2538	1.2055E-06	404.6484	0.9367771	104976.
295.200	-2.76E-05	3.5947	-9.1003	1.2573E-06	402.1929	0.8151621	106272.
298.800	-2.31E-05	-23.8656	-6.3921	1.2341E-06	403.5019	0.6894131	107568.
302.400	-1.87E-05	-42.3919	-4.1317	1.1582E-06	404.6983	0.5663452	108864.
306.000	-1.47E-05	-53.5798	-2.3008	1.0483E-06	405.4207	0.4508450	110160.
309.600	-1.12E-05	-58.9265	-0.8661939	9.1948E-07	405.7660	0.3461461	111456.
313.200	-8.11E-06	-59.7892	0.2142607	7.8353E-07	405.8217	0.2541064	112752.
316.800	-5.54E-06	-57.3607	0.9875092	6.4937E-07	405.6649	0.1754760	114048.
320.400	-3.44E-06	-52.6600	1.5016	5.2338E-07	405.3613	0.1101458	115344.
324.000	-1.77E-06	-46.5336	1.8032	4.0978E-07	404.9657	0.0573706	116640.
327.600	-4.87E-07	-39.6652	1.9352	3.1107E-07	404.5222	0.0159647	117936.
331.200	4.69E-07	-32.5912	1.9359	2.2832E-07	404.0654	-0.0155333	119232.
334.800	1.16E-06	-25.7197	1.8383	1.6155E-07	403.6216	-0.0387229	120528.
338.400	1.63E-06	-19.3508	1.6692	1.0993E-07	403.2104	-0.0552313	121824.
342.000	1.95E-06	-13.6985	1.4498	7.2084E-08	402.8454	-0.0666253	123120.
345.600	2.15E-06	-8.9100	1.1961	4.6193E-08	402.5362	-0.0743433	124416.
349.200	2.28E-06	-5.0854	0.9189001	3.0166E-08	402.2892	-0.0796421	125712.
352.800	2.37E-06	-2.2931	0.6251458	2.1716E-08	402.1089	-0.0835548	127008.
356.400	2.44E-06	-0.5836885	0.3184051	1.8422E-08	401.9985	-0.0868568	128304.
360.000	2.50E-06	0.0000	0.0000	1.7754E-08	401.9608	-0.0900350	64800.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     2.77923652 in
Computed slope at pile head      =    -0.04037851
Maximum bending moment           =   774293.64469 lbs-in
Maximum shear force              =   -16050.84210 lbs
Depth of maximum bending moment  =    75.60000000 in
Depth of maximum shear force     =     108.00000 in
Number of iterations             =            27
Number of zero deflection points =             4
```

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

```
Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =      13000.000 lbs
Specified moment at pile head       =          0.000 in-lbs
Specified axial load at pile head   =      -7500.000 lbs
```

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	2.277	7.0017E-07	13000.0000	-0.0340215	735.2941	0.0000	0.0000
3.600	2.154	45881.4204	12992.7276	-0.0339689	3698.1165	-4.0402	6.7511
7.200	2.032	91713.3168	12963.6002	-0.0338114	6657.7408	-12.1417	21.5073
10.800	1.911	137394.	12900.0617	-0.0335490	9607.5700	-23.1575	43.6251
14.400	1.791	182782.	12796.9214	-0.0331823	12538.5673	-34.1427	68.6370
18.000	1.672	227740.	12650.6801	-0.0327122	15441.7205	-47.1025	101.4123
21.600	1.555	272101.	12454.5804	-0.0321398	18306.3631	-61.8418	143.1476
25.200	1.441	315677.	12200.8322	-0.0314667	21120.3368	-79.1295	197.7319
28.800	1.329	358247.	11881.5993	-0.0306949	23869.3477	-98.2221	266.1265
32.400	1.220	399567.	11488.9739	-0.0298271	26537.5871	-119.9031	353.9094
36.000	1.114	439357.	11014.1897	-0.0288664	29107.0751	-143.8660	464.9439
39.600	1.012	477310.	10447.1004	-0.0278166	31557.9162	-171.1836	609.0573
43.200	0.913656	513074.	9777.4356	-0.0266824	33867.3998	-200.8524	791.4017
46.800	0.819714	546267.	8996.7310	-0.0254693	36010.8387	-232.8723	1022.7227
50.400	0.730277	576475.	8096.5228	-0.0241835	37961.5682	-267.2434	1317.4127
54.000	0.645593	603256.	7068.3469	-0.0228325	39690.9436	-303.9655	1694.9939
57.600	0.565883	626135.	5903.7391	-0.0214246	41168.3393	-343.0388	2182.3246
61.200	0.491335	644606.	4594.2354	-0.0199694	42361.1460	-384.4632	2816.9515
64.800	0.422103	658135.	3131.3717	-0.0184775	43234.7694	-428.2388	3652.3319
68.400	0.358297	666154.	1506.6837	-0.0169610	43752.6277	-474.3656	4766.2028
72.000	0.299984	668067.	-288.2928	-0.0154331	43876.1495	-522.8436	6274.4621
75.600	0.247179	663245.	-2221.3349	-0.0139085	43564.7712	-551.0687	8025.9549
79.200	0.199843	651322.	-4159.7933	-0.0124030	42794.8518	-525.8526	9472.7902
82.800	0.157877	632625.	-6004.1678	-0.0109327	41587.4471	-498.7999	11373.9076
86.400	0.121128	607502.	-7750.0891	-0.0095125	39965.1229	-471.1564	14003.1176
90.000	0.089387	576310.	-9390.6538	-0.0081568	37950.9137	-440.2684	17731.5034
93.600	0.062398	539449.	-10902.1784	-0.0068791	35570.5451	-399.4675	23046.8058
97.200	0.039858	497443.	-12244.6985	-0.0056916	32858.0162	-346.3770	31285.2644
100.800	0.021419	450980.	-13256.7946	-0.0046055	29857.5908	-215.8986	36288.0000
104.400	0.006698	401746.	-13771.2781	-0.0036290	26678.2806	-69.9255	37584.0000
108.000	-0.004710	351630.	-13805.5760	-0.0027662	23442.0541	50.8712	38880.0000
111.600	-0.013219	302196.	-13448.4620	-0.0020175	20249.8058	147.5255	40176.0000
115.200	-0.019236	254693.	-12784.0331	-0.0013798	17182.2284	221.6017	41472.0000
118.800	-0.023153	210077.	-11890.0384	-0.0008475	14301.1267	275.0620	42768.0000
122.400	-0.025338	169038.	-10836.6729	-0.0004134	11651.0634	310.1411	44064.0000
126.000	-0.026130	132030.	-9685.8017	-6.8574E-05	9261.2322	329.2318	45360.0000
129.600	-0.025832	99297.0087	-8490.5743	0.0001963	7147.4626	334.7834	46656.0000
133.200	-0.024716	70908.7093	-7295.3764	0.0003913	5314.2698	329.2154	47952.0000
136.800	-0.023015	46791.4261	-6136.0670	0.0005260	3756.8807	314.8454	49248.0000
140.400	-0.020928	26757.4332	-5040.4439	0.0006103	2463.1726	293.8341	50544.0000
144.000	-0.018621	10533.1847	-4028.8845	0.0006530	1415.4813	268.1434	51840.0000
147.600	-0.016227	-2215.2745	-3115.1093	0.0006625	878.3469	239.5095	53136.0000
151.200	-0.013851	-11859.8274	-2307.0217	0.0006464	1501.1501	209.4280	54432.0000
154.800	-0.011573	-18790.9262	-1607.5818	0.0006113	1948.7303	179.1497	55728.0000
158.400	-0.009450	-23401.4068	-1015.6786	0.0005630	2246.4551	149.6854	57024.0000
162.000	-0.007520	-26073.4120	-526.9722	0.0005063	2419.0015	121.8182	58320.0000

165.600	-0.005804	-27168.2659	-134.6809	0.0004453	2489.7024	96.1214	59616.0000
169.200	-0.004313	-27019.0664	169.7015	0.0003833	2480.0678	72.9799	60912.0000
172.800	-0.003045	-25925.7179	395.7714	0.0003226	2409.4641	52.6145	62208.0000
176.400	-0.001990	-24152.0892	553.6692	0.0002653	2294.9309	35.1065	63504.0000
180.000	-0.001135	-21924.9732	653.6239	0.0002125	2151.1134	20.4238	64800.0000
183.600	-0.000460	-19434.5200	705.5865	0.0001652	1990.2908	8.4443	66096.0000
187.200	5.46E-05	-16835.8310	718.9478	0.0001236	1822.4788	-1.0213	67392.0000
190.800	0.000430	-14251.4197	702.3336	8.8032E-05	1655.5887	-8.2088	68688.0000
194.400	0.000688	-11774.2753	663.4696	5.8228E-05	1495.6256	-13.3823	69984.0000
198.000	0.000849	-9471.2940	609.1063	3.3898E-05	1346.9090	-16.8195	71280.0000
201.600	0.000932	-7386.8794	544.9942	1.4592E-05	1212.3066	-18.7983	72576.0000
205.200	0.000955	-5546.5478	475.9005	-2.1893E-07	1093.4660	-19.5871	73872.0000
208.800	0.000931	-3960.4073	405.6576	-1.1106E-05	991.0400	-19.4368	75168.0000
212.400	0.000875	-2626.4124	337.2349	-1.8649E-05	904.8964	-18.5759	76464.0000
216.000	0.000797	-1533.3233	272.8263	-2.3413E-05	834.3095	-17.2067	77760.0000
219.600	0.000706	-663.3275	213.9476	-2.5928E-05	778.1289	-15.5037	79056.0000
223.200	0.000610	5.6992	161.5368	-2.6682E-05	735.6621	-13.6134	80352.0000
226.800	0.000514	498.2964	116.0536	-2.6104E-05	767.4719	-11.6550	81648.0000
230.400	0.000422	839.8753	77.5747	-2.4572E-05	789.5296	-9.7222	82944.0000
234.000	0.000337	1055.5070	45.8815	-2.2401E-05	803.4542	-7.8851	84240.0000
237.600	0.000261	1169.0126	20.5396	-1.9854E-05	810.7839	-6.1937	85536.0000
241.200	0.000194	1202.3200	0.9671803	-1.7138E-05	812.9347	-4.6798	86832.0000
244.800	0.000137	1175.0508	-13.5058	-1.4416E-05	811.1738	-3.3607	88128.0000
248.400	9.02E-05	1104.3001	-23.5893	-1.1806E-05	806.6050	-2.2413	89424.0000
252.000	5.23E-05	1004.5703	-29.9952	-9.3905E-06	800.1649	-1.3175	90720.0000
255.600	2.26E-05	887.8275	-33.4074	-7.2233E-06	792.6262	-0.5781272	92016.0000
259.200	2.75E-07	763.6471	-34.4608	-5.3321E-06	784.6071	-0.0071195	93312.0000
262.800	-1.58E-05	639.4216	-33.7275	-3.7253E-06	776.5852	0.4145033	94608.0000
266.400	-2.65E-05	520.6077	-31.7084	-2.3969E-06	768.9127	0.7072276	95904.0000
270.000	-3.30E-05	410.9916	-28.8301	-1.3300E-06	761.8342	0.8918102	97200.0000
273.600	-3.61E-05	312.9588	-25.4459	-5.0096E-07	755.5036	0.9883438	98496.0000
277.200	-3.66E-05	227.7542	-21.8388	1.1826E-07	750.0015	1.0156	99792.0000
280.800	-3.53E-05	155.7257	-18.2280	5.5741E-07	745.3502	0.9904438	101088.
284.400	-3.26E-05	96.5429	-14.7751	8.4631E-07	741.5284	0.9278130	102384.
288.000	-2.92E-05	49.3905	-11.5924	1.0134E-06	738.4835	0.8403495	103680.
291.600	-2.53E-05	13.1321	-8.7504	1.0850E-06	736.1421	0.7385307	104976.
295.200	-2.14E-05	-13.5541	-6.2858	1.0845E-06	736.1694	0.6307421	106272.
298.800	-1.75E-05	-32.0668	-4.2082	1.0323E-06	737.3649	0.5234415	107568.
302.400	-1.39E-05	-43.7976	-2.5076	9.4542E-07	738.1224	0.4213655	108864.
306.000	-1.07E-05	-50.0702	-1.1591	8.3793E-07	738.5274	0.3277593	110160.
309.600	-7.90E-06	-52.0982	-0.1288741	7.2092E-07	738.6584	0.2446143	111456.
313.200	-5.52E-06	-50.9592	0.6226518	6.0290E-07	738.5848	0.1729001	112752.
316.800	-3.56E-06	-47.5826	1.1369	4.9006E-07	738.3668	0.1127830	114048.
320.400	-1.99E-06	-42.7472	1.4548	3.8661E-07	738.0545	0.0638248	115344.
324.000	-7.76E-07	-37.0873	1.6149	2.9519E-07	737.6891	0.0251575	116640.
327.600	1.33E-07	-31.1037	1.6524	2.1710E-07	737.3027	-0.0043671	117936.
331.200	7.87E-07	-25.1785	1.5976	1.5264E-07	736.9200	-0.0260528	119232.
334.800	1.23E-06	-19.5926	1.4765	1.0137E-07	736.5593	-0.0412583	120528.
338.400	1.52E-06	-14.5426	1.3098	6.2279E-08	736.2332	-0.0513179	121824.
342.000	1.68E-06	-10.1586	1.1140	3.3992E-08	735.9501	-0.0574813	123120.
345.600	1.76E-06	-6.5202	0.9009455	1.4892E-08	735.7152	-0.0608681	124416.
349.200	1.79E-06	-3.6710	0.6789990	3.2209E-09	735.5312	-0.0624355	125712.
352.800	1.78E-06	-1.6312	0.4532973	-2.8511E-09	735.3995	-0.0629543	127008.
356.400	1.77E-06	-0.4074070	0.2265952	-5.1857E-09	735.3204	-0.0629912	128304.
360.000	1.75E-06	0.0000	0.0000	-5.6522E-09	735.2941	-0.0628950	64800.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:


```
Pile-head deflection             =    2.27690698 in
Computed slope at pile head      =   -0.03402147
Maximum bending moment           =  668066.96092 lbs-in
Maximum shear force              =  -13805.57598 lbs
Depth of maximum bending moment  =   72.00000000 in
Depth of maximum shear force     =    108.00000 in
Number of iterations             =           25
Number of zero deflection points =            4
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

```
Type 1 = Shear and Moment,          y = pile-head displacment in
Type 2 = Shear and Slope,           M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness,  V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment,     S = Pile-head Slope, radians
Type 5 = Deflection and Slope,      R = Rot. Stiffness of Pile-head in-lbs/rad
```

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 14400.	M= 0.000	-4100.0000	2.7792	774294.	-16050.8421
1	V= 13000.	M= 0.000	-7500.0000	2.2769	668067.	-13805.5760

The analysis ended normally.

===

LPILE Plus for Windows, Version 5.0 (5.0.45)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

===

This program is licensed to:

Neville Su
URS

Files Used for Analysis

```
Path to file locations:      L:\Neville\Project\Santa Monica Pier\Calcs\LPILE\
Name of input data file:     Helical scour rev.lpd
Name of output file:         Helical scour rev.lpo
Name of plot output file:    Helical scour rev.lpp
Name of runtime file:        Helical scour rev.lpr
```

Time and Date of Analysis

Date: July 12, 2010   Time: 9:01:49

Problem Title

SM Pier - Gangway - Helical Anchor - 5-foot Scour

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 1000
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 360.00 in

Depth of ground surface below top of pile = 60.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	7.00000000	54.2000	10.2000	29000000.
2	360.0000	7.00000000	54.2000	10.2000	29000000.

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 60.000 in
Distance from top of pile to bottom of layer = 420.000 in
p-y subgrade modulus k for top of soil layer = 100.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 100.000 lbs/in**3

(Depth of lowest layer extends 60.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 2 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	60.00	0.03470
2	420.00	0.03470

Shear Strength of Soils

Shear strength parameters with depth defined using 2 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	60.000	0.00000	35.00	------	------
2	420.000	0.00000	35.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Cyclic loading criteria was used for computation of p-y curves.

Number of cycles of loading = 50.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 14400.000 lbs
Bending moment at pile head = 0.000 in-lbs
Axial load at pile head = -4100.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 13000.000 lbs
Bending moment at pile head = 0.000 in-lbs
Axial load at pile head = -7500.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)

Specified shear force at pile head = 14400.000 lbs
Specified moment at pile head = 0.000 in-lbs
Specified axial load at pile head = -4100.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	14.068	2.1544E-07	14400.0000	-0.1228604	401.9608	0.0000	0.0000
3.600	13.626	50026.5798	14400.0000	-0.1228032	3632.4595	0.0000	0.0000
7.200	13.184	100055.	14400.0000	-0.1226313	6863.0674	0.0000	0.0000
10.800	12.743	150087.	14400.0000	-0.1223448	10093.8937	0.0000	0.0000
14.400	12.303	200123.	14400.0000	-0.1219438	13325.0477	0.0000	0.0000
18.000	11.865	250167.	14400.0000	-0.1214281	16556.6385	0.0000	0.0000
21.600	11.429	300219.	14400.0000	-0.1207978	19788.7755	0.0000	0.0000
25.200	10.995	350281.	14400.0000	-0.1200529	23021.5679	0.0000	0.0000
28.800	10.565	400355.	14400.0000	-0.1191933	26255.1249	0.0000	0.0000
32.400	10.137	450442.	14400.0000	-0.1182189	29489.5559	0.0000	0.0000
36.000	9.713	500545.	14400.0000	-0.1171299	32724.9703	0.0000	0.0000
39.600	9.294	550665.	14400.0000	-0.1159261	35961.4773	0.0000	0.0000
43.200	8.879	600803.	14400.0000	-0.1146074	39199.1865	0.0000	0.0000
46.800	8.469	650961.	14400.0000	-0.1131739	42438.2072	0.0000	0.0000
50.400	8.064	701142.	14400.0000	-0.1116255	45678.6490	0.0000	0.0000
54.000	7.665	751346.	14400.0000	-0.1099621	48920.6215	0.0000	0.0000
57.600	7.272	801576.	14400.0000	-0.1081838	52164.2341	0.0000	0.0000
61.200	6.886	851833.	14398.3270	-0.1062903	55409.5966	-0.9294545	0.4859217
64.800	6.507	902106.	14385.4097	-0.1042817	58656.0409	-6.2468	3.4562
68.400	6.135	952329.	14346.3108	-0.1021581	61899.2264	-15.4748	9.0803
72.000	5.771	1002384.	14270.4190	-0.0999196	65131.5402	-26.6874	16.6470
75.600	5.416	1052126.	14153.4200	-0.0975668	68343.7074	-38.3121	25.4673
79.200	5.069	1101408.	13991.1886	-0.0951006	71526.1082	-51.8165	36.8014
82.800	4.731	1150056.	13776.5608	-0.0925222	74667.5481	-67.4212	51.3035
86.400	4.403	1197868.	13501.7609	-0.0898334	77755.0738	-85.2454	69.7043
90.000	4.084	1244616.	13158.8835	-0.0870363	80773.8725	-105.2420	92.7655
93.600	3.776	1290043.	12739.8813	-0.0841337	83707.3112	-127.5370	121.5929
97.200	3.478	1333860.	12235.4367	-0.0811288	86536.8304	-152.7100	158.0476
100.800	3.192	1375743.	11635.0982	-0.0780258	89241.4583	-180.8113	203.9316
104.400	2.917	1415329.	10929.3634	-0.0748295	91797.7685	-211.2636	260.7624
108.000	2.653	1452226.	10109.7681	-0.0715457	94180.3618	-244.0671	331.1773
111.600	2.402	1486008.	9167.8485	-0.0681808	96361.8656	-279.2216	418.5695
115.200	2.162	1516221.	8095.1406	-0.0647427	98312.9326	-316.7272	527.3458
118.800	1.935	1542381.	6883.1804	-0.0612401	100002.	-356.5840	663.2887
122.400	1.721	1563972.	5523.5041	-0.0576827	101396.	-398.7918	834.0723
126.000	1.520	1580448.	4007.6476	-0.0540818	102460.	-443.3507	1050.0107
129.600	1.332	1591231.	2327.1469	-0.0504496	103157.	-490.2608	1325.1630
133.200	1.157	1595714.	473.5382	-0.0468000	103446.	-539.5219	1679.0003
136.800	0.994905	1593259.	-1561.6427	-0.0431480	103288.	-591.1341	2138.9803
140.400	0.846141	1583197.	-3786.8597	-0.0395104	102638.	-645.0975	2744.6388
144.000	0.710430	1564827.	-6210.5769	-0.0359053	101452.	-701.4120	3554.3008
147.600	0.587622	1537420.	-8841.2583	-0.0323527	99681.8797	-760.0776	4656.5271
151.200	0.477491	1500215.	-11687.3680	-0.0288741	97279.3187	-821.0944	6190.5679
154.800	0.379729	1452419.	-14757.3702	-0.0254927	94192.8586	-884.4624	8385.0924
158.400	0.293943	1393209.	-18059.7293	-0.0222340	90369.3623	-950.1815	11637.1252
162.000	0.219645	1321733.	-21400.9262	-0.0191249	85753.7001	-906.0390	14850.0817
165.600	0.156244	1238558.	-24455.9820	-0.0161929	80382.6590	-791.2143	18230.2614
169.200	0.103056	1145172.	-27111.2629	-0.0134631	74352.1541	-683.9418	23891.7736
172.800	0.059310	1042960.	-29347.7570	-0.0109572	67751.7581	-558.5549	33903.0962
176.400	0.024164	933544.	-30859.4369	-0.0086938	60686.1840	-281.2673	41904.0000
180.000	-0.003285	820515.	-31294.7605	-0.0066851	53387.2553	39.4208	43200.0000
183.600	-0.023969	708025.	-30690.5501	-0.0049346	46123.1090	296.2516	44496.0000
187.200	-0.038814	599398.	-29268.6074	-0.0034374	39108.4415	493.7166	45792.0000
190.800	-0.048718	497189.	-27267.2792	-0.0021816	32508.2741	618.1324	45677.0727
194.400	-0.054521	403009.	-24947.9136	-0.0011507	26426.5073	670.4040	44266.1145

198.000	-0.057002	317530.	-22475.3851	-0.0003255	20906.6816	703.2229	44412.1628
201.600	-0.056865	241176.	-19912.2627	0.0003143	15976.0767	720.7340	45627.8815
205.200	-0.054740	174171.	-17308.7439	0.0007899	11649.1808	725.6653	47724.0981
208.800	-0.051178	116577.	-14706.5034	0.0011229	7929.9747	720.0239	50648.7516
212.400	-0.046655	68317.5592	-12140.7277	0.0013346	4813.6113	705.4070	54431.1520
216.000	-0.041568	29202.8308	-9703.7581	0.0014463	2287.7524	648.4650	56160.0000
219.600	-0.036241	-1506.8039	-7495.3862	0.0014780	499.2636	578.4083	57456.0000
223.200	-0.030926	-24720.3178	-5545.7573	0.0014480	1998.2913	504.7188	58752.0000
226.800	-0.025816	-41393.5112	-3862.1787	0.0013723	3074.9735	430.6026	60048.0000
230.400	-0.021046	-52487.4941	-2441.5738	0.0012648	3791.3746	358.6223	61344.0000
234.000	-0.016709	-58935.5062	-1272.7248	0.0011372	4207.7592	290.7382	62640.0000
237.600	-0.012858	-61617.5429	-338.3443	0.0009991	4380.9534	228.3620	63936.0000
241.200	-0.009515	-61342.0912	383.0616	0.0008583	4363.1659	172.4191	65232.0000
244.800	-0.006678	-58834.1617	915.5653	0.0007207	4201.2148	123.4163	66528.0000
248.400	-0.004326	-54728.7460	1284.4331	0.0005906	3936.1049	81.5102	67824.0000
252.000	-0.002426	-49568.8079	1514.9863	0.0004712	3602.8986	46.5749	69120.0000
255.600	-0.000934	-43806.9347	1631.6990	0.0003643	3230.8219	18.2655	70416.0000
259.200	0.000197	-37809.8219	1657.5154	0.0002708	2843.5544	-3.9230	71712.0000
262.800	0.001016	-31864.8295	1613.3682	0.0001910	2459.6527	-20.6033	73008.0000
266.400	0.001572	-26187.9325	1517.8717	0.0001245	2093.0634	-32.4503	74304.0000
270.000	0.001913	-20932.4771	1387.1670	7.0567E-05	1753.6890	-40.1634	75600.0000
273.600	0.002080	-16198.2472	1234.8900	2.8045E-05	1447.9731	-44.4349	76896.0000
277.200	0.002114	-12040.4414	1072.2398	-4.2932E-06	1179.4801	-45.9263	78192.0000
280.800	0.002049	-8478.2473	908.1221	-2.7791E-05	949.4491	-45.2502	79488.0000
284.400	0.001914	-5502.7824	749.3463	-4.3802E-05	757.3065	-42.9586	80784.0000
288.000	0.001734	-3084.2468	600.8574	-5.3635E-05	601.1280	-39.5353	82080.0000
291.600	0.001528	-1178.1924	465.9864	-5.8517E-05	478.0433	-35.3931	83376.0000
295.200	0.001313	269.1276	346.7051	-5.9558E-05	419.3399	-30.8743	84672.0000
298.800	0.001099	1316.3259	243.8754	-5.7742E-05	486.9634	-26.2533	85968.0000
302.400	0.000897	2023.3262	157.4843	-5.3918E-05	532.6184	-21.7418	87264.0000
306.000	0.000711	2448.6213	86.8582	-4.8796E-05	560.0821	-17.4949	88560.0000
309.600	0.000546	2647.2647	30.8544	-4.2961E-05	572.9096	-13.6183	89856.0000
313.200	0.000402	2669.5046	-11.9737	-3.6872E-05	574.3458	-10.1751	91152.0000
316.800	0.000280	2559.9658	-43.2373	-3.0883E-05	567.2722	-7.1936	92448.0000
320.400	0.000179	2357.2842	-64.5993	-2.5252E-05	554.1839	-4.6742	93744.0000
324.000	9.83E-05	2094.1051	-77.6845	-2.0155E-05	537.1890	-2.5954	95040.0000
327.600	3.44E-05	1797.3606	-84.0126	-1.5698E-05	518.0265	-0.9201927	96336.0000
331.200	-1.47E-05	1488.7513	-84.9505	-1.1935E-05	498.0979	0.3991056	97632.0000
334.800	-5.15E-05	1185.3646	-81.6825	-8.8725E-06	478.5065	1.4164	98928.0000
338.400	-7.86E-05	900.3751	-75.1942	-6.4840E-06	460.1031	2.1882	100224.
342.000	-9.82E-05	643.7747	-66.2694	-4.7156E-06	443.5330	2.7701	101520.
345.600	-0.000113	423.0960	-55.4973	-3.4939E-06	429.2825	3.2145	102816.
349.200	-0.000123	244.0909	-43.2884	-2.7298E-06	417.7231	3.5683	104112.
352.800	-0.000132	111.3390	-29.8977	-2.3228E-06	409.1506	3.8710	105408.
356.400	-0.000140	28.7588	-15.4549	-2.1623E-06	403.8179	4.1528	106704.
360.000	-0.000148	0.0000	0.0000	-2.1294E-06	401.9608	4.4332	54000.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection              =    14.06826781 in
Computed slope at pile head       =    -0.12286045
Maximum bending moment            =       1595714. lbs-in
Maximum shear force               =   -31294.76051 lbs
Depth of maximum bending moment   =      133.20000 in
Depth of maximum shear force      =      180.00000 in
Number of iterations              =             32
Number of zero deflection points  =              3
```

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

```
Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       13000.000 lbs
Specified moment at pile head       =           0.000 in-lbs
Specified axial load at pile head   =       -7500.000 lbs
```

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res. p lbs/in	Es*h F/L lbs/in
0.000	11.655	-8.6175E-07	13000.0000	-0.1039375	735.2941	0.0000	0.0000
3.600	11.281	43993.6874	13000.0000	-0.1038871	3576.2149	0.0000	0.0000
7.200	10.907	87990.0953	13000.0000	-0.1037360	6417.3113	0.0000	0.0000
10.800	10.534	131992.	13000.0000	-0.1034841	9258.7592	0.0000	0.0000
14.400	10.162	176002.	13000.0000	-0.1031313	12100.7341	0.0000	0.0000
18.000	9.792	220023.	13000.0000	-0.1026778	14943.4118	0.0000	0.0000
21.600	9.423	264057.	13000.0000	-0.1021235	17786.9682	0.0000	0.0000
25.200	9.057	308108.	13000.0000	-0.1014682	20631.5791	0.0000	0.0000
28.800	8.693	352178.	13000.0000	-0.1007121	23477.4203	0.0000	0.0000
32.400	8.331	396270.	13000.0000	-0.0998550	26324.6679	0.0000	0.0000
36.000	7.974	440386.	13000.0000	-0.0988968	29173.4980	0.0000	0.0000
39.600	7.619	484529.	13000.0000	-0.0978377	32024.0867	0.0000	0.0000
43.200	7.269	528703.	13000.0000	-0.0966773	34876.6103	0.0000	0.0000
46.800	6.923	572909.	13000.0000	-0.0954158	37731.2451	0.0000	0.0000
50.400	6.582	617150.	13000.0000	-0.0940529	40588.1678	0.0000	0.0000
54.000	6.246	661430.	13000.0000	-0.0925887	43447.5550	0.0000	0.0000
57.600	5.916	705750.	13000.0000	-0.0910230	46309.5835	0.0000	0.0000
61.200	5.591	750115.	12998.3270	-0.0893558	49174.4304	-0.9294549	0.5984945
64.800	5.272	794513.	12985.4097	-0.0875869	52041.4948	-6.2468	4.2655
68.400	4.960	838880.	12946.3108	-0.0857164	54906.5041	-15.4748	11.2314
72.000	4.655	883098.	12870.4189	-0.0837444	57761.9124	-26.6874	20.6390
75.600	4.357	927025.	12753.4199	-0.0816715	60598.5126	-38.3121	31.6544
79.200	4.067	970512.	12591.1884	-0.0794985	63406.7513	-51.8165	45.8669
82.800	3.785	1013388.	12376.5605	-0.0772265	66175.5004	-67.4212	64.1295
86.400	3.511	1055453.	12101.7605	-0.0748573	68891.8714	-85.2455	87.4077
90.000	3.246	1096479.	11758.8829	-0.0723930	71541.1153	-105.2421	116.7263
93.600	2.990	1136208.	11339.8805	-0.0698361	74106.6607	-127.5370	153.5709
97.200	2.743	1174355.	10835.4356	-0.0671901	76570.0075	-152.7101	200.4223
100.800	2.506	1210595.	10235.0968	-0.0644589	78910.2408	-180.8114	259.7505
104.400	2.279	1244567.	9529.3615	-0.0616473	81103.9873	-211.2638	333.7375
108.000	2.062	1275877.	8709.7657	-0.0587609	83125.8971	-244.0672	426.0937
111.600	1.856	1304104.	7767.8455	-0.0558064	84948.6420	-279.2218	541.6503
115.200	1.660	1328792.	6695.1368	-0.0527912	86542.9138	-316.7275	686.7628
118.800	1.476	1349458.	5483.1758	-0.0497241	87877.4226	-356.5842	869.8884
122.400	1.302	1365586.	4123.4983	-0.0466149	88918.8947	-398.7921	1102.4251
126.000	1.140	1376630.	2607.6405	-0.0434746	89632.0709	-443.3511	1399.9542
129.600	0.989250	1382013.	927.1383	-0.0403154	89979.7037	-490.2612	1784.1198
133.200	0.849812	1381128.	-926.4723	-0.0371511	89922.5556	-539.5224	2285.5417
136.800	0.721762	1373337.	-2961.6553	-0.0339967	89419.3963	-591.1348	2948.4587
140.400	0.605035	1357969.	-5186.8749	-0.0308689	88427.0003	-645.0983	3838.3763
144.000	0.499506	1334324.	-7610.5952	-0.0277857	86900.1442	-701.4130	5055.1685
147.600	0.404978	1301672.	-10241.2803	-0.0247670	84791.6037	-760.0788	6756.6178
151.200	0.321183	1259250.	-13087.3947	-0.0218343	82052.1510	-821.0958	9203.2935
154.800	0.247771	1206264.	-16097.1017	-0.0190108	78630.5515	-850.9637	12364.0959
158.400	0.184305	1142324.	-18995.2635	-0.0163213	74501.5973	-759.1262	14827.8564
162.000	0.130258	1068616.	-21571.2817	-0.0137893	69741.8917	-671.9950	18572.1941

165.600	0.085022	986266.	-23833.0564	-0.0114361	64424.0607	-584.5464	24750.7845
169.200	0.047918	896401.	-25737.6697	-0.0092801	58620.9610	-473.5721	35578.4817
172.800	0.018205	800454.	-26959.7425	-0.0073369	52425.1083	-205.3572	40608.0000
176.400	-0.004907	701895.	-27226.5653	-0.0056164	46060.5886	57.1224	41904.0000
180.000	-0.022233	604119.	-26643.5140	-0.0041208	39746.6775	266.7950	43200.0000
183.600	-0.034577	509839.	-25394.0081	-0.0028451	33658.4597	427.3749	44496.0000
187.200	-0.042718	421129.	-23646.6661	-0.0017790	27929.9481	543.3706	45792.0000
190.800	-0.047386	339487.	-21570.6627	-0.0009080	22657.8653	609.9646	46340.0837
194.400	-0.049255	265771.	-19323.4270	-0.0002148	17897.6178	638.4997	46667.2542
198.000	-0.048933	200346.	-16997.7562	0.0003190	13672.7922	653.5397	48081.1619
201.600	-0.046958	143404.	-14637.9515	0.0007126	9995.7142	657.4629	50403.3802
205.200	-0.043802	94991.6293	-12309.7139	0.0009856	6869.4399	636.0024	52272.0000
208.800	-0.039862	54827.5044	-10097.2478	0.0011572	4275.8156	593.1454	53568.0000
212.400	-0.035470	22353.9339	-8056.5746	0.0012456	2178.8138	540.5620	54864.0000
216.000	-0.030894	-3112.5707	-6216.0690	0.0012676	936.2904	481.9411	56160.0000
219.600	-0.026343	-22333.3114	-4591.7924	0.0012385	2177.4821	420.4349	57456.0000
223.200	-0.021977	-36106.5974	-3189.4263	0.0011716	3066.9010	358.6574	58752.0000
226.800	-0.017908	-45233.9161	-2006.1794	0.0010784	3656.3035	298.7019	60048.0000
230.400	-0.014212	-50492.8550	-1032.6058	0.0009688	3995.9028	242.1723	61344.0000
234.000	-0.010933	-52616.3632	-254.2890	0.0008507	4133.0297	190.2259	62640.0000
237.600	-0.008087	-52277.7978	346.6392	0.0007306	4111.1667	143.6232	63936.0000
241.200	-0.005672	-50081.1090	790.1689	0.0006134	3969.3141	102.7822	65232.0000
244.800	-0.003671	-46555.4597	1097.2777	0.0005027	3741.6430	67.8338	66528.0000
248.400	-0.002053	-42153.5636	1288.9957	0.0004011	3457.3877	38.6762	67824.0000
252.000	-0.000783	-37253.0309	1385.6616	0.0003102	3140.9326	15.0271	69120.0000
255.600	0.000180	-32160.0504	1406.3594	0.0002307	2812.0501	-3.5284	70416.0000
259.200	0.000878	-27114.7865	1368.5171	0.0001628	2486.2490	-17.4951	71712.0000
262.800	0.001353	-22297.9359	1287.6514	0.0001062	2175.1977	-27.4303	73008.0000
266.400	0.001643	-17837.9607	1177.2349	6.0255E-05	1887.1919	-33.9122	74304.0000
270.000	0.001786	-13818.5909	1048.6666	2.4002E-05	1627.6386	-37.5146	75600.0000
273.600	0.001816	-10286.2653	911.3245	-3.6025E-06	1399.5363	-38.7865	76896.0000
277.200	0.001760	-7257.2491	772.6813	-2.3693E-05	1203.9357	-38.2375	78192.0000
280.800	0.001645	-4724.2393	638.4647	-3.7414E-05	1040.3649	-36.3273	79488.0000
284.400	0.001491	-2662.3236	512.8474	-4.5873E-05	907.2154	-33.4601	80784.0000
288.000	0.001315	-1034.2153	398.6527	-5.0106E-05	802.0792	-29.9814	82080.0000
291.600	0.001130	205.2705	297.5652	-5.1056E-05	748.5496	-26.1784	83376.0000
295.200	0.000947	1105.4973	210.3362	-4.9554E-05	806.6823	-22.2822	84672.0000
298.800	0.000774	1717.0151	136.9786	-4.6322E-05	846.1715	-18.4720	85968.0000
302.400	0.000614	2089.2421	76.9454	-4.1963E-05	870.2083	-14.8798	87264.0000
306.000	0.000471	2268.7560	29.2882	-3.6973E-05	881.8005	-11.5964	88560.0000
309.600	0.000348	2298.1209	-7.2045	-3.1743E-05	883.6968	-8.6774	89856.0000
313.200	0.000243	2215.1694	-33.8919	-2.6574E-05	878.3401	-6.1490	91152.0000
316.800	0.000156	2052.6641	-52.1857	-2.1687E-05	867.8462	-4.0142	92448.0000
320.400	8.67E-05	1838.2616	-63.4754	-1.7231E-05	854.0010	-2.2578	93744.0000
324.000	3.23E-05	1594.7111	-69.0722	-1.3299E-05	838.2736	-0.8515108	95040.0000
327.600	-9.05E-06	1340.2236	-70.1690	-9.9384E-06	821.8399	0.2421641	96336.0000
331.200	-3.93E-05	1088.9575	-67.8145	-7.1566E-06	805.6143	1.0659	97632.0000
334.800	-6.06E-05	851.5726	-62.8996	-4.9343E-06	790.2850	1.6647	98928.0000
338.400	-7.48E-05	635.8142	-56.1533	-3.2310E-06	776.3522	2.0833	100224.
342.000	-8.38E-05	447.0942	-48.1477	-1.9909E-06	764.1655	2.3643	101520.
345.600	-8.92E-05	289.0430	-39.3083	-1.1478E-06	753.9593	2.5465	102816.
349.200	-9.21E-05	164.0126	-29.9300	-6.2901E-07	745.8853	2.6637	104112.
352.800	-9.37E-05	73.5134	-20.1974	-3.5700E-07	740.0413	2.7433	105408.
356.400	-9.47E-05	18.5722	-10.2083	-2.5155E-07	736.4934	2.8062	106704.
360.000	-9.55E-05	0.0000	0.0000	-2.3028E-07	735.2941	2.8651	54000.0000

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:


```
Pile-head deflection              =    11.65547424 in
Computed slope at pile head       =    -0.10393751
Maximum bending moment            =       1382013. lbs-in
Maximum shear force               =   -27226.56531 lbs
Depth of maximum bending moment   =      129.60000 in
Depth of maximum shear force      =      176.40000 in
Number of iterations              =             29
Number of zero deflection points  =              3
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

```
Type 1 = Shear and Moment,          y = pile-head displacment in
Type 2 = Shear and Slope,           M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness,  V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment,     S = Pile-head Slope, radians
Type 5 = Deflection and Slope,      R = Rot. Stiffness of Pile-head in-lbs/rad
```

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 14400.	M= 0.000	-4100.0000	14.0683	1595714.	-31294.7605
1	V= 13000.	M= 0.000	-7500.0000	11.6555	1382013.	-27226.5653

The analysis ended normally.

Appendix E

Response to Comments

APPENDIX E - RESPONSE TO COMMENTS

I. INTRODUCTION

An Initial Study was prepared by the City of Santa Monica (City) in accordance with the California Environmental Quality Act (CEQA), as amended, to evaluate the potential environmental effects associated with implementation of the Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade Project. The Initial Study assessed the project's potential for significant environmental impacts for each environmental category listed in the CEQA Guidelines' Environmental Checklist Form (Appendix G), as well as additional City-specific categories. Mitigation measures were developed as needed to reduce potentially significant effects of the project to a less than significant level. The Initial Study was submitted to the State Clearinghouse, Governor's Office of Planning and Research, and circulated for public review on June 17, 2011. A Notice of Intent to Adopt a Mitigated Negative Declaration was circulated with the Initial Study. The 30-day comment period required by CEQA Guidelines Section 15073(b) concluded on July 18, 2011.

II. COMMENT LETTERS

In accordance with CEQA Guidelines Section 15074(b), prior to approving a project, the decision-making body of the lead agency shall consider the proposed negative declaration or mitigated negative declaration together with any comments received during the public review process. The decision-making body shall adopt the proposed negative declaration or mitigated negative declaration only if it finds on the basis of the whole record before it (including the Initial Study and any comments received), that there is no substantial evidence that the project will have a significant effect on the environment and that the negative declaration or mitigated negative declaration reflects the lead agency's independent judgment and analysis. The City received two (2) comment letters during the 30-day public review period, and as such City staff have provided written responses herein. Agencies/individuals that provided written comments are listed below:

1. Dianna Watson, IGR/CEQA Branch Chief, California Department of Transportation
2. Dave Singleton, Program Analyst, California Native American Heritage Commission

Copies of the original comment letters are included on the subsequent pages. Each comment letter is followed by a response from City staff. None of the comments made on the Initial Study affect the original conclusions related to potential environmental significance that were drawn in the Initial Study.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, REGIONAL PLANNING
IGR/CEQA BRANCH
100 MAIN STREET, MS # 16
LOS ANGELES, CA 90012-3606
PHONE: (213) 897-9140
FAX: (213) 897-1337

LETTER A

Flex your power!
Be energy efficient!

July 12, 2011

Mr. Eric Bailey
Public Works Department
1437 4th Street, Suite 300
Santa Monica, CA 90401

Re: Santa Monica Pier Emergency Gangway
& Phase 4 Structural Upgrade Project, MND
IGR No. 110626EA, SCH No. 2011061047
Vic. LA-10,

Dear Mr. Bailey:

Thank you for including the California Department of Transportation (Department) in the environmental review process for the above referenced project. The proposed project consists of two major components: the Emergency Gangway and floating dock, and the Phase 4 Structural upgrades.

Transportation of heavy construction equipment and/or materials, which requires the use of oversized-transport vehicles on State highways, will require a transportation permit from the Department. It is recommended that large size truck trips be limited to off-peak commute periods. **A-1**

If you have any questions, please feel free to contact Elmer Alvarez, the project coordinator, at (213) 897-6696 and refer to IGR/CEQA No. 110626EA.

Sincerely,

DiAnna Watson

DIANNA WATSON
IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

Date Received: July 12, 2011

Dianna Watson, IGR/CEQA Branch Chief
State of California Department of Transportation
District 7, Regional Planning
IGR/CEQA Branch
100 Main Street, MS #16
Los Angeles, California 90012-3606

RE: Santa Monica Pier Emergency Gangway & Phase 4 Structural Upgrade Project, MND IGR No. 110626EA, SCH No. 2011061047 Vic. LA-10

Response to Comment A-1

This letter acknowledges Caltrans' the receipt of the Initial Study/Mitigated Negative Declaration (IS/MND), and indicates that heavy equipment transport that requires the operation of oversize vehicles on State highways will require a transportation permit from Caltrans. The letter also indicates that it is recommended that trips associated with large-sized trucks be limited to off-peak commute periods.

LETTER B

STATE OF CALIFORNIA

Edmund G. Brown, Jr., *Governor*

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

RECEIVED
JUL - 7 2011
CITY OF SANTA MONICA
CIVIL ENGINEERING DIVISION

July 1, 2011

Mr. Eric Bailey, Environmental Planner
City of Santa Monica Public Works Department
1437 – 4th Street, Suite 300
Santa Monica, CA 90401

Re: SCH#2011061047; CEQA Notice of Completion; proposed Negative Declaration for the "**Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade Project**" located in the City of Santa Monica; Los Angeles County, California

Dear Mr. Bailey:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources. The NAHC wishes to comment on the above-referenced proposed Project.

This letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9. **B-1**

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including …objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC Sacred Lands File (SLF) search resulted in; **Native American cultural resources were not identified** within the 'area of potential effect (APE), based on the USGS coordinates provided. The absence of archaeological items at the surface level does not preclude their existence at the subsurface level once ground-breaking activity is underway. **B-2**

The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254.10. **B-3**

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural **B-4** significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Pursuant to C"A Public Resources Code § 5097.95, the NAHC requests that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and Section 2183.2 that requires documentation, data recovery of cultural resources. **B-4 (cont.)**

Furthermore we recommend, also, that you contact the California Historic Resources Information System (CHRIS) California Office of Historic Preservation for pertinent archaeological data within or near the APE, at (916) 445-7000 for the nearest Information Center in order to learn what archaeological fixtures may have been recorded in the APE. **B-5**

Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. **B-6**

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery'. **B-7**

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects. **B-8**

The response to this search for Native American cultural resources is conducted in the NAHC Sacred Lands Inventory, established by the California Legislature (CA Public Resources Code 5097.94(a) and is exempt from the CA Public Records Act (c.f. California Government Code 6254.10) although Native Americans on the attached contact list may wish to reveal the nature of identified cultural resources/historic properties. Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places and there may be sites within the APE eligible for listing on the California Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious **B-9** and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

B-9 (cont.)

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

California Native American Contact List
Los Angeles County
July 1, 2011

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Chairperson
P.O. Box 86908 — Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net
(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
3098 Mace Avenue, Aapt. D — Gabrielino
Costa Mesa, , CA 92626
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 — Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address — Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
1875 Century Pk East #1500 — Gabrielino
Los Angeles , CA 90067
(760) 721-0371-work
(310) 428-7720 - cell
(310) 587-0170 - FAX
bacuna1@gabrieinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 — Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Shoshoneon Gabrieleno Band of Mission Indians
Andy Salas, Chairperson
PO Box 393 — Gabrieleno
Covina , CA 91723
(626) 926-4131
gabrielenoindians@yahoo.
com
(213) 688-0181 - FAX

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011061047; CEQA Notice of Completion; proposed Negative Declaration for the Santa Monica Pier Emergency Gangway and Phase 4 Strucural Upgrade Project; located in the City of Santa Monica; Los Angeles County, California.

California Native American Contact List
Los Angeles County
July 1, 2011

Gabrielino-Tongva Tribe
Linda Candelaria, Chairwoman
1875 Century Park East, Suite 1500
Los Angeles , CA 90067 Gabrielino
lcandelaria1@gabrielinoTribe.org
626-676-1184- cell
(310) 587-0170 - FAX
760-904-6533-home

Santa Ynez Tribal Elders Council
Freddie Romero, Cultural Preservation Conslnt
P.O. Box 365 Chumash
Santa Ynez , CA 93460
805-688-7997, Ext 37
freddyromero1959@yahoo.
com

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011061047; CEQA Notice of Completion; proposed Negative Declaration for the Santa Monica Pier Emergency Gangway and Phase 4 Strucural Upgrade Project; located in the City of Santa Monica; Los Angeles County, California.

Date Received: July 7, 2011

Dave Singleton, Program Analyst
State of California Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, California 95814

RE: SCH#2011061047; CEQA Notice of Completion; proposed Negative Declaration for the "Santa Monica Pier Emergency Gangway and Phase 4 Structural Upgrade Project" located in the City of Santa Monica; Los Angeles County, California

Response to Comment B-1

Comment noted. The Commenter indicates that the Native American Heritage Commission (NAHC) is a Trustee Agency charged with protection and preservation of Native American cultural resources, and wishes to comment on the CEQA document. The Commenter also states that the letter provided includes various statues relating to Native American resources. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-2

Comment noted. The Commenter describes impact findings under CEQA with regard to cultural resources and notes that records searches of the NAHC Sacred Lands File found no resources at the project site, though that does not preclude the existence of undiscovered resources. As such, as discussed in Section VI, *Cultural Resources*, of the IS/MND, mitigation measures are provided to address previously undiscovered cultural resources encountered during construction activities, consistent with NAHC guidance. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-3

Comment noted. The Commenter defines "Sacred Sites," and notes that items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-4

Comment noted. The Commenter indicates that early consultation with Native American tribes is encouraged, offers guidance regarding consultation, and provides a list of potentially affected local tribes in the area. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-5

Comment noted. The Commenter also suggests that a review of records contained in the California Historic Resources Information System (CHRIS) for archaeological records be conducted for projects in areas with reasonable sensitivity for cultural resources. However, this comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-6

Comment noted. The Commenter suggests that consultation should be carried out, as applicable, in compliance with federal NEPA requirements and other federal agency requirements, including the Secretary of the Interior's Standards for historic properties. As indicated in Section VI, *Cultural Resources*, of the IS/MND, mitigation is provided to ensure that any modifications to the historic Santa Monica Pier would be carried in accordance with the Secretary's Standards. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-7

Comment noted. The Commenter states that State law provides protocols to be followed in the event of the accidental discovery of cultural resources during construction, which are to be complied with under these circumstances. As discussed in Section VI, *Cultural Resources*, of the IS/MND, mitigation measures are provided to address previously undiscovered cultural resources encountered during construction activities, consistent with NAHC guidance. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-8

Comment noted. The Commenter again indicates that early and regular consultation with Native American groups provides for greater effectiveness in addressing cultural resources concerns regarding development projects. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

Response to Comment B-9

Comment noted. The Commenter reiterates that Sacred Lands Inventory results are confidential but that Native American tribes affected by the project and involved in consultation may reveal details about such resources/properties. Similarly, the Commenter indicates that historic properties may also be protected by confidentiality, and confidentiality may also be imposed at the discretion of the Secretary of the Interior if the resource is not eligible for listing in the California or National Registers. This comment does not raise any specific environmental issues or substantive issues regarding the analysis presented in the IS/MND.

PCR Irvine
One Venture, Suite 150
Irvine, California 92618
TEL 949.753.7001
FAX 949.753.7002
PCRinfo@pcrnet.com

PCR Santa Monica
233 Wilshire Boulevard, Suite 130
Santa Monica, California 90401
TEL 310.451.4488
FAX 310.451.5279
PCRinfo@pcrnet.com

PCR Pasadena
790 East Colorado Boulevard, Suite 900
Pasadena, California 91101
TEL 626.204.6170
FAX 626.204.6171
PCRinfo@pcrnet.com