Claude Anthony Marengo
Marengo Morton Architects
7724 Girard Ave
La Jolla, CA 92037

September 19, 2018

Dear Mr. Marengo,

Please find attached the results of a neighborhood survey that I performed on Tuesday September 11, 2018. The survey was conducted by walking from where La Jolla Shores Public Park terminates to the beginning of Scripps Beach along El Paseo Grande. I was instructed to document the number of homes that were one-story and two-story along with the roof materials. In summary, on the west side of El Paseo Grande (not including the proposed project), there were a total of nine 1-story homes and nine 2-story homes. There were a total of seven homes with flat roofs. For the east side, there were a total of six 1-story homes and fourteen two-story homes. There were a total of six flats roofs.

Thank you,

Chandra Slaven, AICP

West Side	# of Stories	Type of Roof	East Side	# of Stories	Type of Roof
1	2	Red	1	2	Red
2	2	Flat	2	1	Brown
3	2	Red	3	2	Brown
4	2	Brown	4	2	Flat
5	2	Brown	5	2	Flat
6	Cardenas		6	2	Brown
7	Seidler	Flat	7	2	Brown
8	Johnson	Flat	8	1	Brown
9	1	Red	9	1	Grey
10	2	Brown	10	2	Grey
11	1	Brown	11	1	Grey
12	2	Red	12	1	Blue
13	2	Red	13	1	Brown
14	1	Flat	14	2	Flat
15	1	Flat	15	2	Flat
16	1	Flat	16	2	Brown
17	1	Red	17	2	Flat
18	1	Flat	18	2	Brown
19	1	Flat	19	2	Red
			20	2	Flat
Total # of 1 story	9		Total # of 1 story	6	
Total # of 2 story	9		Total # of 2 story	14	
# of Flat Roofs	7		# of Flat Roofs	6	

CHRISTIAN WHEELER
ENGINEERING

REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION

DESSY RESIDENCE

8470 EL PASEO GRANDE

LA JOLLA, CALIFORNIA

PREPARED FOR

2310 C LLC

1900 WESTERN AVENUE

LAS VEGAS, NEVADA 89102

PREPARED BY

CHRISTIAN WHEELER ENGINEERING

3980 HOME AVENUE

SAN DIEGO, CALIFORNIA 92105

CHRISTIAN WHEELER
ENGINEERING

February 2, 2017

2310 C LLC | CWE 2160398.03

1900 Western Avenue

Las Vegas, Nevada 89102

Attention: Mr. David Lesnick

Subject: **Report of Preliminary Geotechnical Investigation**
Dessy Residence, 8470 El Paseo Grande, La Jolla, California

Ladies and Gentlemen:

In accordance with your request and our proposal dated August 18, 2016, we have completed a geotechnical investigation for the subject project. We are presenting herewith a report of our findings and recommendations.

It is our professional opinion and judgment that no geotechnical conditions exist on the subject property that would preclude the construction of the proposed residence provided the recommendations presented herein are followed.

If you have questions after reviewing this report, please do not hesitate to contact our office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

REGISTERED PROFESSIONAL ENGINEER
DANIEL B. ADLER
No. 36037
Exp. 6-30-18
CIVIL
STATE OF CALIFORNIA

REGISTERED GEOLOGIST
DAVID R. RUSSELL
No. 2215
CERTIFIED ENGINEERING GEOLOGIST
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Daniel B. Adler, RCE # 36037 David R. Russell, C.E.G. #2215

DBA:drr
ec: davidlessnick@mac.com; CSlaven@blueheron.com

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CHRISTIAN WHEELER
ENGINEERING

PRELIMINARY GEOTECHNICAL INVESTIGATION

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

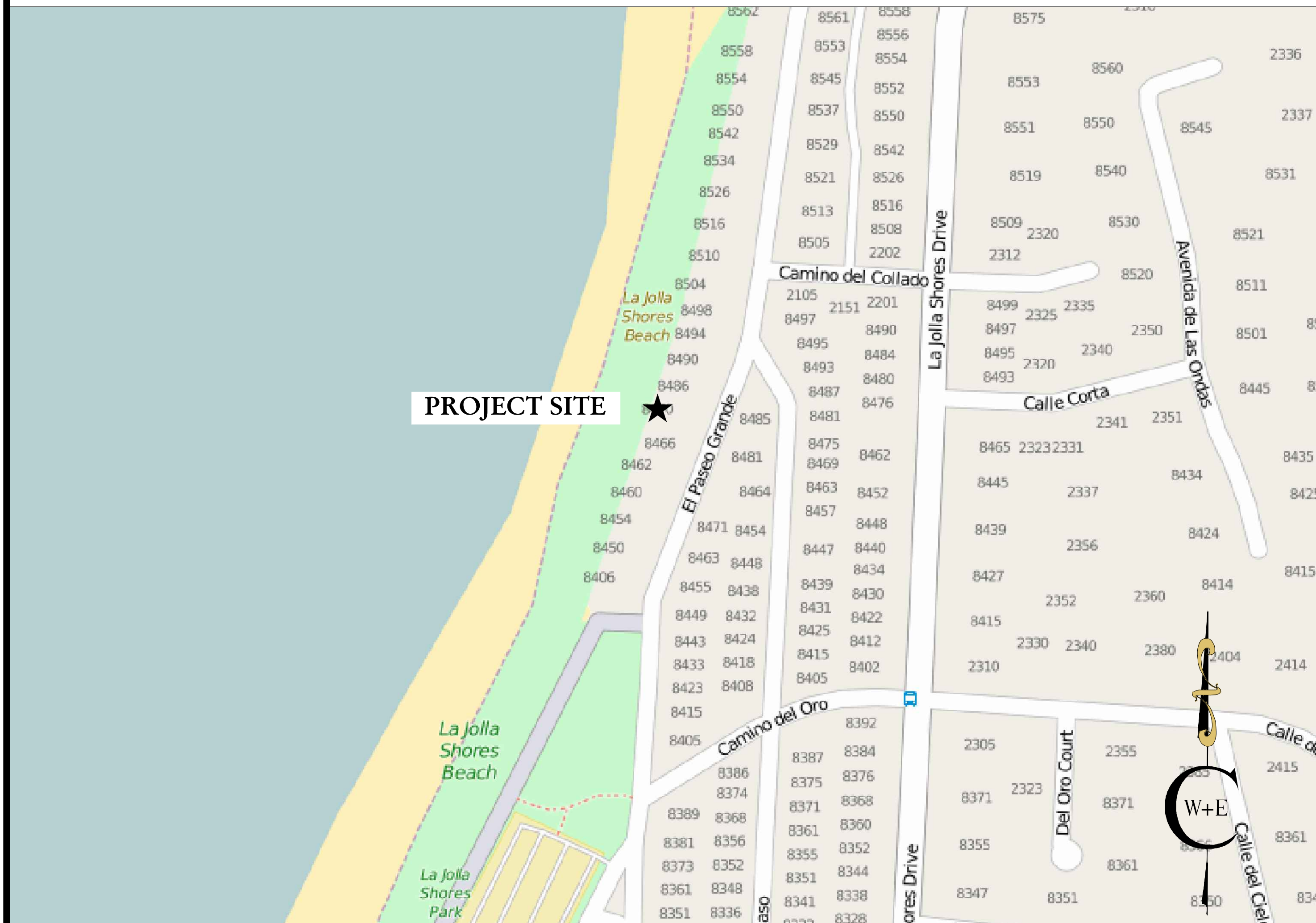
INTRODUCTION AND PROJECT DESCRIPTION

This report presents the results of a preliminary geotechnical investigation performed for a proposed existing residential structure to be located at 8470 El Paseo Grande, in the La Jolla area of the City of San Diego, California. The following Figure No. 1 presents a vicinity map showing the location of the property.

Based on our review of the referenced architectural plans prepared by Marengo Morton Architects, we understand that it is proposed to raze the existing improvements on-site and to construct a new two-story, single-family residence at the site. The residence will also include a basement level and rooftop deck. We anticipate that the below grade portions of the residence will be of concrete/masonry construction and that the above grade portions of the proposed residence will be of conventional, wood frame construction. We also anticipate that the residence will be supported by conventional shallow foundations. A swimming pool, spa, and patio are also proposed to the west of the proposed structure. The pool and spa will be supported on deep foundation systems consisting of drilled, cast-in-place concrete piers so that they will not surcharge an existing seawall along the west side of the developed portion of the property. No changes to the existing seawall are anticipated at this time. Grading to accommodate the proposed improvements is expected to consist of cuts of approximately 13 feet from existing grades to create the basement level of the home.

To assist in the preparation of this report, we were provided with a topographic map of the site prepared by San Diego Land Surveying, dated June 29, 2016 and a set of architectural plans for the project prepared by Marengo Morton Architects, dated December 21, 2016. A copy of the topographic survey was used as a base map for our Site Plan and Geotechnical Map, and is included herein as Plate No. 1. A

SITE VICINITY



DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	1

CHRISTIAN WHEELER
ENGINEERING

copy of the proposed first floor plan was used as a base map for our First Floor Plan and Geotechnical Map, and is included herein as Plate No. 2.

This report has been prepared for the exclusive use of 2310 C LLC, and its design consultants, for specific application to the project described herein. Should the project be modified, the conclusions and recommendations presented in this report should be reviewed by Christian Wheeler Engineering for conformance with our recommendations and to determine whether any additional subsurface investigation, laboratory testing and/or recommendations are necessary. Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, expressed or implied.

SCOPE OF SERVICES

Our preliminary geotechnical investigation consisted of surface reconnaissance, subsurface exploration, obtaining representative soil samples, laboratory testing, analysis of the field and laboratory data, and review of relevant geologic literature. Our scope of service did not include assessment of hazardous substance contamination, recommendations to prevent floor slab moisture intrusion or the formation of mold within the structure, evaluation or design of storm water infiltration facilities, or any other services not specifically described in the scope of services presented below.

More specifically, the intent of our proposed investigation was to:

- Prepare, in order to facilitate our subsurface exploration of the site, a general application, plan set, and engineer's cost estimate in order to obtain a ministerial grading permit in accordance with City Information Bulletin 560.
- Obtain a waiver from the County of San Diego Department of Environmental Health to conduct the proposed subsurface investigation.
- Drill five exploratory borings on-site and hand-auger one boring to explore the existing soil conditions to the depths influenced by the proposed construction.
- Backfill the boring holes using a grout or a grout/bentonite mix as required by the County of San Diego Department of Environmental Health.

- Evaluate, by laboratory tests and our past experience with similar soil types, the engineering properties of the various soil strata that may influence the proposed construction, including bearing capacities, expansive characteristics and settlement potential.
- Describe the general geology and coastal geomorphology at the site, including possible geologic hazards that could have an effect on the proposed construction, and provide the seismic design parameters as required by the 2016 edition of the California Building Code.
- Discuss potential construction difficulties that may be encountered due to soil conditions, groundwater or geologic hazards, and provide geotechnical recommendations to mitigate identified construction difficulties.
- Address the potential for soil liquefaction and dynamic settlement at the site in the event of a major, proximal seismic event.
- Provide site preparation and grading recommendations for the anticipated work.
- Provide foundation recommendations for the type of construction anticipated and develop soil engineering design criteria for the recommended foundation designs.
- Provide design parameters for restrained and unrestrained retaining walls.
- Provide a preliminary geotechnical report that presents the results of our investigation which includes a plot plan showing the location of our subsurface explorations, excavation logs, laboratory test results, and our conclusions and recommendations for the proposed project.

Although tests for the presence of soluble sulfates within the soils that may be in contact with reinforced concrete were performed as part of the scope of our services, it should be understood Christian Wheeler Engineering does not practice corrosion engineering. If a corrosivity analysis is considered necessary, we recommend that the client retain an engineering firm that specializes in this field to consult with them on this matter. The results of our sulfate testing should only be used as a guideline to determine if additional testing and analysis is necessary.

FINDINGS

SITE DESCRIPTION

The subject site is a developed, nearly rectangular-shaped lot that is located at 8470 El Paseo Grande in the La Jolla Shores area of the city of San Diego, California. The property is identified as Assessor's

Parcel Number 346-050-01 and is bound by El Paseo Grande to the east, La Jolla Shores beach to the west, and by developed residential properties to the north and south. The lot supports an existing single-family residence and associated appurtenances. Approximately the western one-fourth of the property is vacant and extends into the La Jolla Shores beach. An existing seawall exists along the east side of the beach area of the site and a concrete sidewalk is located atop and behind the seawall (see Plate Nos, 1, 3, and 4). Topographically, the majority of the developed portion of the site is relatively level with on-site elevations of about 20 feet to 26 feet. To the west of the relatively level areas of the developed portion of the site that support the existing residence and rear yard patio, the site slopes gently downward to a small site retaining wall along the east side of the concrete sidewalk. Elevations in this gentle rear yard slope area range from approximately 16 feet to 19 feet. From south to north, elevations along the existing concrete sidewalk behind the seawall range from about 13 feet to 15 feet, respectively.

GENERAL GEOLOGY AND SUBSURFACE CONDITIONS

GEOLOGIC SETTING AND SOIL DESCRIPTION: The subject site is located in the Coastal Plains Physiographic Province of San Diego County. Based upon the findings of our subsurface explorations and review of readily available, pertinent geologic and geotechnical literature, it was determined that the site is underlain by artificial fill, Holocene-age beach sands, and Quaternary-age old paralic deposits. These materials are described below:

ARTIFICIAL FILL (Qaf): Artificial fill was encountered in each our subsurface explorations. As encountered in our borings B-2, B-3, B-4, and B-5 and our hand auger HA-1, the fill was noted to consist of brown to light brown, clayey sand (SC) and clayey sand/sandy clay (SC/CL) that was generally very moist and loose/medium stiff, in consistency. Within boring B-1, which was drilled approximately 13 feet behind (east of) the existing seawall that abuts the coastal beach, the fill was noted to consist of 5½ feet of brown, clayey sand/sandy clay (SC/CL) that was generally very moist and loose/medium stiff, in consistency. Below this, fill consisting of 5 feet light grey, poorly-graded sand (SP) that was moist and loose to medium dense in consistency was encountered (extending to a depth of 10½ feet). Based on our review of the referenced geotechnical literature and historic photographs, up to 13 feet of man-placed fill is expected behind (landward of) the existing seawall that abuts the coastal beach. The geologic cross sections A-A' and B-B' presented on Plates 3 and 4 of this report depict the spatial distribution of man-placed fill across the site. The tested artificial fill was found to have a low expansion potential (EI=47).

BEACH SAND (Qb): As presented on Plate No. 1 of this report, the western, undeveloped portion of the site that is within the La Jolla Shores coastal beach and is covered with Holocene-age beach sands primarily consisting of loose, poorly-graded sand (SP) with occasional gravels and cobbles. Based on our review of the referenced geotechnical literature and historic photographs, the beach sands, which are considered transitory and which will both thicken and thin seasonally, are expected to extend to an approximate elevation of 0 feet down to the existing abrasion platform below the east side of the beach area.

OLD PARALIC DEPOSITS (Qop): Quaternary-age old paralic (terrace) deposits were encountered underlying the artificial fill within the developed portions of the site and underlie the beach sands within the undeveloped, coastal beach area of the subject lot. These materials generally consisted of interbedded layers of light brown to dark reddish-brown, sandy clay (CL) and clayey sand/sandy clay (SC/CL) that were generally moist to saturated and medium stiff to very stiff/medium dense, in consistency. The old paralic deposits were found to have a medium Expansion Index (EI=64 and 89).

GEOLOGIC STRUCTURE: Based on our review of the referenced geologic maps and our experience in the vicinity of the subject site, the old paralic deposits that underlie the site are expected to be generally massive, with faint bedding that dips gently (<3°) to the west-southwest.

COASTAL GEOMORPHOLOGY: As described below, the western margin of the subject lot is located within the City's Geologic Hazard Category 48, which is assigned broad beach areas that are considered to be generally stable. For comparison, Sheet 29 of the City's Seismic Safety Study depicts an area of "generally stable" coastal bluff (Geologic Hazard Category 47) approximately 300 feet to the north of the subject site. The Shoreline Erosion Assessment and Atlas of the San Diego Region prepared by the California Department of Boating and Waterways and the San Diego Association of Governments describes the coastline on and adjacent to the subject site as a low lying beach.

Based on the findings of our subsurface exploration of the site, review of additional subsurface exploration logs for the adjacent residential lot located at 8466 El Paseo Grande (CTE, 2007), and review of the City of San Diego's "Coastal Bluffs and Beaches Guidelines" and "Steep Hillsides Guidelines," the western side of the subject site (landward of the existing seawall and adjacent La Jolla Shores beach area) does not meet the criteria of a sensitive coastal bluff. This finding is based on our interpretation of the original coastal geomorphology (pre-development) at the site.

Specifically, The Environmentally Sensitive Lands Regulations define a Sensitive Coastal Bluff as: "Sensitive Coastal Bluff means a coastal bluff that is designated within Hazard Category Numbers 41 through 47, inclusive, on the City's Geologic Hazard Maps, plus an additional 100-foot landward strip located and contiguous to the coastal bluff edge." As also presented in the Coastal Bluff and Beach Guidelines, "Sensitive coastal bluffs are a form of coastal bluffs that are generally located along the shoreline and adjacent to coastal beaches." As described herein, the subject site is located within Geologic Hazard Categories 48 and 52, "coastal beaches" and "other terrain", respectively.

Based on the City of San Diego classification of the subject site within Geologic Categories 48 and 52, the pre-development coastal terrace/escarpment at the site does not classify as a sensitive coastal bluff, and therefore not as a coastal bluff of a historic bluff, based on the site's location adjacent to a coastal beach. The City of San Diego Geologic Hazard Categories in the site area is shown on Plate Nos. 1-4 of this report.

Our interpretation that the escarpment at the site does not meet the criteria of a coastal bluff, based on the findings of our site specific investigation, is consistent with City of San Diego's more general classification of the site area that the pre-development terrace/escarpment at the site is not a sensitive coastal bluff.

Additionally, according to the Environmentally Sensitive Lands Regulations, there are two criteria used to establish when steep hillside regulations are applicable to a proposed development. The first criterion is applicable if any portion of the site contains a natural gradient of at least 200 percent (2 feet of vertical distance for every 1 foot of horizontal distance) and a vertical elevation (vertical relief) of at least 10 feet. This is the same criteria for a coastal bluff, as described in the Coastal Bluff and Beach Guidelines. The second criterion is when a development is proposed on a site containing any portions with a natural gradient of 25 percent (2½ feet of vertical distance for every 10 feet of horizontal distance) and a vertical elevation of at least 50 feet. This criterion is not applicable to the subject site, because the site elevation has been and is presently today below 26 feet in elevation, as presented on the most recent site survey (San Diego Land Surveying, 2016) and our review of historical topographic maps and photographs.

Therefore, it is our professional opinion that the site does not classify as a steep hillside and is not subject to the steep hillside regulations. This finding is consistent with previous findings and rulings by the City of San Diego for similar projects in the vicinity of the site, including the adjacent residential parcel to the south (8466 El Paseo Grande) for which a Coastal Development Permit for a new single-family residence was recently granted and recorded on December 14, 2016 (CDP No. 1558398, SDP No. 1558399).

GROUNDWATER: Free groundwater was encountered in our boring B-1, drilled within the northwest portion of the developed area of the subject lot, at an approximate depth of 16 feet below existing site grades (elevation ± 1 foot). Free groundwater was not encountered in our other subsurface explorations which were drilled to a maximum depth of 20 feet below existing site grades. As such, free groundwater below the developed portions of the site is anticipated at elevations of about 1 foot to 3 feet, from west to east across the site. As encountered within our hand auger HA-1, heavy seepage (perched water) was encountered at an approximate depth of 10 feet below existing site grades (approximate elevation of 12 feet). Given the clayey nature of much of the old paralic deposits underlying the site as well as the very moist nature of most of the fill encountered on-site, additional zones of perched water may be anticipated.

We do not expect any significant free groundwater related conditions during or after the proposed construction. However, it should be recognized that groundwater seepage problems might occur both during and after construction. Wet soils as the result of localized perched water should be anticipated within the lower portions of the proposed basement excavation. This condition will affect the construction of the proposed basement. Recommendations to mitigate this condition are provided hereinafter. Furthermore, it should be recognized that minor groundwater seepage problems might occur after construction and landscaping are completed. These are usually minor phenomena and are often the result of an alteration in drainage patterns and/or an increase in irrigation water. Based on the anticipated construction and the permeability of the on-site soils, it is our opinion that any seepage problems that may occur will be minor in extent. It is further our opinion that these problems can be most effectively corrected on an individual basis if and when they occur.

TECTONIC SETTING: Much of Southern California, including the San Diego County area, is characterized by a series of Quaternary-age fault zones that consist of several individual, en echelon faults that generally strike in a northerly to northwesterly direction. Some of these fault zones (and the individual faults within the zone) are classified as "active" according to the criteria of the California Division of Mines and Geology. Active fault zones are those that have shown conclusive evidence of faulting during the Holocene Epoch (the most recent 11,000 years). The Division of Mines and Geology used the term "potentially active" on Earthquake Fault Zone maps until 1988 to refer to all Quaternary-age (last 1.6 million years) faults for the purpose of evaluation for possible zonation in accordance with the Alquist-Priolo Earthquake Fault Zoning Act and identified all Quaternary-age faults as "potentially active" except for certain faults that were presumed to be inactive based on direct geologic evidence of inactivity during all of Holocene time or longer. Some faults considered to be "potentially active" would be considered to be "active" but lack specific criteria used by the State Geologist, such as *sufficiently active* and *well-defined*. Faults older than Quaternary-age are not specifically defined in Special Publication 42, Fault Rupture Hazard Zones in California, published by the California Division of Mines and Geology. However, it is generally accepted that faults showing no movement during the Quaternary period may be considered to be "inactive". The City of San Diego guidelines indicate that since the beginning of the Pleistocene Epoch marks the boundary between "potentially active" and "inactive" faults, unfaulted Pleistocene-age deposits are accepted as evidence that a fault may be considered to be "inactive".

A review of available geologic maps indicates that the nearest active fault is the Rose Canyon Fault Zone, located approximately ½ mile (¾ km) to the southwest. Other active fault zones in the region that could possibly affect the site include the Newport-Inglewood, Coronado Bank and the Palos Verde Fault Zones to the northwest; the Elsinore, San Jacinto, and San Andreas Fault Zones to the northeast; and the Earthquake Valley Fault to the east.

The Scripps Fault, which is a relatively small, southwest to northeast trending fault, has been mapped by others at or near the northern perimeter of the site (Kennedy and Tan, 2008). Where exposed in the canyon approximately ½ mile (¾ km) to the northeast of the subject site, the Scripps Fault juxtaposes Tertiary-age sedimentary deposits of the Scripps Formation and Ardath Shale. The Scripps Fault has not been mapped as bisecting the middle to early Pleistocene-aged very old paralic deposits that crop out approximately 0.6 miles (1 km) to the northeast of the subject site. As such, it is our professional opinion and judgment that the Scripps Fault may be considered inactive.

The following Table I presents the active faults that are considered most likely to significantly affect the proposed residence over the anticipated economic lifetime of the structure.

TABLE I: PROXIMAL FAULT ZONES

Fault Zone	Distance	Max. Magnitude Earthquake
Rose Canyon	< 1 km	7.2 Magnitude
Coronado Bank	21 km	7.6 Magnitude
Newport-Inglewood	37 km	7.1 Magnitude
Elsinore	62 km	7.1 Magnitude
Earthquake Valley	72 km	6.5 Magnitude

GENERAL GEOLOGIC HAZARDS

GENERAL: The site is located in an area where the risks due to significant geologic hazards are relatively low. No geologic hazards of sufficient magnitude to preclude the construction of the subject project are known to exist. In our professional opinion and to the best of our knowledge, the site is suitable for the proposed improvements.

CITY OF SAN DIEGO SEISMIC SAFETY STUDY: As part of our services, we have reviewed the City of San Diego Seismic Safety Study. This study is the result of a comprehensive investigation of the City that rates areas according to geological risk potential (nominal, low, moderate, and high) and identifies potential geotechnical hazards and/or describes geomorphic conditions.

According to the San Diego Seismic Safety Map No. 29, the majority of the subject lot is located in Geologic Hazards Category 52, which is assigned to level to sloping areas with generally favorable geologic structure, where the level of geologic risk is generally considered to be "low." The western portion of the subject lot is located in Geologic Hazards Category 48, which is assigned to broad beach areas that are considered to be "generally stable." The majority of the site is also located within

Geologic Hazards Category 12, which is assigned to areas underlain by or in close proximity to faults that considered to be potentially active, inactive, presumed inactive or of unknown activity. As described above in the Tectonic setting section of this report, the Scripps Fault, which is a relatively small, southwest to northeast trending fault, has been mapped by others at or near the northern perimeter of the site (Kennedy and Tan, 2008). However, given the fact that the Scripps Fault does not bisect the middle to early Pleistocene-aged very old paralic deposits that crop out approximately 0.6 miles (1 km) to the northeast of the subject site, it is our professional opinion and judgment that the Scripps Fault is inactive.

SURFACE RUPTURE: There are no known active faults that traverse the subject site; therefore, the risk for surface rupture at the subject site is considered low.

SLOPE STABILITY: As part of this investigation we reviewed the publication, "Landslide Hazards in the Southern Part of the San Diego Metropolitan Area" by Tan and Giffen, 1995. This reference is a comprehensive study that classifies San Diego County into areas of relative landslide susceptibility. The subject site is located in Area 2, which is considered to be "marginally susceptible" to slope failures. Based on our findings and the proposed construction, it is our opinion that the risk of slope failures affecting the existing and proposed improvements at the site is considered to be negligible.

LIQUEFACTION: In order for a site to be subject to liquefaction, three general conditions must be present: loose, sandy and silty deposits of a specified plasticity; shallow groundwater; and, earthquake shaking of sufficient magnitude and duration. Based on our site-specific study, both shallow groundwater is present at the site and strong earthquake shaking may affect the site. However, based on the consistency and plasticity of the old paralic deposits underlying the site, the soils underlying the portions of the site to be developed are not considered susceptible to soil liquefaction in the event of a significant, proximal seismic event.

FLOODING: As delineated on the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency, the site is not located within either the 100-year flood zone or the 500-year flood zone.

TSUNAMIS: Tsunamis are great sea waves produced by a submarine earthquake or volcanic eruption. Historically, the San Diego area has been relatively free of tsunami-related hazards and tsunamis reaching San Diego have generally been well within the normal tidal range. It is thought that the wide continental margin off the coast acts to diffuse and reflect the wave energy of remotely generated tsunamis. The largest historical tsunami to reach San Diego's coast was 4.6 feet high, generated by the 1960 earthquake in Chile.

The developed potions of the subject lot are not within the projected tsunami inundation area presented on the La Jolla Quadrangle of the Tsunami Inundation Map for Emergency Planning (CEMA, 2009). However, the site has previously been mapped within the maximum tsunami projected runup area in the San Diego County Multi-Jurisdictional Hazard Mitigation Plan (URS, 2004). Additionally, a lack of knowledge about the offshore fault systems makes it difficult to assess the risk due to locally generated tsunamis. However, the risk associated with tsunamis at the site is considered to be comparable to nearby, similarly developed sites.

The County of San Diego and the City of San Diego have developed a tsunami alert and evacuation plan. The City has posted signs throughout the community showing routes of evacuation in the event of a tsunami warning, evacuation center locations, and the limits of tsunami hazard areas. The mapped limit of the tsunami inundation zone at the subject lot is just west (seaward) of the area of proposed site improvements and construction.

SEICHES: Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays or reservoirs. Due to the site’s location, it is considered to have a negligible risk potential for seiches.

CONCLUSIONS

In general, it is our professional opinion and judgment that the subject property is suitable for the construction of the subject project and associated improvements provided the recommendations presented herein are implemented. The main geotechnical conditions encountered affecting the proposed project are expansive soils, potentially compressible artificial fill and old paralic deposits, temporary cut slopes, and very moist soils and localized seepage conditions.

The site is underlain by expansive soils. As encountered in the subsurface explorations, the anticipated prevailing foundation soils have a medium expansion potential (EI between 51 and 90). The recommendations contained hereinafter reflect this condition. It should be recognized that the intent of this report is to provide cost-effective site preparation, foundation, and interior floor slab recommendations to mitigate the potential detrimental effect of the on-site expansive soils on the proposed structure. However, soils with medium expansion potential may detrimentally affect light-weight exterior improvements such as site walls, sidewalks, and driveways. Select grading consisting of replacing the expansive soils with a soil that has a low expansive potential is one of the best ways to mitigate for expansive soil conditions. However, this may be unfeasible for the subject project. If select grading is unfeasible, consideration should be given to utilizing materials that are tolerant to movement, implementing drought tolerant landscaping, providing positive drainage away from exterior improvements, and providing concrete surfaces with appropriate weakened plane joints. Regardless of these or other similar measures, some distress to exterior improvements requiring future maintenance or even replacement should be anticipated due to expansive soils.

As encountered in our subsurface explorations, potentially compressible artificial fill and old paralic deposits underlying the proposed construction area extend to a maximum depth of about 11 feet below existing grade (boring B-4). However, deeper potentially compressible soils may exist in areas of the site not investigated. These deposits are considered unsuitable, in their present condition, for the support of settlement sensitive improvements. It is anticipated that potentially compressible materials underlying the proposed structure will be removed to achieve proposed finish pad grades. However, where underlying proposed exterior improvements, these materials should be partially removed and replaced as compacted fill or exported from the site as recommended hereinafter.

Temporary cut slopes up to about 13 feet deep (including foundation excavations) are anticipated for the proposed basement construction. Temporary shoring will be necessary for some of the construction excavations. Groundwater may be encountered in excavations associated with temporary shoring construction.

Heavy seepage (perched water) was encountered in hand auger HA-1, at an approximate depth of 10 feet below existing site grades (approximate elevation of 12 feet). This is considered a localized condition; however, additional zones of perched water may be anticipated. Seepage conditions may affect the proposed construction. Recommendations will be provided by our office, as needed. In addition, the majority of the soils encountered in our borings were found to be in a very moist condition. The soils may be too wet to be immediately replaced as compacted fill. This will hamper site preparation recommended for exterior improvements. Replacement with imported low expansive soil (EI < 50) may mitigate this condition and also mitigate for potential expansive soils under proposed exterior improvements. Based on our findings, it is our opinion that hydrostatic pressures do not have to be considered for foundation and retaining wall design.

Based on the anticipated very moist soil conditions at basement finish grade and the characteristics of the proposed structure, it is our opinion that a structural concrete mat is the most suitable foundation system for the support of the proposed structure.

No structural plans are presently available for the proposed swimming pool and spa to be constructed west of the proposed structure. Due to the geotechnical conditions in this area, it is anticipated that these improvements will be supported by drilled cast-in-place concrete piers extending into competent old paralic deposits.

The site is located in an area that is relatively free of geologic hazards that will have a significant effect on the proposed construction. The most likely geologic hazard that could affect the site is ground shaking due to seismic activity along one of the regional active faults. However, construction in accordance with the requirements of the most recent edition of the California Building Code and the local governmental agencies should provide a level of life-safety suitable for the type of development proposed.

RECOMMENDATIONS

GRADING AND EARTHWORK

GENERAL: All grading should conform to the guidelines presented in the current edition of the California Building Code, the minimum requirements of the City of San Diego, and the recommended Grading Specifications and Special Provisions attached hereto, except where specifically superseded in the text of this report.

PREGRADE MEETING: It is recommended that a pregrade meeting including the grading contractor, the client, and a representative from Christian Wheeler Engineering be performed, to discuss the recommendations of this report and address any issues that may affect grading operations.

CLEARING AND GRUBBING: Site preparation should begin with the demolition of the existing improvements, and removal of the resulting debris as well as any existing vegetation and other deleterious materials in areas to receive proposed improvements or new fill soils.

SITE PREPARATION: It is recommended that existing potentially compressible soils underlying the proposed exterior settlement sensitive improvements be removed to a minimum depth of 3 feet below existing or proposed grade, whichever is more. Deeper removals may be necessary in areas of the site not investigated or due to unforeseen conditions. Lateral removals limits should extend at least 3 feet from the perimeter of the improvements or removal depth, whichever is more. No removals are recommended beyond property lines. All excavated areas should be approved by the geotechnical engineer or his representative prior to replacing any of the excavated soils. Unless select grading as described hereinafter is performed, the excavated materials can be replaced as properly compacted fill in accordance with the recommendations presented in the "Compaction and Method of Filling" section of this report.

SELECT GRADING: Select grading should be considered for areas to receive exterior settlement sensitive improvements. Select grading should consist of the placement of low expansion imported soils (EI between 21 and 50) extending to a minimum depth of 3 feet below proposed finish pad grade.

IMPORTED FILL: Imported fill should consist of low expansive silty and or clayey sands (EI between 21 and 50) with relatively high strength and low permeability. Imported fill should be approved by this office prior to delivery to the site. At least 72 hours will be necessary to properly evaluated potential import material.

PROCESSING OF FILL AREAS: Prior to placing any new fill soils or constructing any new improvements in areas that have been cleaned out to receive fill, the exposed soils should be scarified to a depth of about 12 inches, watered thoroughly, and compacted to at least 90 percent relative compaction.

COMPACTION AND METHOD OF FILLING: In general, all structural fill placed at the site should be compacted to a relative compaction of at least 90 percent of its maximum laboratory dry density as determined by ASTM Laboratory Test D1557. Clayey fills should be placed at a minimum 3 percent above optimum moisture content, in lifts six to eight inches thick, with each lift compacted by mechanical means. Sandy fills should be placed at or slightly above optimum moisture content Fills should consist of approved earth material, free of trash or debris, roots, vegetation, or other materials determined to be unsuitable by the Geotechnical Consultant. Fill material should be free of rocks or lumps of soil in excess of 3 inches in maximum dimension.

Utility trench backfill within 5 feet of the proposed structure and beneath all concrete flatwork or pavements should be compacted to a minimum of 90 percent of its maximum dry density.

TEMPORARY SLOPES: We anticipate that temporary excavation slopes up to about 11 feet high will be required for the construction of the proposed basement. In general, temporary cuts can be excavated at an inclination of 1:1 or flatter inclination. We recommend that our firm be contacted to have an engineering geologist observe the temporary cut slopes during grading to ascertain that no unforeseen adverse conditions exist. If adverse conditions are identified, it may be necessary to flatten the slope inclination. No surcharge loads such as soil or equipment stockpiles, vehicles, etc. should be allowed within a distance from the top of temporary slopes equal to half the slope height.

The contractor is solely responsible for designing and constructing stable, temporary excavations and may need to shore, slope, or bench the sides of trench excavations as required to maintain the stability of the excavation sides where the friable sands are exposed. The contractor's "competent person", as defined in the OSHA Construction Standards for Excavations, 29 CFR, Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety process. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. Christian Wheeler Engineering should be immediately notified if zones of potential instability, sloughing or raveling develop, and mitigation measures should be implemented prior to continuing work.

TEMPORARY SHORING

GENERAL: Shoring will be necessary for the construction of the proposed basement. It is anticipated that the shoring system will utilize soldier beams with wooden lagging. The following design parameters may be assumed to calculate earth pressures on shoring.

Angle of friction	19°
Apparent cohesion	500 pounds per square foot
Soil unit weight	125 pounds per cubic foot (pcf)

Active pressures can be applied to shoring that is capable of rotating 0.002 radians. At-rest pressures should be applied to a shoring system that is unyielding and not able to rotate. These values do not include surcharge loads. Construction surcharge loads should be evaluated on a case-by-case basis. Vertical and lateral movements of the temporary shoring are expected to be small assuming an adequate lateral support system.

DRILLING CHARACTERISTICS: Based on our findings, it is our opinion that drilling for shoring construction may be performed with conventional, heavy duty drilling equipment in good working order. However, groundwater may be encountered at a depth of about 16 feet from existing grade (elevation ±1 foot).

SURFACE DRAINAGE: The drainage around the proposed improvements should be designed to collect and direct surface water away from proposed improvements toward appropriate drainage facilities. Rain gutters with downspouts that discharge runoff away from the structure into controlled drainage devices are recommended.

The ground around the proposed improvements should be graded so that surface water flows rapidly away from the improvements without ponding. In general, we recommend that the ground adjacent to structure slope away at a gradient of at least 5 percent for a minimum distance of 10 feet. If the minimum distance of 10 feet cannot be achieved, an alternative method of drainage runoff away from the building at the termination of the 5 percent slope will need to be used. Swales and impervious surfaces that are located within 10 feet of the building should have a minimum slope of 2 percent. It is essential that new and existing drainage patterns be coordinated to produce proper drainage.

Drainage patterns provided at the time of construction should be maintained throughout the life of the proposed improvements. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Over watering should be avoided. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, zones of wet or saturated soil may develop.

FOUNDATIONS

GENERAL: Based on our findings and engineering judgment, the structure may be supported on a structural concrete mat foundation. It is recommended that he proposed swimming pool and spa be supported by drilled cast-in-place concrete piers, extending into competent old paralic deposits. Light exterior improvements may be supported by conventional shallow continuous and isolated spread footings. The following recommendations are considered the minimum based on the anticipated soil conditions after site preparation as recommended in this report is performed, and are not intended to be lieu of structural considerations. All foundations should be designed by a qualified professional.

STRUCTURAL MAT FOUNDATION

A structurally reinforced concrete mat foundation is recommended for support of the proposed residence. Thickness and reinforcement requirements of the mat foundation should be in accordance with the recommendations of the project structural engineer. To reduce potential consolidation settlements, the mat should be designed using an allowable bearing capacity of no more than 1,500 pounds per square foot. The recommended allowable bearing capacity may be increased by up to one-third when considering loads of a short duration such as wind or seismic forces.

Mat foundations typically experience some deflection due to loads placed on the mat and the reaction of the soils underlying the mat. A design coefficient of subgrade reaction, K_{v1}, of 150 pounds per cubic inch (pci) may be used for evaluating such deflections at the site. This value is based on the soil conditions encountered in our exploratory excavations and is considered as applied to a unit square foot area. The value should be adjusted for the design mat size. The coefficient of subgrade reaction K_b for a mat of a specific width may be evaluated using the following equation:

$$K_b = K_{v1}\,[(b+1)/2b]^2$$

Where **b** is the least width of the foundation

Based on our preliminary evaluation, the anticipated total static settlement for the mat foundation should be less than approximately 1 inch. Anticipated maximum differential settlements of approximately 50 percent of the total settlements may occur between the center of the base of the structure and the structure corners.

Lateral forces may be resisted by passive pressure resistance. For passive pressure design, an allowable equivalent fluid pressure of 250 pounds per cubic foot (pcf) may be assumed.

CONVENTIONAL SHALLOW FOUNDATIONS

DIMENSIONS: Conventional footings supporting light exterior miscellaneous improvements should have a minimum embedment depth of 18 inches below lowest adjacent finish grade. Property line footings should extend to a minimum depth of 24 inches below lowest adjacent finish pad grade. Continuous and isolated footings should have a minimum width of 18 inches and 24 inches, respectively.

BEARING CAPACITY: Continuous footings with a minimum embedment of 24 inches and a minimum width of 18 inches may be designed for an allowable soil bearing pressure of 1,500 pounds per square foot (psf). The bearing value may also be increased by one-third for combinations of temporary loads such as those due to wind or seismic loads.

FOOTING REINFORCEMENT: The project structural engineer should provide reinforcement requirements for foundations. However, based on soil conditions, we recommend that the minimum reinforcing for continuous footings should consist of at least 2 No. 5 bars positioned near the bottom of the footing and 2 No. 5 bars positioned near the top of the footing.

LATERAL LOAD RESISTANCE: Lateral loads against foundations may be resisted by friction between the bottom of the footing and the supporting soil, and by the passive pressure against the footing. The coefficient of friction between concrete and fill material may be considered to be 0.25. The passive resistance for the fill may be considered to be equal to an equivalent fluid weight of 250 pounds per cubic foot. These values are based on the assumption that the footings are poured tight against undisturbed soil. If a combination of the passive pressure and friction is used, the friction value should be reduced by one-third.

CONCRETE CAST-IN-PLACE PIERS

MINIMUM PIER DIMENSIONS: Cast-in-place concrete pier foundations to support the proposed swimming pool and spa should have a minimum diameter of 24 inches. The piers should extend to a minimum depth of 10 feet below the existing grade and 10 feet into old paralic deposits, whichever is more. At this depth, a bearing capacity of 6,000 pounds per square foot (psf) may be assumed for said piers. This bearing pressure may be increased by 800 psf for each additional foot of depth and 400 psf for each additional foot of width, up to a maximum bearing pressure of 15,000 psf. This value may be increased by one-third when considering wind and/or seismic loads.

PIER REINFORCING: The reinforcing steel for the piers should be specified by the project structural designer. As a minimum, we recommend that the pier reinforcing extend the full depth of the pier excavation.

LATERAL BEARING CAPACITY: The allowable lateral bearing resistance to lateral loads for the portion of the piers embedded into old paralic deposits may be assumed to be 250 pounds per square foot per foot of depth up to a maximum of 2,500 pounds per square foot. This value may be assumed to act on an area equal to twice the pier diameter.

PIER EXCAVATION OBSERVATION AND CLEANING: Based on our findings, it is our opinion that drilling for swimming pool and spa foundation construction may be performed with conventional, heavy duty drilling equipment in good working order. However, groundwater may be encountered at a depth of about 16 feet from existing grade (elevation ±1 foot). The pier excavations should be observed by a member from our staff to determine that the minimum embedment recommend in this report is achieved. Prior to placing the steel reinforcing cages, all loose or disturbed soils at the bottom of the pier excavations should be removed. The cleanout of the pier excavations should be approved by the geotechnical engineer.

FOUNDATION EXCAVATION OBSERVATION: All footing excavations should be observed by Christian Wheeler Engineering prior to placing of forms and reinforcing steel to determine whether the foundation recommendations presented herein are followed and that the foundation soils are as anticipated in the preparation of this report. All footing excavations should be excavated neat, level, and square. All loose or unsuitable material should be removed prior to the placement of concrete.

SETTLEMENT CHARACTERISTICS: The anticipated total and differential settlement for conventional shallow foundations is expected to be less than about 1 inch and 1 inch over 40 feet, respectively, provided the recommendations presented in this report are followed. It should be recognized that minor cracks normally occur in concrete slabs and foundations due to concrete shrinkage during curing or redistribution of stresses, therefore some cracks should be anticipated. Such cracks are not necessarily an indication of excessive vertical movements.

EXPANSIVE CHARACTERISTICS: The prevailing foundation soils are assumed to have a medium expansive potential (EI between 51 and 90). The recommendations within this report reflect these conditions.

FOUNDATION PLAN REVIEW: The final foundation plan and accompanying details and notes should be submitted to this office for review. The intent of our review will be to verify that the plans used for construction reflect the minimum dimensioning and reinforcing criteria presented in this section and that no additional criteria are required due to changes in the foundation type or layout. It is not our intent to review structural plans, notes, details, or calculations to verify that the design engineer has correctly applied the geotechnical design values. It is the responsibility of the design engineer to properly design/specify the foundations and other structural elements based on the requirements of the structure and considering the information presented in this report.

SOLUBLE SULFATES: The water soluble sulfate content of selected soil samples from the site was determined in accordance with California Test Method 417. The results of these tests indicate that the soil sample had a soluble sulfate content of 0.016 and 0.026 percent. Soils with a soluble sulfate content of less than 0.1 percent are considered to be negligible. Therefore, no special requirements are considered necessary for the concrete mix design.

SEISMIC DESIGN FACTORS

The seismic design factors applicable to the subject site are provided below. The seismic design factors were determined in accordance with the 2016 California Building Code. The site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters are presented in the following Table II.

TABLE II: SEISMIC DESIGN FACTORS

Site Coordinates: Latitude Longitude	32.863° -117.261°
Site Class	D
Site Coefficient F_a	1.0
Site Coefficient F_v	1.506
Spectral Response Acceleration at Short Periods S_s	1.277 g
Spectral Response Acceleration at 1 Second Period S_1	0.494 g
$S_{MS}=F_aS_s$	1.277 g
$S_{M1}=F_vS_1$	0.744 g
$S_{DS}=2/3*S_{MS}$	0.851 g
$S_{D1}=2/3*S_{M1}$	0.496 g

Probable ground shaking levels at the site could range from slight to moderate, depending on such factors as the magnitude of the seismic event and the distance to the epicenter. It is likely that the site will experience the effects of at least one moderate to large earthquake during the life of the proposed improvements.

ON-GRADE CONCRETE SLABS

UNDER-SLAB VAPOR RETARDERS: Steps should be taken to minimize the transmission of moisture vapor from the subsoil through the interior slabs where it can potentially damage the interior floor coverings. Local industry standards typically include the placement of a vapor retarder, such as plastic, in a layer of coarse sand placed directly beneath the concrete slab. Two inches of sand are typically used above and below the plastic. The vapor retarder should be at least 15-mil Stegowrap® or similar material with sealed seams and should extend at least 12 inches down the sides of the interior and perimeter footings. The sand should have a sand equivalent of at least 30, and contain less than 10% passing the Number 100 sieve and less than 5% passing the Number 200 sieve. The membrane should be placed in accordance with the recommendation and consideration of ACI 302, "Guide for Concrete Floor and Slab Construction" and ASTM E1643, "Standards Practice for Installation of Water Vapor Retarder Used in Contact with Earth or Granular Fill Under Concrete Slabs." It is the flooring contractor's responsibility to place floor coverings in accordance with the flooring manufacturer specifications. Due to the anticipated very moist condition of the subgrade soils, special waterproofing consideration is recommended.

EXTERIOR CONCRETE FLATWORK: Exterior concrete slabs0on-grade and driveways should have a minimum thickness of 5 inches and be reinforced with at least No. 4 bars placed at 12 inches on center each way (ocew). Driveway slabs should be provided with a thickened edge a least 18 inches deep and 6 inches wide. All slabs should be provided with weakened plane joints in accordance with the American Concrete Institute (ACI) guidelines. Special attention should be paid to the method of concrete curing to reduce the potential for excessive shrinkage cracking. It should be recognized that minor cracks occur normally in concrete slabs due to shrinkage. Some shrinkage cracks should be expected and are not necessarily an indication of excessive movement or structural distress. However, it should be recognized that soils with medium (EI between 51 and 90) expansion potential may detrimentally affect light weight exterior improvements such as site walls, sidewalks, and driveways. Some distress to exterior improvements requiring future maintenance or even replacement should be anticipated due to expansive soils.

EARTH RETAINING WALLS

FOUNDATIONS: Foundations for any proposed retaining walls should be constructed in accordance with the foundation recommendations presented previously in this report.

PASSIVE PRESSURE: The passive pressure for the anticipated foundation soils may be considered to be 250 pounds per square foot per foot of depth. The upper foot of embedment should be neglected when calculating passive pressures, unless the foundation abuts a hard surface such as a concrete slab. The passive pressure may be increased by one-third for seismic loading. The coefficient of friction for concrete to soil may be assumed to be 0.25 for the resistance to lateral movement. When combining frictional and passive resistance, the friction should be reduced by one-third.

ACTIVE PRESSURE: The active soil pressure for the design of "unrestrained" and "restrained" earth retaining structures with level backfill may be assumed to be equivalent to the pressure of a fluid weighing 53 and 70 pounds per cubic foot, respectively. These pressures do not consider any other surcharge. If any are anticipated, this office should be contacted for the necessary increase in soil pressure.

Seismic lateral earth pressures may be assumed to equal an inverted triangle starting at the bottom of the wall with the maximum pressure equal to 12H pounds per square foot (where H = wall height in feet) occurring at the top of the wall.

WATERPROOFING AND WALL DRAINAGE SYSTEMS: The need for waterproofing should be evaluated by others. If required, the project architect should provide (or coordinate) waterproofing details for the retaining walls. The design values presented above are based on a drained backfill condition and do not consider hydrostatic pressures. Unless hydrostatic pressures are incorporated into the design, the retaining wall designer should provide a detail for a wall drainage system. Typical retaining wall drain system details are presented as Plate No. 5 of this report for informational purposes. Additionally, outlets points for the retaining wall drain system should be coordinated with the project civil engineer.

BACKFILL: Retaining wall backfill soils should be compacted to at least 90 percent relative compaction. Expansive or clayey soils should not be used for backfill material. The wall should not be backfilled until the masonry has reached an adequate strength.

LIMITATIONS

REVIEW, OBSERVATION AND TESTING

The recommendations presented in this report are contingent upon our review of final plans and specifications. Such plans and specifications should be made available to the geotechnical engineer and engineering geologist so that they may review and verify their compliance with this report and with the California Building Code.

It is recommended that Christian Wheeler Engineering be retained to provide continuous soil engineering services during the earthwork operations. This is to verify compliance with the design concepts, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our best estimate of the project requirements based on an evaluation of the subsurface soil conditions encountered at the subsurface exploration locations and on the assumption that the soil conditions do not deviate appreciably from those encountered. It should be recognized that the performance of the foundations and/or cut and fill slopes may be influenced by undisclosed or unforeseen variations in the soil conditions that may occur in the intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of the geotechnical engineer so that he may make modifications if necessary.

CHANGE IN SCOPE

This office should be advised of any changes in the project scope or proposed site grading so that we may determine if the recommendations contained herein are appropriate. This should be verified in writing or modified by a written addendum.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Government Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our borings, surveys, and explorations are made, and that our data, interpretations, and recommendations be based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for the interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

CLIENT'S RESPONSIBILITY

It is the responsibility of the Client, or its representatives, to ensure that the information and recommendations contained herein are brought to the attention of the structural engineer and architect for the project and incorporated into the project's plans and specifications. It is further their responsibility to take the necessary measures to insure that the contractor and his subcontractors carry out such recommendations during construction.

FIELD EXPLORATIONS

Six subsurface explorations were made on December 2, 2016 at the locations indicated on the Site Plan and Geotechnical Map included herewith as Plate No. 1. These explorations consisted of five small diameter borings drilled utilizing a tripod drill rig and a hand-auger test pit. The fieldwork was conducted under the observation and direction of our engineering geology personnel.

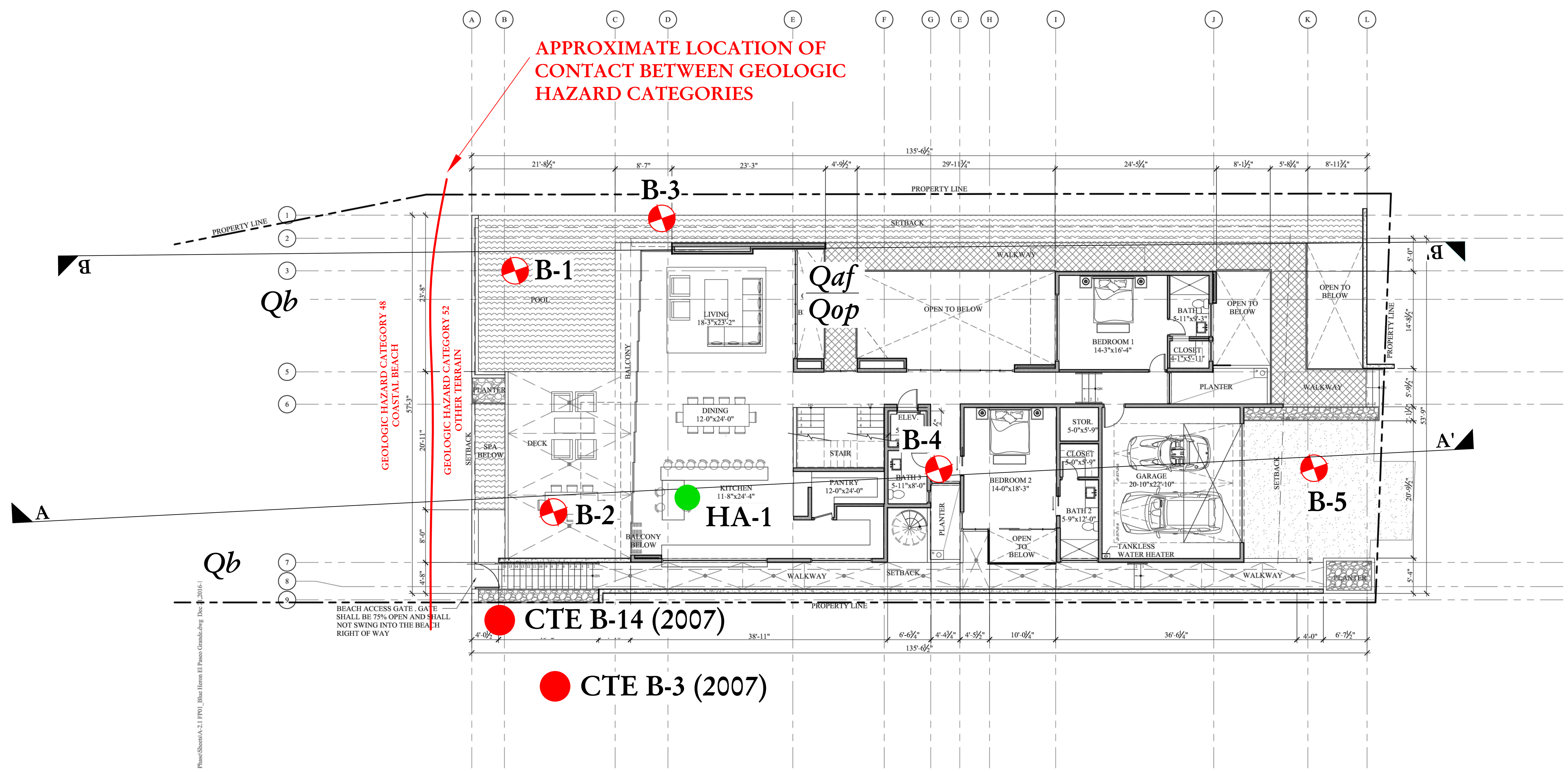
The explorations were carefully logged when made. The exploration logs are presented on Appendix A. The soils are described in accordance with the Unified Soils Classification. In addition, a verbal textural description, the wet color, the apparent moisture, and the density or consistency is provided. The density of granular soils is given as very loose, loose, medium dense, dense or very dense. The consistency of silts or clays is given as either very soft, soft, medium stiff, stiff, very stiff, or hard.

Bulk and relatively undisturbed chunk samples of the earth materials encountered were collected and transported to our laboratory for testing.

LABORATORY TESTING

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. A brief description of the tests performed and the subsequent results are presented in Appendix B.


APPROXIMATE LOCATION OF
CONTACT BETWEEN GEOLOGIC
HAZARD CATEGORIES
GEOLOGIC HAZARD CATEGORY 48
COASTAL BEACH
GEOLOGIC HAZARD CATEGORY 52
OTHER TERRAIN
CITY PARK
PACIFIC OCEAN
BEACH
SEAWALL
CONCRETE SIDEWALK
LOT 1
COMPTON TERRACE
MAP 2705
ONE STORY
WOOD & BRICK BUILDING
ONE STORY
STUCCO RESIDENCE
8470 EL PASEO GRANDE
ONE STORY
WOOD
BUILDING
POR. 1281
PUEBLO LANDS
MM 36
LOT 2
MAP NO 2615
ONE STORY
WOOD BUILDING
EL PASEO GRANDE
ASPHALT
SLATE SURFACE
FINISH FLOOR
23.83
FINISH FLOOR
24.64
GARAGE
FINISH FLOOR
24.50
FOUND LEAD &
DISC "LS 4830"
PER CR 11733
FOUND 2" IRON
PIPE "LS 2201"
PER MAP 2705
FOUND 2" IRON PIPE, NO
DISC. SEE CR 11733 &
PER MAP 2705
FOUND ¾" IRON
PIPE "LS 2201"
PER MAP 2705
N 81°56'30" W 50.98'
N 19°20'10" E 51.84'
N 70°48'40" W 146.07'
N 70°44'57" W 193.82'
N 21°19'32" E 61.94'
Qb
Qaf
Qop
B-1
B-2
B-3
B-4
B-5
HA-1
CTE B-14 (2007)
CTE B-3 (2007)
A
A'
B
B'
CWE LEGEND
B-5 APPROXIMATE BORING LOCATION
HA-1 APPROXIMATE HAND AUGER LOCATION
B-14 APPROXIMATE CTE BORING LOCATION (2007)
Qaf/Qop ARTIFICIAL FILL OVER OLD PARALIC DEPOSITS
Qb BEACH DEPOSITS
GEOLOGIC CONTACT
SCALE: 1" = 10'
TOPOGRAPHICAL SURVEY
For the exclusive use of:
D. MARIN DEVELOPMENT
1900 WESTERN AVENUE
LAS VEGAS, NV 89102
San Diego Land Surveying & Engineering, Inc.
9665 Chesapeake Drive, Suite 445, San Diego, California 92123-1354
Phone: (858) 565-8362 Fax: (858) 565-4354
Date: 06/29/2016
Revised:
Revised:
Scale: 1"=10'
Drawn by: W.P.T.
Sheet 1 of 1 Sheet
Drawing: El Paseo Grande 8470-TS
A.P.N. 346-050-01
PROFESSIONAL LAND SURVEYOR
ROBERT J. BATEMAN
No. 7046
CALIFORNIA
ROBERT J. BATEMAN, P.L.S. 7046
SITE PLAN AND GEOTECHNICAL MAP
DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA
DATE: FEBRUARY 2017
JOB NO.: 2160398.03
BY: MWL
PLATE NO.: 1
CHRISTIAN WHEELER ENGINEERING



CWE LEGEND	
B-5	APPROXIMATE BORING LOCATION
HA-1	APPROXIMATE HAND AUGER LOCATION
B-14	APPROXIMATE CTE BORING LOCATION (2007)
Qaf / Qop	ARTIFICIAL FILL OVER OLD PARALIC DEPOSITS
Qb	BEACH DEPOSITS
	GEOLOGIC CONTACT

Marengo Morton Architects
7724 Girard Ave.
Second Floor
La Jolla, CA 92037
Tel. (858) 459-3769
Fax. (858) 459-3768
Michael Morton AIA
Claude Anthony Marengo DESA

LICENSED ARCHITECT MICHAEL RENE MORTON C-19371 REN. 04/30/2017 STATE OF CALIFORNIA

blue heron DESIGN • BUILD

DRESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CA 92037

REVISIONS
06/25/2016 STARTED PROJECT
10/04/2016

PHASE: COASTAL
PROJECT NO. 2016-22
REVIEWED BY: CAM
DRAWN BY: CG
DATE: 12/09/2016

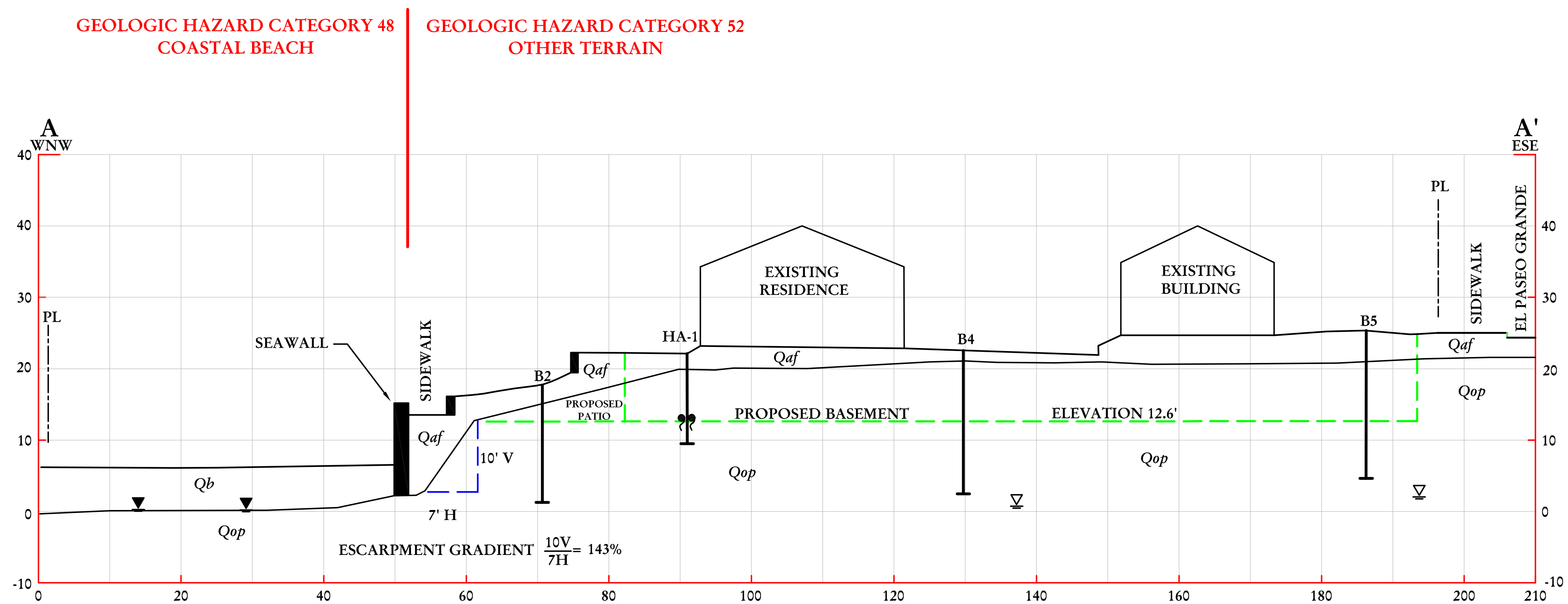
SHEET TITLE: PROPOSED FIRST FLOOR PLAN
A-2.1
SHEET 7 OF 14

FIRST FLOOR PLAN AND GEOTECHNICAL MAP

DRESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	MWL	PLATE NO.:	2

CHRISTIAN WHEELER ENGINEERING



CWE LEGEND	
Qaf	ARTIFICIAL FILL
Qb	HOLOCENE BEACH SANDS
Qop	OLD PARALIC DEPOSITS
	GEOLOGIC CONTACT
	PROPOSED CONFIGURATION OF BASEMENT AND WALK-OUT PATIO
	ENCOUNTERED SEEPAGE WATER
	FREE GROUNDWATER

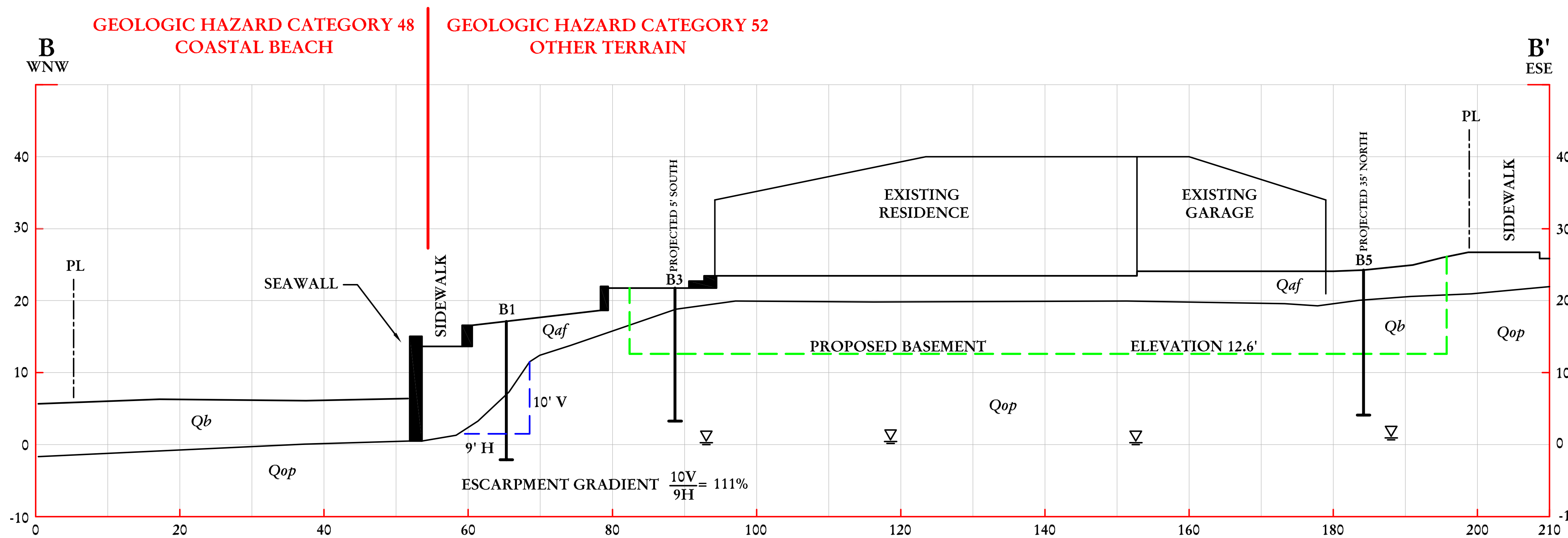
SCALE: 1" = 20'

GEOLOGIC CROSS SECTION A-A'

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SD	PLATE NO.:	3

CHRISTIAN WHEELER
ENGINEERING



CWE LEGEND	
Qaf	ARTIFICIAL FILL
Qb	HOLOCENE BEACH SANDS
Qop	OLD PARALIC DEPOSITS
——	GEOLOGIC CONTACT
— —	PROPOSED CONFIGURATION OF BASEMENT AND WALK-OUT PATIO
♀♀	ENCOUNTERED SEEPAGE WATER
▼	FREE GROUNDWATER

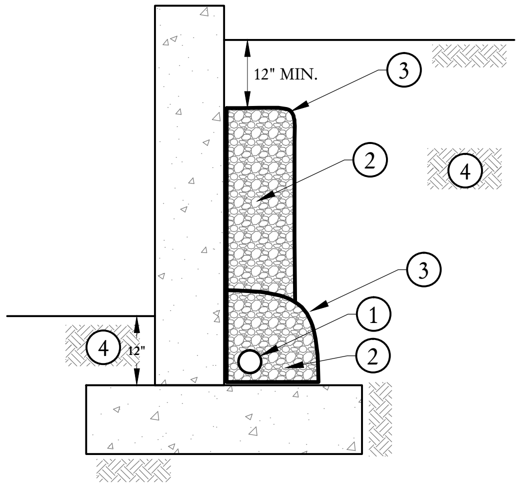
0 20' 40'

SCALE: 1" = 20'

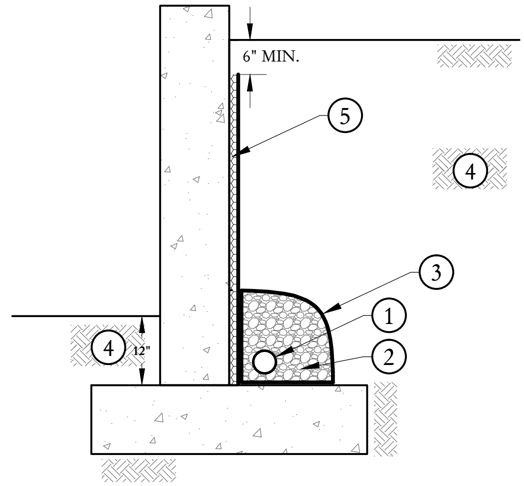
GEOLOGIC CROSS SECTION B-B'

DESSY RESIDENCE 8470 EL PASEO GRANDE LA JOLLA, CALIFORNIA			
DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SD	PLATE NO.:	4

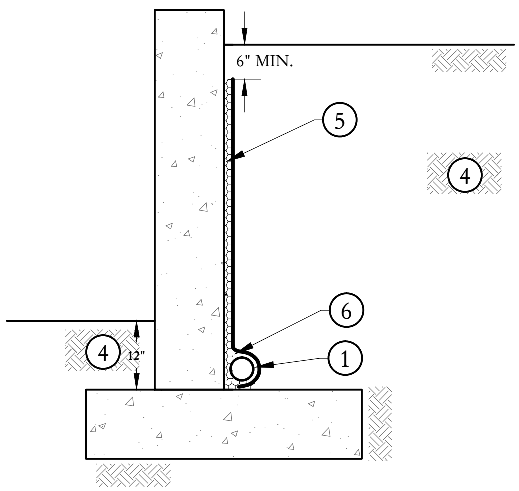
CHRISTIAN WHEELER
ENGINEERING



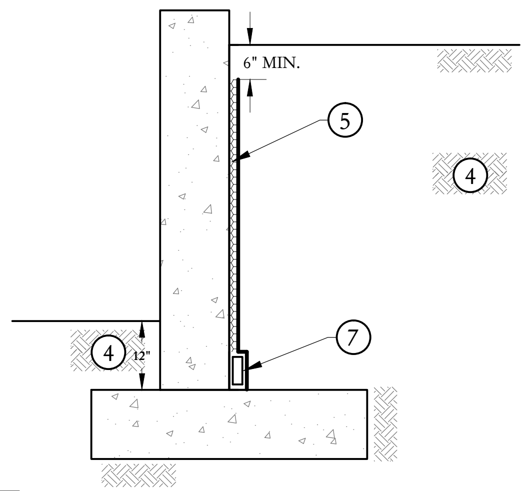
1 DETAIL



2 DETAIL



3 DETAIL



4 DETAIL

NOTES AND DETAILS

GENERAL NOTES:

1) THE NEED FOR WATERPROOFING SHOULD BE EVALUATED BY OTHERS.
2) WATERPROOFING TO BE DESIGNED BY OTHERS (CWE CAN PROVIDE A DESIGN IF REQUESTED).
3) EXTEND DRAIN TO SUITABLE DISCHARGE POINT PER CIVIL ENGINEER.
4) DO NOT CONNECT SURFACE DRAINS TO SUBDRAIN SYSTEM.

DETAILS:

1. 4-INCH PERFORATED PVC PIPE ON TOP OF FOOTING, HOLES POSITIONED DOWNWARD (SDR 35, SCHEDULE 40, OR EQUIVALENT).
2. ¾ INCH OPEN-GRADED CRUSHED AGGREGATE.
3. GEOFARBRIC WRAPPED COMPLETELY AROUND ROCK.
4. PROPERLY COMPACTED BACKFILL SOIL.
5. WALL DRAINAGE PANELS (MIRADRAIN OR EQUIVALENT) PLACED PER MANUFACTURER'S REC'S.
6. UNDERLAY SUBDRAIN WITH AND CUT FABRIC BACK FROM DRAINAGE PANELS AND WRAP FABRIC AROUND PIPE.
7. COLLECTION DRAIN (TOTAL DRAIN OR EQUIVALENT) LOCATED AT BASE OF WALL DRAINAGE PANEL PER MANUFACTURER'S RECOMMENDATIONS.

CANTILEVER RETAINING WALL DRAINAGE SYSTEMS	**DESSY RESIDENCE** 8470 EL PASEO GRANDE LA JOLLA, CALIFORNIA		CHRISTIAN WHEELER ENGINEERING
	DATE: FEBRUARY 2017	JOB NO.: 2160398.03	
	BY: SRD	PLATE NO.: 5	

Appendix A

Subsurface Explorations

LOG OF HAND AUGER HA-1

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	N/A
Existing Elevation:	22.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Artificial Fill (Qaf):** Brown, very moist, loose, very fine- to medium-grained, CLAYEY SAND with trace brick debris.							
			SM	**Old Paralic Deposits (Qop):** Tan, moist, loose, very fine- to medium-grained, SILTY SAND.							
			CL	Tan to grayish-brown, moist, medium stiff, SANDY CLAY with white precipitate deposits.							
5				Tan.							
			SC/CL	Brown to dark brown, moist, medium dense/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.							
10	❜❜			Heavy seepage at 10 feet.							
				Boring terminated at 12.5 feet. Heavy seepage at 10 feet.							
15											
20											
25											
30											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ❜❜ Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-1

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-1

Date Logged:	12/1/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	17.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	16.0 feet

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0				Lawn and Associated Topsoil.							
			SC/ CL	**Artificial Fill (Qaf):** Brown, very moist, loose/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY with rootlets. Expansion Index of 47 (Low).	9	Cal					SA EI MD SO4 DS
5			SP	Light gray, moist, loose, fine- to medium-grained, POORLY GRADED SAND.							
				Medium dense.	20	Cal*					
10			CL	**Old Paralic Deposits (Qop):** Dark reddish-brown and grayish-brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.	21	Cal					SA
				Medium dense/very stiff.	32	Cal		19.1	107.8		Con
15				Saturated.							
					41	Cal		14.9	116.1		
				Boring terminated at 18.5 feet. Groundwater at 16 feet.							
20											
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-2

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-2

Date Logged:	12/1/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	17.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0				Lawn and Associated Topsoil.							
			SC/ CL	**Artificial Fill (Qaf):** Brown, very moist, loose/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY with brick and concrete debris.							
			CL	**Old Paralic Deposits (Qop):** Tan to light brown, moist to very moist, medium stiff, SANDY CLAY with rootlets.							
5					8	Cal		25.7	94.9		Con
			SC/ CL	Brown to dark brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY.	18	Cal		20.0	105.6		
10				Grayish-brown to orangish-brown, mottled.							
					31	Cal		19.3	108.0		
				Dark reddish-brown and grayish-brown.							
15											
					34	Cal		18.7	107.7		
				Boring terminated at 16.5 feet. No groundwater or seepage encountered.							
20											
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-3

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-3

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	21.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Artificial Fill (Qaf):** Dark brown, very moist, very loose, very fine- to medium-grained, CLAYEY SAND.							
			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist to very moist, stiff, SANDY CLAY.							
5					16	Cal		24.0	98.5		
			SC/ CL	Brown to dark brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.							
10				Very stiff /medium dense, trace gravels.	31	Cal		16.4	111.9		
15			SC	Light gray to orangish-brown, moist, medium dense, very fine- to medium-grained, CLAYEY SAND, mottled.	29	Cal		17.6	108.6		
			SC/ CL	Dark reddish-brown to dark brown, moist, dense/hard, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.	41	Cal		17.1	110.9		
				Boring terminated at 18 feet. No groundwater or seepage encountered.							
20											
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-4

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-4

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	23.5 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SC	**Artificial Fill (Qaf):** Brown, very moist, loose, very fine- to medium-grained, CLAYEY SAND with abundant roots to 1.5 feet.							
				Light brown.	10	Cal					
5			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist, medium stiff, SANDY CLAY. Expansion Index of 64 (Medium).	12	Cal		23.1	100.6		HA EI PI SO4 DS
10					11	Cal		27.1	95.4		Con
			CL	Brown to dark brown, moist to very moist, medium dense/very stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.							HA EI
15					28	Cal		20.3	106.1		Con,DS
				Dark reddish-brown to grayish-brown, very stiff.							
20					38	Cal		17.7	107.4		
				Boring terminated at 20 feet. No groundwater or seepage encountered.							
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-5

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-5

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	25.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SC	**Artificial Fill (Qaf):** Brown to light brown, very moist, loose, CLAYEY SAND.							
					12	Cal					
5			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist to very moist, medium stiff, very fine- to medium-grained, SANDY CLAY.							
					10	Cal		23.8	98.5		
10			CL	Brown to dark brown, moist, stiff, SANDY CLAY, mottled.							
					17	Cal		22.4	102.8		Con
15											
					27	Cal		20.1	108.5		
				Dark reddish-brown to grayish-brown, very stiff.							
20					40	Cal		15.9	115.4		
				Boring terminated at 20 feet. No groundwater or seepage encountered.							
25											
30											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-6

CHRISTIAN WHEELER
ENGINEERING

Appendix B

Laboratory Test Results

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. Brief descriptions of the tests performed are presented below:

a) **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System and are presented on the exploration logs in Appendix A.

b) **MOISTURE-DENSITY: MOISTURE-DENSITY:** In-place moisture contents and dry densities were determined for selected soil samples in accordance with ATM D 2937. The results are summarized in the boring logs presented in Appendix A.

c) **MAXIMUM DRY DENSITY AND OPTIUM MOISTURE CONTENT TEST:** The maximum dry density and optimum moisture content of a selected soil sample were determined in the laboratory in accordance with ASTM D 1557, Method A.

d) **DIRECT SHEAR:** Direct shear tests were performed on selected samples of the on-site soils in accordance with ASTM D 3080.

e) **EXPANSION INDEX TEST:** Expansion index tests were performed on selected remolded soil samples in accordance with ASTM D 4829.

f) **GRAIN SIZE DISTRIBUTION:** The grain size distribution of selected soil samples was determined in accordance with ASTM C136 and/or ASTM D 422.

g) **ATTERBERG LIMITS:** The Liquid Limit, Plastic Limit and Plastic Index of a selected soil sample was determined in accordance with ASTM D424.

h) **SOLUBLE SULFATES:** The soluble sulfate content of selected soil samples was determined in accordance with California Test Method 417.

i) **CONSOLIDATION TEST:** Consolidation tests were performed on selected undisturbed samples in accordance with ASTM D 2435.

LABORATORY TEST RESULTS

DESSY RESIDENCE

8470 EL PASEO GRANDE

LA JOLLA, CALIFORNIA

MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT (ASTM D1557)

Sample Location	**Boring B1 @ ½'-5'**
Sample Description	Brown Clayey Sand/Sandy Clay (SC/CL)
Maximum Density	126.4 pcf
Optimum Moisture	9.5 %

DIRECT SHEAR (ASTM D3080)

Sample Location	**Boring B1 @ ½'-5'**	**Boring B4 @ 6½'**	**Boring B4 @ 13½'-**
Sample Type	Remolded to 90 %	Undisturbed	Undisturbed
Friction Angle	26°	19°	22°
Cohesion	200 psf	500 psf	850 psf

EXPANSION INDEX TESTS (ASTM D4829)

Sample Location	**Boring B1 @ ½'-5'**	**Boring B4 @ 4'-9'**	**Boring B4 @ 11'-16'**
Initial Moisture:	9.9 %	11.4 %	10.0 %
Initial Dry Density	111.2 pcf	105.8 pcf	108.5pcf
Final Moisture:	20.5 %	24.2 %	25.7 %
Expansion Index:	47 (Low)	64 (Medium)	89 (Medium)

GRAIN SIZE DISTRIBUTION (ASTM D422)

Sample Location	**Boring B1 @ ½'-5'**	**Boring B1 @ 10½'-15'**	**Boring B4 @ 4'-9'**	**Boring B4 @ 11'-16'**
Sieve Size	*Percent Passing*	*Percent Passing*	*Percent Passing*	*Percent Passing*
⅜	100			
#4	98			
#8	97	100	100	100
#16	95	99	99	99
#30	90	96	99	97
#50	79	87	95	90
#100	67	74	89	82
#200	54	63	79	72
0.05 mm			71	65
0.005 mm			36	30
0.001 mm			30	22

LABORATORY TEST RESULTS (CONT.)

ATTERBERG LIMITS (ASTM D424)

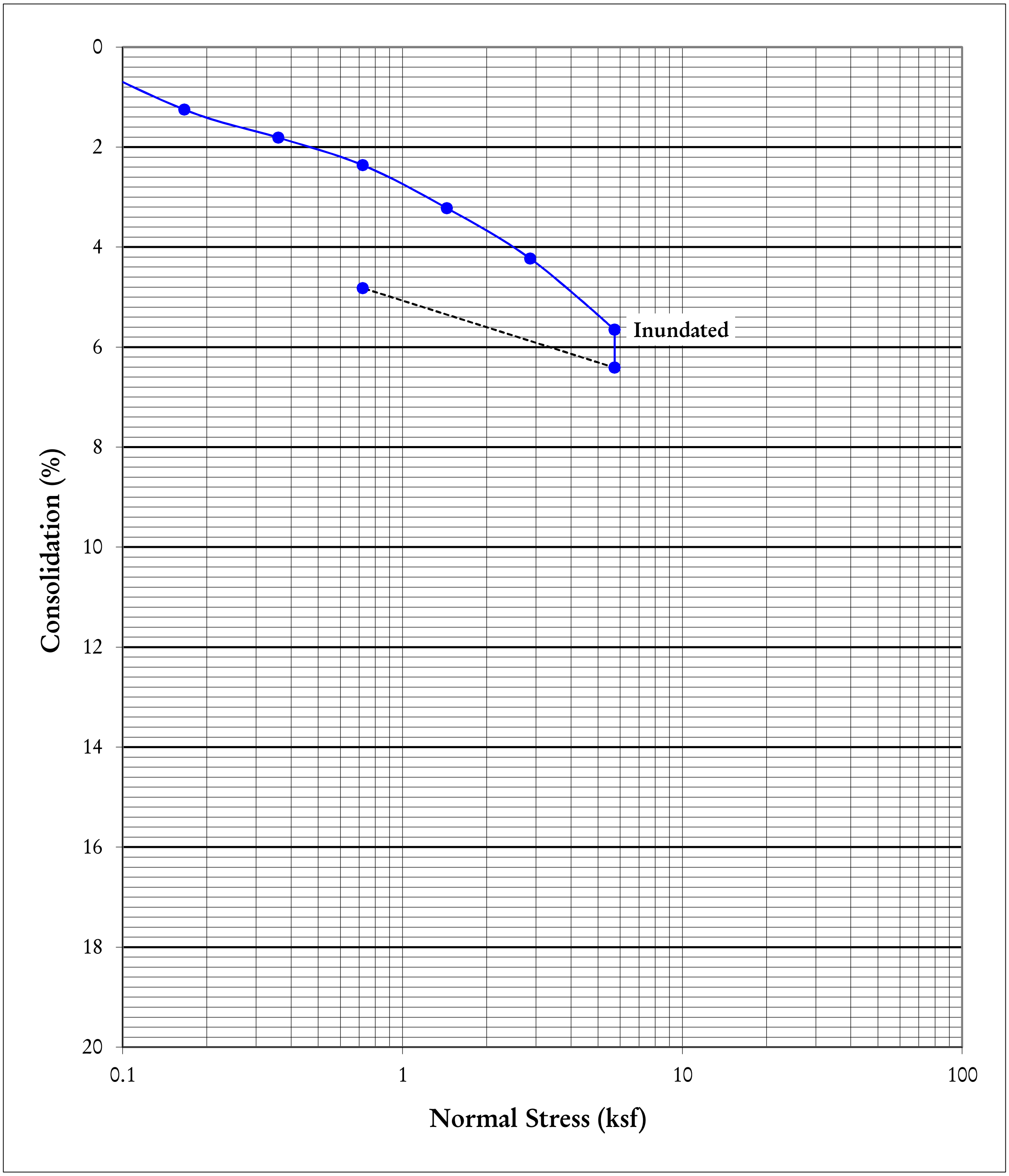
Sample Location	**Boring B4 @ 4'-9'**
Liquid Limit	41
Plastic Limit	18
Plasticity Index	23

SOLUBLE SULFATES (CALIFORNIA TEST 417)

Sample Location	**Boring B1 @ ½'-5'**	**Boring B4 @ 4'-9'**
Soluble Sulfate	0.026 % (SO_4)	0.016 % (SO_4)

CONSOLIDATION TEST

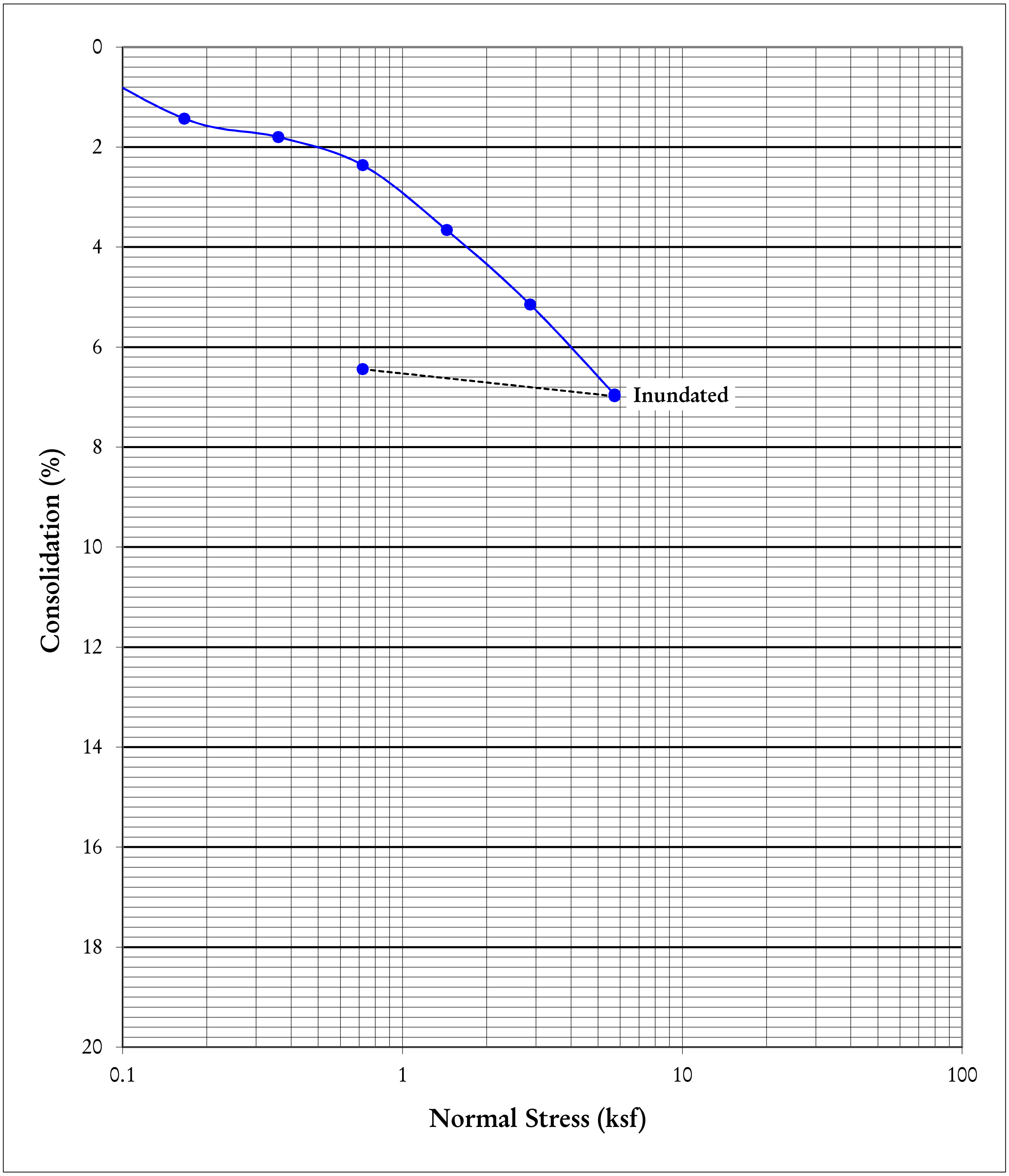
ASTM D2435



CHRISTIAN WHEELER ENGINEERING	DESSY RESIDENCE 8470 El Paseo Grande, La Jolla, California		B-1 @ 14.5'
BY: DBA	DATE: February 2017	REPORT NO.:2160398.03	PLATE NO.: B-4

CONSOLIDATION TEST

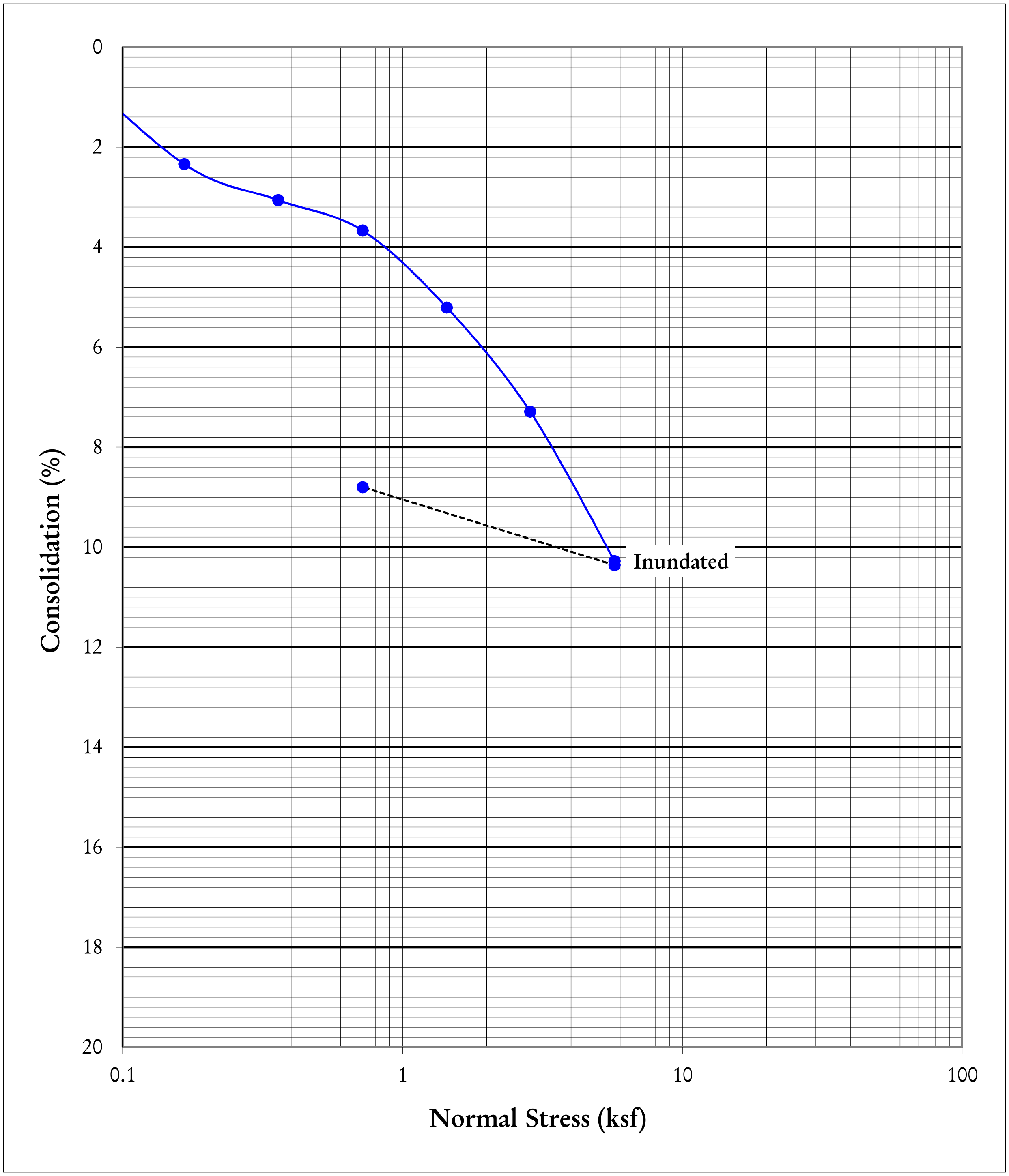
ASTM D2435



CHRISTIAN WHEELER ENGINEERING	DESSY RESIDENCE 8470 El Paseo Grande, La Jolla, California		B-2 @ 8.5'
	BY: DBA	DATE: FEBRUARY 2017	REPORT NO.:2160398.03	PLATE NO.: B-5

CONSOLIDATION TEST

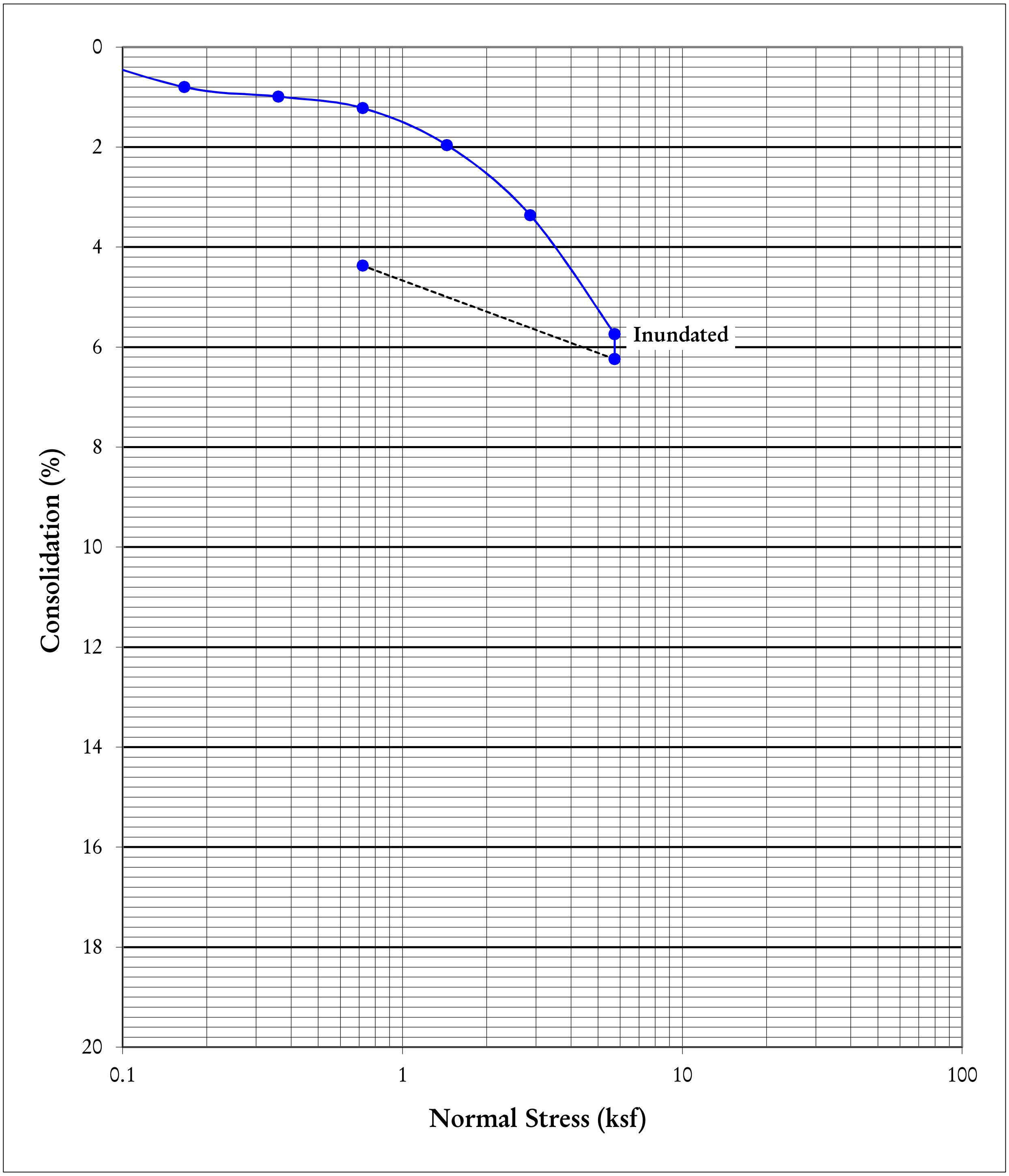
ASTM D2435



CHRISTIAN WHEELER ENGINEERING	DESSY RESIDENCE 8470 El Paseo Grande, La Jolla, California			B-4 @ 9.5'
	BY: DBA	DATE: FEBRUARY 2017	REPORT NO.:2160398.03	PLATE NO.: B-6

CONSOLIDATION TEST

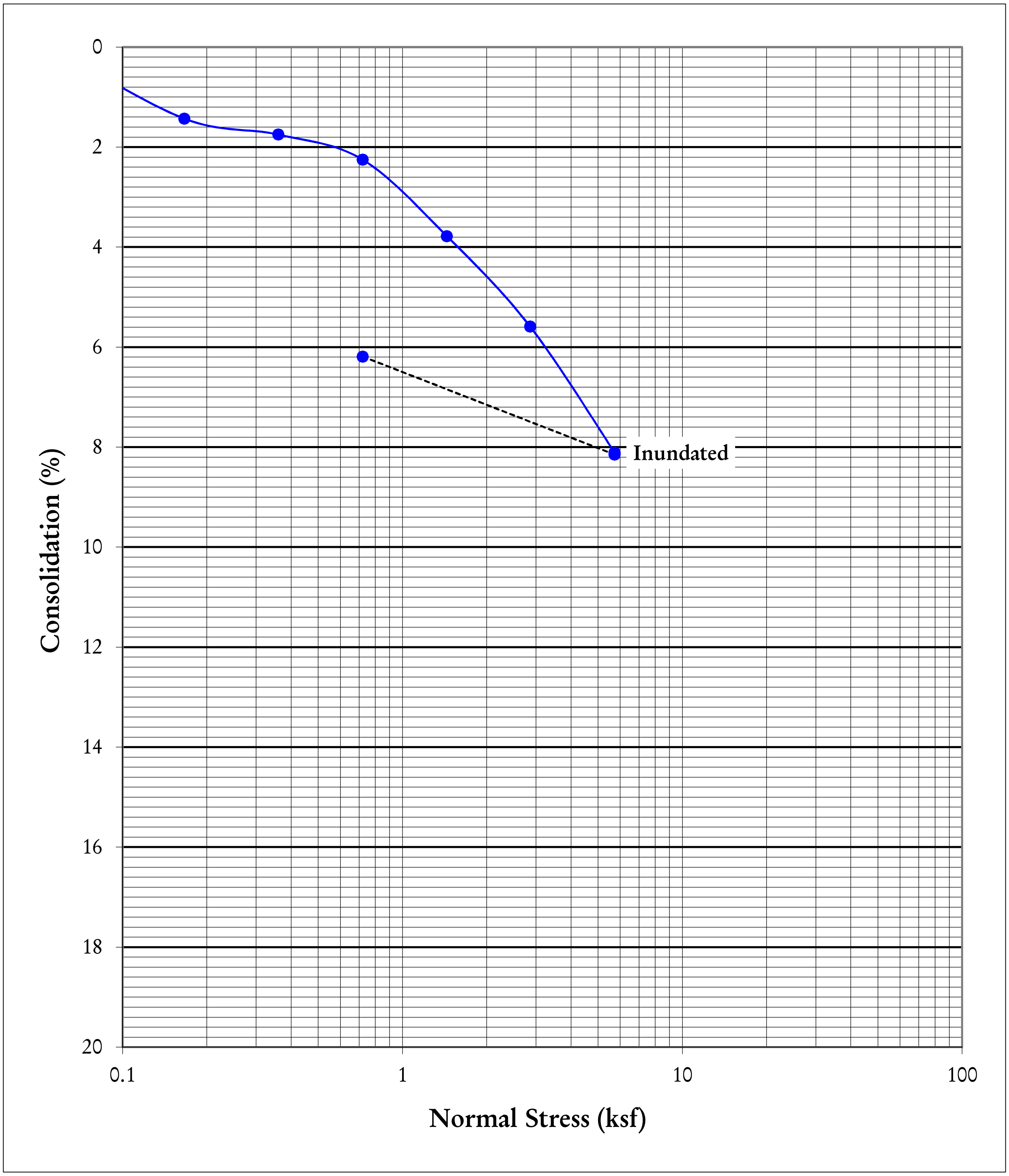
ASTM D2435



CHRISTIAN WHEELER ENGINEERING	DESSY RESIDENCE 8470 El Paseo Grande, La Jolla, California		B-4 @ 15.5'
BY: DBA	DATE: FEBRUARY 2017	REPORT NO.:2160398.03	PLATE NO.: B-7

CONSOLIDATION TEST

ASTM D2435



CHRISTIAN WHEELER ENGINEERING	DESSY RESIDENCE 8470 El Paseo Grande, La Jolla, California		B-5 @ 11.5'
BY: DBA	DATE: FEBRUARY 2017	REPORT NO.:2160398.03	PLATE NO.: B-8

Appendix C

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Appendix D

Recommended Grading Specifications – General Provisions

RECOMMENDED GRADING SPECIFICATIONS - GENERAL PROVISIONS

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

GENERAL INTENT

The intent of these specifications is to establish procedures for clearing, compacting natural ground, preparing areas to be filled, and placing and compacting fill soils to the lines and grades shown on the accepted plans. The recommendations contained in the preliminary geotechnical investigation report and/or the attached Special Provisions are a part of the Recommended Grading Specifications and shall supersede the provisions contained hereinafter in the case of conflict. These specifications shall only be used in conjunction with the geotechnical report for which they are a part. No deviation from these specifications will be allowed, except where specified in the geotechnical report or in other written communication signed by the Geotechnical Engineer.

OBSERVATION AND TESTING

Christian Wheeler Engineering shall be retained as the Geotechnical Engineer to observe and test the earthwork in accordance with these specifications. It will be necessary that the Geotechnical Engineer or his representative provide adequate observation so that he may provide his opinion as to whether or not the work was accomplished as specified. It shall be the responsibility of the contractor to assist the Geotechnical Engineer and to keep him appraised of work schedules, changes and new information and data so that he may provide these opinions. In the event that any unusual conditions not covered by the special provisions or preliminary geotechnical report are encountered during the grading operations, the Geotechnical Engineer shall be contacted for further recommendations.

If, in the opinion of the Geotechnical Engineer, substandard conditions are encountered, such as questionable or unsuitable soil, unacceptable moisture content, inadequate compaction, adverse weather, etc., construction should be stopped until the conditions are remedied or corrected or he shall recommend rejection of this work.

Tests used to determine the degree of compaction should be performed in accordance with the following American Society for Testing and Materials test methods:

Maximum Density & Optimum Moisture Content - ASTM D1557
Density of Soil In-Place - ASTM D1556 or ASTM D6938

All densities shall be expressed in terms of Relative Compaction as determined by the foregoing ASTM testing procedures.

PREPARATION OF AREAS TO RECEIVE FILL

All vegetation, brush and debris derived from clearing operations shall be removed, and legally disposed of. All areas disturbed by site grading should be left in a neat and finished appearance, free from unsightly debris.

After clearing or benching the natural ground, the areas to be filled shall be scarified to a depth of 6 inches, brought to the proper moisture content, compacted and tested for the specified minimum degree of compaction. All loose soils in excess of 6 inches thick should be removed to firm natural ground which is defined as natural soil which possesses an in-situ density of at least 90 percent of its maximum dry density.

When the slope of the natural ground receiving fill exceeds 20 percent (5 horizontal units to 1 vertical unit), the original ground shall be stepped or benched. Benches shall be cut to a firm competent formational soil. The lower bench shall be at least 10 feet wide or 1-1/2 times the equipment width, whichever is greater, and shall be sloped back into the hillside at a gradient of not less than two (2) percent. All other benches should be at least 6 feet wide. The horizontal portion of each bench shall be compacted prior to receiving fill as specified herein for compacted natural ground. Ground slopes flatter than 20 percent shall be benched when considered necessary by the Geotechnical Engineer.

Any abandoned buried structures encountered during grading operations must be totally removed. All underground utilities to be abandoned beneath any proposed structure should be removed from within 10 feet of the structure and properly capped off. The resulting depressions from the above described procedure should be backfilled with acceptable soil that is compacted to the requirements of the Geotechnical Engineer. This includes, but is not limited to, septic tanks, fuel tanks, sewer lines or leach lines, storm drains and water lines. Any buried structures or utilities not to be abandoned should be brought to the attention of the Geotechnical Engineer so that he may determine if any special recommendation will be necessary.

All water wells which will be abandoned should be backfilled and capped in accordance to the requirements set forth by the Geotechnical Engineer. The top of the cap should be at least 4 feet below finish grade or 3 feet below the bottom of footing whichever is greater. The type of cap will depend on the diameter of the well and should be determined by the Geotechnical Engineer and/or a qualified Structural Engineer.

FILL MATERIAL

Materials to be placed in the fill shall be approved by the Geotechnical Engineer and shall be free of vegetable matter and other deleterious substances. Granular soil shall contain sufficient fine material to fill the voids. The definition and disposition of oversized rocks and expansive or detrimental soils are covered in the geotechnical report or Special Provisions. Expansive soils, soils of poor gradation, or soils with low strength characteristics may be thoroughly mixed with other soils to provide satisfactory fill material, but only with the explicit consent of the Geotechnical Engineer. Any import material shall be approved by the Geotechnical Engineer before being brought to the site.

PLACING AND COMPACTION OF FILL

Approved fill material shall be placed in areas prepared to receive fill in layers not to exceed 6 inches in compacted thickness. Each layer shall have a uniform moisture content in the range that will allow the compaction effort to be efficiently applied to achieve the specified degree of compaction. Each layer shall be uniformly compacted to the specified minimum degree of compaction with equipment of adequate size to economically compact the layer. Compaction equipment should either be specifically designed for soil compaction or of proven reliability. The minimum degree of compaction to be achieved is specified in either the Special Provisions or the recommendations contained in the preliminary geotechnical investigation report.

When the structural fill material includes rocks, no rocks will be allowed to nest and all voids must be carefully filled with soil such that the minimum degree of compaction recommended in the Special Provisions is achieved. The maximum size and spacing of rock permitted in structural fills and in non-structural fills is discussed in the geotechnical report, when applicable.

Field observation and compaction tests to estimate the degree of compaction of the fill will be taken by the Geotechnical Engineer or his representative. The location and frequency of the tests shall be at the Geotechnical Engineer's discretion. When the compaction test indicates that a particular layer is at less than the required degree of compaction, the layer shall be reworked to the satisfaction of the Geotechnical Engineer and until the desired relative compaction has been obtained.

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction by sheepsfoot roller shall be at vertical intervals of not greater than four feet. In addition, fill slopes at a ratio of two horizontal to one vertical or flatter, should be trackrolled. Steeper fill slopes shall be over-built and cut-back to finish contours after the slope has been constructed. Slope compaction operations shall result in all fill material six or more inches inward from the finished face of the slope having a relative compaction of at least 90 percent of maximum dry density or the degree of compaction specified in the Special Provisions section of this specification. The compaction operation on the slopes shall be continued until the Geotechnical Engineer is of the opinion that the slopes will be surficially stable.

Density tests in the slopes will be made by the Geotechnical Engineer during construction of the slopes to determine if the required compaction is being achieved. Where failing tests occur or other field problems arise, the Contractor will be notified that day of such conditions by written communication from the Geotechnical Engineer or his representative in the form of a daily field report.

If the method of achieving the required slope compaction selected by the Contractor fails to produce the necessary results, the Contractor shall rework or rebuild such slopes until the required degree of compaction is obtained, at no cost to the Owner or Geotechnical Engineer.

CUT SLOPES

The Engineering Geologist shall inspect cut slopes excavated in rock or lithified formational material during the grading operations at intervals determined at his discretion. If any conditions not anticipated in the preliminary report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or fault planes are encountered during grading, these conditions shall be analyzed by the Engineering Geologist and Geotechnical Engineer to determine if mitigating measures are necessary.

Unless otherwise specified in the geotechnical report, no cut slopes shall be excavated higher or steeper than that allowed by the ordinances of the controlling governmental agency.

ENGINEERING OBSERVATION

Field observation by the Geotechnical Engineer or his representative shall be made during the filling and compaction operations so that he can express his opinion regarding the conformance of the grading with acceptable standards of practice. Neither the presence of the Geotechnical Engineer or his representative or the observation and testing shall release the Grading Contractor from his duty to compact all fill material to the specified degree of compaction.

SEASON LIMITS

Fill shall not be placed during unfavorable weather conditions. When work is interrupted by heavy rain, filling operations shall not be resumed until the proper moisture content and density of the fill materials can be achieved. Damaged site conditions resulting from weather or acts of God shall be repaired before acceptance of work.

RECOMMENDED GRADING SPECIFICATIONS - SPECIAL PROVISIONS

RELATIVE COMPACTION: The minimum degree of compaction to be obtained in compacted natural ground, compacted fill, and compacted backfill shall be at least 90 percent. For street and parking lot subgrade, the upper six inches should be compacted to at least 95 percent relative compaction.

EXPANSIVE SOILS: Detrimentally expansive soil is defined as clayey soil which has an expansion index of 50 or greater when tested in accordance with the Uniform Building Code Standard 29-2.

OVERSIZED MATERIAL: Oversized fill material is generally defined herein as rocks or lumps of soil over 6 inches in diameter. Oversized materials should not be placed in fill unless recommendations of placement of such material are provided by the Geotechnical Engineer. At least 40 percent of the fill soils shall pass through a No. 4 U.S. Standard Sieve.

TRANSITION LOTS: Where transitions between cut and fill occur within the proposed building pad, the cut portion should be undercut a minimum of one foot below the base of the proposed footings and recompacted as structural backfill. In certain cases that would be addressed in the geotechnical report, special footing reinforcement or a combination of special footing reinforcement and undercutting may be required.

Appendix E

Logs of CTE Borings B-3 and B-14 (2007)

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD, SOLID STEM	DRILLING DATE:	10/2/2006
LOGGED BY:	D. RIES	SAMPLE METHOD:	BULK AND CONTINUES SPT	ELEVATION:	17.5

BORING: B-3

Depth (Feet)	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						0-0.3' TURF:	Hand Augered to 1.5 feet
				CL		0.3'-1.5': Soft, very moist, (irrigation), grayish brown fine sandy CLAY (CL) with silt, fine roots.	
	3			SC		1.5'-2.5': Soft to loose, moist to very moist, grayish brown clayey fine SAND (SC) with thin rootlets, occasional fine gravel, (possible fill).	
					Fill	2.5'-3': Soft, moist, yellowish grayish brown, CLAY (CL), trace fine sand, no roots, pinholes, porous.	EI
	5					3'-3.3': Continues soft to loose, moist to very moist, clayey fine SAND (SC) with thin rootlets, occasional fine gravel, (possible fill).	
5	4			CL		3.3'-6': Soft, moist, yellowish gray brown, CLAY (CL), trace fine sand, no roots, pinholes porous.	
	7				Qsw	6'-7': medium stiff, moist, yellowish gray brown CLAY (CL), at 7' becomes dark brown, less porous.	GA AL
					Qsw		
	10				BP_1	8.5'-10': Stiff, moist, dark yellow, gray, brown, orange, mottling, silty CLAY (CL) with trace fine to medium grained sand, scattered coarse grains, and organics.	
10	14					10'-11.5': Stiff, moist, mottled dark gray, brown, with dark orange brown blotches, silty CLAY (CL), with fine sand, scattered medium to coarse sand, trace fine gravel.	
	8			CL	BP_2	11.5'-15': Increasing sand content, grading to fine sandy CLAY (CL), mottled.	
	10						
15	18					15'-16.5': Becomes very stiff.	
			▼			Groundwater at 17'	
	12					17'-18.5': Stiff, wet, mottled dark reddish brown and dark gray dark brown, fine sandy CLAY (CL).	
	17			CL-SC	BP_3	18.5'-20': Grades to very stiff to medium dense, wet, mottled gray brown, orange brown, sandy CLAY to clayey fine SAND (SC), with medium to coarse grains.	
20	24			CL-ML		20'-21.5': Very stiff, wet, mottled gray, gray orange brown sandy silty CLAY to clayey sandy SILT.	GA
	18			SM	BP_4	22'-24': Medium dense, wet, yellowish brown, silty fine SAND (SM) with CLAY.	
	24			SP		24'-24.5': Medium dense, wet, dark brownish gray, SAND (SP), silt to clay, fine to medium grained, at 24.2' a 1/2" thick clay trace layer.	
25							

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GEOTECHNICAL | CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, SUITE 115 | ESCONDIDO, CA 92026 | 760.746.4955

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD, SOLID STEM	DRILLING DATE:	10/2/2006
LOGGED BY:	D. RIES	SAMPLE METHOD:	BULK AND CONTINUES SPT	ELEVATION:	17.5

BORING: B-3

Depth (Feet)	Sample Type: Bulk	Sample Type: Driven	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25			38			SP-SM		25'-26.5': Dense, wet, dark brown gray and black poorly graded, SAND with silt (SP-SM), fine to medium grained with occasional coarse sand grains, light and dark laminations.	GA
			16					26.5'-27.8': Becomes medium dense.	
			9			SM		27.8'-28': Medium dense, wet, brown silty SAND (SM).	
						SP-SM		28'-29': Medium dense, wet, dark brown, gray, black, poorly graded SAND with silt (SP-SM).	
30						SP		29'-29.5': Loose, wet, brown silty SAND (SM).	
			46					30.5': Dense, wet, grading from last sample to yellow gray clean medium grained SAND (SP).	
			40					32': Dense, wet, yellow, gray, SAND (SP).	
35								Total Depth 33.5' Groundwater at 17' Backfill with Bentonite	
40									
45									
50									

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GEOTECHNICAL | CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, SUITE 115 | ESCONDIDO, CA 92026 | 760.746.4955

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	14.5

BORING: B-14

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1' TOPSOIL: @ 1' Loose, moist, yellow gray, clayey SAND with roots.	
			2			CL		1.5'-3': Very soft, moist, yellow gray fine sandy CLAY.	
			5				Qsw	3'-3.75': Becomes soft.	
5			5					3.75'-6': Medium stiff, moist, gray brown sandy CLAY.	
			11			CL	Qsw BP_1	6'-7.25': Stiff, moist, dark gray silty CLAY with sand.	
			11					7.25'-7.5': Stiff, slightly moist, orange brown sandy CLAY. 7.5'-8': Becomes mottled orange to gray brown. 8'-9': Becomes mottled orange to gray brown..	
10			17			SC-CL	BP_2	9'-10.5': Very stiff, slightly moist, mottled red gray brown, clayey SAND to sandy CLAYwith gravel size pieces of charoal.	
								End of Boring at 10.5' Groundwater Not Observed	
15									
20									
25									

March 20, 2017

2310 C LLC CWE 2160398.04

1900 Western Avenue

Las Vegas, Nevada 89102

Attention: Mr. David Lesnick

Subject: Report of Geotechnical Infiltration Feasibility Study
On-Site Storm Water Infiltration, Dessy Residence,
8470 El Paseo Grande, La Jolla, California

Reference: Christian Wheeler Engineering, Report CWE2160398.03, dated February 2, 2017

Ladies and Gentlemen:

In accordance with your request and our proposal dated February 21, 2017, we have prepared this report to present the results of our storm water infiltration evaluation at the subject site. In general, the purpose of our investigation was to provide design infiltration rates based on percolation rates measured in the field. We understand that a biofiltration BMP is planned as part of the storm water management for the subject project and that it is necessary to provide information as required by the City of San Diego. Based on our discussions with the project civil engineer, we understand that a storm water infiltration or bio-filtration basin is planned within the west side of the lot as part of the storm water management plan for the subject project. The basin is expected to extend approximately 3 feet below the grade of the lower level of the proposed residence on site.

FINDINGS

SITE DESCRIPTION

The subject site is a developed, nearly rectangular-shaped lot that is located at 8470 El Paseo Grande in the La Jolla Shores area of the city of San Diego, California. The property is identified as Assessor's Parcel Number 346-050-01 and is bound by El Paseo Grande to the east, La Jolla Shores beach to the west, and by developed residential properties to the north and south. The lot supports an existing single-family residence and associated appurtenances. Approximately the western one-fourth of the property is vacant and extends into the La Jolla Shores beach. An existing seawall runs along the west side of the site, and a concrete sidewalk is located atop and behind the seawall. Topographically, the majority of the developed portion of the site is relatively level with on-site elevations of about 20 feet to 26 feet. To the west of the relatively level areas of the developed portion of the site that support the existing residence and rear yard patio, the site slopes gently downward to a small site retaining wall along the east side of the concrete sidewalk. Elevations in this gentle rear yard slope area range from approximately 16 feet to 19 feet. From south to north, elevations along the existing concrete sidewalk behind the seawall range from about 13 feet to 15 feet, respectively.

FIELD INVESTIGATION

The subsurface exploration associated with this study consisted of two 6-inch diameter hand auger borings. The excavations were conducted within 50 feet of the proposed infiltration BMP in order to preform percolation testing. The approximate locations of our percolation test borings and previous borings are shown on Plate No. 1 of this report. Logs of our previous explorations are presented in Appendix A of this report. The borings were logged in detail with emphasis on describing the soil profile. Low permeability and relatively impermeable materials were identified in the borings. No evidence of soil contamination was detected within the samples obtained. The approximate locations of the percolation borings are also shown on Plate No. 1.

GEOLOGIC SETTING AND SOIL DESCRIPTION

Based on the results of our subsurface explorations and review of pertinent, readily available geologic literature, we have determined that the proposed BMP area is underlain by artificial fill and Quaternary-age old paralic deposits. As encountered in our borings B-2, B-3, B-4, and B-5 and our hand auger HA-1, the fill was noted to consist of brown to light brown, clayey sand (SC) and clayey sand/sandy clay (SC/CL) that was generally very moist and loose/medium stiff, in consistency. Within boring B-1, which was drilled approximately 13 feet behind (east of) the existing seawall that abuts the coastal beach, the fill was noted to consist of 5½ feet of brown, clayey sand/sandy clay (SC/CL) that was generally very moist and loose/medium stiff, in consistency. Below this, fill consisting of 5 feet light grey, poorly-graded sand (SP) that was moist and loose to medium dense in consistency was encountered (extending to a depth of 10½ feet). The old paralic deposits consisted of tan to light brown, moist, medium stiff sandy clay (CL), and clayey sand/sandy clay (SC/CL).

GROUNDWATER

Free groundwater was encountered in our boring B-1, drilled within the northwest portion of the developed area of the subject lot, at an approximate depth of 16 feet below existing site grades (elevation ± 1

foot). Free groundwater was not encountered in our other subsurface explorations which were drilled to a maximum depth of 20 feet below existing site grades. As such, free groundwater below the developed portions of the site is anticipated at elevations of about 1 foot to 3 feet, from west to east across the site. As encountered within our hand auger HA-1, heavy seepage (perched water) was encountered at an approximate depth of 10 feet below existing site grades (approximate elevation of 12 feet). Given the clayey nature of much of the old paralic deposits underlying the site as well as the very moist nature of most of the fill encountered on-site, additional zones of perched water may be anticipated. The encountered water is not known to have any beneficial usage. It is our opinion that the seasonal high groundwater level at the site is approximately 15 feet below grade and will fluctuate with tidal changes due to the site's close proximity to the ocean.

INFILTRATION RATE DETERMINATION

FIELD MEASUREMENT

Percolation testing was performed in two, five-foot-deep hand auger borings that were drilled within 50 feet of the planned infiltration area. Perforated pipe was set in the percolation test holes and surrounded by ¾-inch gravel to prevent caving. After pipe installation, the test holes were presoaked overnight. The approximate locations of the percolation borings (PT-1 and PT-2) are shown on Plate No. 1. Field percolation rates were determined the following day (March 7, 2017) by using the falling head test method. It can be noted that the water placed within the percolation borings on the previous day still remained after the overnight presoak. The initial water level was established by refilling the test holes to near the top of the proposed BMP. Percolation rates were monitored and recorded every 30 minutes over a period of 6 hours until the infiltration rates stabilized. Measurements were taken using a water level meter (Solinst, Model 101) with an accuracy measured to 0.005 foot increments (0.06 inch increments). The measured field percolation rates are presented in Table I. To account for the use of gravel around the perimeter of the perforated pipe, an adjustment factor was used in the calculation of the infiltration rate in Table 1.

TABLE I: FIELD PERCOLATION AND INFILTRATION RATES

Test No.	Location	Depth of Testing	Field Percolation Rate	Field Infiltration Rate
PT-1	West of Residence	5 feet	0.96 inches per hour	0.06 inches per hour
PT-2	West of Residence	5 feet	2.4 inches per hour	0.14 inches per hour

Infiltration and percolation are two related but different processes describing the movement of moisture through soil. Infiltration is the downward entry of water into the soil or rock surface and percolation is the flow of water through soil and porous or fractured rock. The direct measurement yielded by a percolation test tends to overestimate the infiltration rate, except perhaps in cases where a BMP is similarly dimensioned to the borehole. As such, adjustments of the measured percolation rates were converted into infiltration rates using the Porchet Method. The spreadsheet used for the conversion is included in Appendix A of this report.

The average infiltration rate for the soils below the proposed infiltration BMP was approximately 0.1 inches per hour.

FACTOR OF SAFETY

The City of San Diego Storm Water Standards BMP Design Manual states that "a maximum factor of safety of 2.0 is recommended for infiltration feasibility screening such that an artificially high factor of safety (FOS) cannot be used to inappropriately rule out infiltration, unless justified. If the site passes the feasibility analysis at a FOS of 2.0, then infiltration must be investigated, but a higher FOS may be selected at the discretion of the design engineer." Using a FOS of 2.0, an infiltration rate of 0.05 inches per hour can be used in the feasibility analysis for the soils below the proposed biofiltration BMP.

GEOTECHNICAL CRITERIA FOR INFILTRATION BMPs

GENERAL

Based on the current Storm Water Standards, BMP Design Manual, certain geotechnical criteria need to be addressed when assessing the feasibility and desirability of the use of infiltration BMPs for a project site. Those criteria, Per Section C.2 of the manual, are addressed below.

C2.1 SOIL AND GEOLOGIC CONDITIONS

Site soil and geologic conditions influence the rate at which water can physically enter the soils. Based on the conditions observed in our exploratory borings, the existing soils in the BMP area consist of clayey sand/sandy clay (SC/CL), and sandy clay (CL). Free groundwater was encountered within our exploratory boring B-1 at depth of approximately 16 feet below existing site grades, corresponding to an approximate elevation of 1 foot. Due to the site's close proximity to the ocean, variations in the local groundwater table may be expected.

C2.2 SETTLEMENT AND VOLUME CHANGE

Settlement and volume change can occur when water is introduced below grade. Based upon the soil conditions observed in our borings, the site is underlain old paralic deposits that are capped by artificial fill.

These materials are considered to have a moderate potential for heave whereas the artificial fill is subject to a higher potential for hydro-collapse upon wetting while the potential for hydro-collapse within the underlying old paralic deposits is considered to be relatively low. The prevailing soils below the subject site have been tested for expansive potential (EI= 47, 64 and 89) and are anticipated to have a medium expansive potential (EI between 51 and 90). This can be mitigated by select grading and incorporating impermeable liners or cut-off walls.

C2.3 SLOPE STABILITY

Infiltration of water has the potential to increase the risk of failure to nearby slopes. No slopes exist or are proposed in the area of the proposed infiltration facility; therefore, the risk of slope movement and slope failure due to infiltration of storm water is considered negligible.

C2.4 UTILITY CONSIDERATIONS

Utilities are either public or private infrastructure components that include underground pipelines, vaults, and wires/conduit, and above ground wiring and associated structures. Infiltration of water can pose a risk to subsurface utilities, or geotechnical hazards can occur within the utility trenches when water is introduced. Care should be taken when planning proposed utility trench and BMP siting. Mitigation will be provided to reduce the potential for water flow into offsite utility trenches.

C2.5 GROUNDWATER MOUNDING

Groundwater mounding occurs when infiltrated water creates a rise in the groundwater table beneath the facility. Groundwater mounding can affect nearby subterranean structures and utilities. Based on the anticipated depth to groundwater, the potential for groundwater mounding is moderate.

C2.6 RETAINING WALL AND FOUNDATIONS

Infiltration of water can result in potential increases in lateral pressures and potential reduction in soil strength. Retaining walls and foundations can be negatively impacted by these changes in soil conditions. This should be taken into account when designing the biofiltration BMP, retaining walls and foundations for the site. The proposed biofiltration BMP is to be located near the existing seawall along the westerly property line. Recommendations are provided herein to mitigate for this hazard.

CONCLUSIONS AND RECOMMENDATIONS

Based on a review of our field study and our experience with similar projects, we anticipate that, as long as the recommendations contained herein are followed, infiltration of storm water utilizing the proposed onsite biofiltration BMP will not result in soil piping, daylight water seepage, or slope instability for the property or properties down-gradient of the site.

For the soils tested, after applying a factor of safety of 2.0, a design infiltration rate of 0.05 inches per hour can be used for the soils in the area of the proposed biofiltration BMP. Based on the presence of slightly permeable soils, it is our opinion that it is feasible to partially infiltrate storm water at the site. However, it is our understanding that considerations are being made to revise the City of San Diego's BMP Design Manual to classify sites with infiltration rates less than 0.1 inches/hour as "No" infiltration. If this is not the case we have provided infiltration recommendations as described below.

For the proposed biofiltration BMP, we recommend that infiltration occurs within the Quaternary-age old paralic deposits. Where the BMP is located within 10 feet of a structure, retaining wall or settlement sensitive improvement we recommended that a cut-off wall or impermeable liner be constructed around the perimeter of the BMP. The cut-off wall or impermeable liner should extend a minimum of 5 feet below proposed grade, at least 2 feet below the lowest adjacent existing or proposed footing, and at least 2 feet below the bottom of the BMP, whichever is greater.

The site is underlain by expansive soils. As encountered in the subsurface explorations, the soils are anticipated to have a medium expansion potential (EI between 51 and 90). Select grading should be considered for areas to receive exterior settlement sensitive improvements. Select grading should consist of the placement of low expansion imported soils (EI between 21 and 50) extending to a minimum depth of 3 feet below proposed finish pad grade.

It should be recognized that routine inspection and maintenance of the BMP basins are necessary to prevent clogging and failure. A maintenance plan should be specified for each BMP by the designer and followed by the owner during the entire lifetime of the BMP device.

"Worksheet C.4-1: Categorization of Infiltration Feasibility Criteria" has been completed and signed for the subject project, and is included in Appendix B of this report.

It should be noted that it is not our intent to review the civil engineering plans, notes, details, or calculations, when prepared, to verify that the engineer has complied with any particular storm water design standards. It is the responsibility of the designer to properly prepare the storm water plan based on the municipal requirements considering the planned site development and infiltration rates.

Detrimentally expansive soils removed from the area of the proposed BMP basin should not be used as structural fill or backfill at the site.

LIMITATIONS

The recommendations and opinions expressed in this report reflect our best estimate of the project requirements based on our limited percolation testing, an evaluation of the subsurface soil conditions encountered at our subsurface exploration locations and the assumption that the infiltration rates and soil conditions do not deviate appreciably from those encountered. It should be recognized that the performance of the BMPs may be influenced by undisclosed or unforeseen variations in the soil conditions that may occur in the intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of the soils engineer so that he may make modifications if necessary. In addition, this office should be advised of any changes in the project scope, proposed site grading or storm water BMP design so that it may be determined if the recommendations contained herein are appropriate. This should be verified in writing or modified by a written addendum.

If you should have any questions regarding this report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

PROFESSIONAL GEOLOGIST
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APPROXIMATE LOCATION OF CONTACT BETWEEN GEOLOGIC HAZARD CATEGORIES
GEOLOGIC HAZARD CATEGORY 48 COASTAL BEACH
GEOLOGIC HAZARD CATEGORY 52 OTHER TERRAIN
CITY PARK
PACIFIC OCEAN
BEACH
SEAWALL
CONCRETE SIDEWALK
LOT 1 COMPTON TERRACE MAP 2705
ONE STORY WOOD & BRICK BUILDING
POR. 1281 PUEBLO LANDS M M 36
ONE STORY STUCCO RESIDENCE 8470 EL PASEO GRANDE
ONE STORY WOOD BUILDING
LOT 2 MAP NO 2615
EL PASEO GRANDE
ASPHALT
FOUND LEAD & DISC "LS 4830" PER CR 11733
FOUND 2" IRON PIPE "LS 2201" PER MAP 2705
FOUND 2" IRON PIPE, NO DISC. SEE CR 11733 & PER MAP 2705
FOUND ¾" IRON PIPE "LS 2201" PER MAP 2705
N 81°56'30" W 50.98'
N 70°48'40" W 146.07'
N 70°44'57" W 193.82'
N 19°20'10" E 51.84'
N 21°19'32" E 61.94'
Qb
Qaf
Qop
B-1
B-2
B-3
B-4
B-5
HA-1
PT-1
PT-2
CTE B-14 (2007)
CTE B-3 (2007)
A
A'
B
B'
CWE LEGEND
B-5 APPROXIMATE BORING LOCATION
HA-1 APPROXIMATE HAND AUGER LOCATION
B-14 APPROXIMATE CTE BORING LOCATION (2007)
PT-2 APPROXIMATE PERCOLATION TEST LOCATION
Qaf/Qop ARTIFICIAL FILL OVER OLD PARALIC DEPOSITS
Qb BEACH DEPOSITS
GEOLOGIC CONTACT
SCALE: 1" = 10'
TOPOGRAPHICAL SURVEY
For the exclusive use of:
D. MARIN DEVELOPMENT
1900 WESTERN AVENUE
LAS VEGAS, NV 89102
San Diego Land Surveying & Engineering, Inc.
9665 Chesapeake Drive, Suite 445, San Diego, California 92123-1354
Phone: (858) 565-8362 Fax: (858) 565-4354
Date: 06/29/2016
Revised:
Revised:
Scale: 1"=10'
Drawn by: W.P.T.
Sheet 1 of 1 Sheet
Drawing: El Paseo Grande 8470-TS
A.P.N. 346-050-01
PROFESSIONAL LAND SURVEYOR ROBERT J. BATEMAN No. 7046 CALIFORNIA
ROBERT J. BATEMAN, P.L.S. 7046
SITE PLAN AND GEOTECHNICAL MAP
DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA
DATE: MARCH 2017
JOB NO.: 2160398.04
BY: MWL
PLATE NO.: 1
CHRISTIAN WHEELER ENGINEERING

Appendix A

Boring Logs

LOG OF HAND AUGER HA-1

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	N/A
Existing Elevation:	22.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Artificial Fill (Qaf):** Brown, very moist, loose, very fine- to medium-grained, CLAYEY SAND with trace brick debris.							
			SM	**Old Paralic Deposits (Qop):** Tan, moist, loose, very fine- to medium-grained, SILTY SAND.							
			CL	Tan to grayish-brown, moist, medium stiff, SANDY CLAY with white precipitate deposits.							
5				Tan.							
			SC/ CL	Brown to dark brown, moist, medium dense/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.							
10	❟❟			Heavy seepage at 10 feet.							
				Boring terminated at 12.5 feet. Heavy seepage at 10 feet.							
15											
20											
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-1

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-1

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

Date Logged:	12/1/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	17.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	16.0 feet

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0				Lawn and Associated Topsoil.							
			SC/ CL	**Artificial Fill (Qaf):** Brown, very moist, loose/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY with rootlets. Expansion Index of 47 (Low).	9	Cal					SA EI MD SO4 DS
5			SP	Light gray, moist, loose, fine- to medium-grained, POORLY GRADED SAND.							
				Medium dense.	20	Cal*					
10			CL	**Old Paralic Deposits (Qop):** Dark reddish-brown and grayish-brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.	21	Cal					SA
				Medium dense/very stiff.	32	Cal		19.1	107.8		Con
15	▼			Saturated.	41	Cal		14.9	116.1		
				Boring terminated at 18.5 feet. Groundwater at 16 feet.							
20											
25											
30											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-2

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-2

Date Logged:	12/1/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	17.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0				Lawn and Associated Topsoil.							
			SC/ CL	**Artificial Fill (Qaf)**: Brown, very moist, loose/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY with brick and concrete debris.							
			CL	**Old Paralic Deposits (Qop)**: Tan to light brown, moist to very moist, medium stiff, SANDY CLAY with rootlets.							
5					8	Cal		25.7	94.9		Con
			SC/ CL	Brown to dark brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY.	18	Cal		20.0	105.6		
10				Grayish-brown to orangish-brown, mottled.	31	Cal		19.3	108.0		
				Dark reddish-brown and grayish-brown.							
15					34	Cal		18.7	107.7		
				Boring terminated at 16.5 feet. No groundwater or seepage encountered.							
20											
25											
30											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-3

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-3

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	21.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Artificial Fill (Qaf):** Dark brown, very moist, very loose, very fine- to medium-grained, CLAYEY SAND.							
			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist to very moist, stiff, SANDY CLAY.							
5					16	Cal		24.0	98.5		
			SC/CL	Brown to dark brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.							
10				Very stiff /medium dense, trace gravels.	31	Cal		16.4	111.9		
15			SC	Light gray to orangish-brown, moist, medium dense, very fine- to medium-grained, CLAYEY SAND, mottled.	29	Cal		17.6	108.6		
			SC/CL	Dark reddish-brown to dark brown, moist, dense/hard, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.	41	Cal		17.1	110.9		
				Boring terminated at 18 feet. No groundwater or seepage encountered.							
20											
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-4

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-4

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	23.5 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SC	**Artificial Fill (Qaf):** Brown, very moist, loose, very fine- to medium-grained, CLAYEY SAND with abundant roots to 1.5 feet.							
				Light brown.	10	Cal					
5			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist, medium stiff, SANDY CLAY. Expansion Index of 64 (Medium).	12	Cal		23.1	100.6		HA EI PI SO4 DS
10					11	Cal		27.1	95.4		Con
			CL	Brown to dark brown, moist to very moist, medium dense/very stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.	28	Cal		20.3	106.1		HA EI Con,DS
15				Dark reddish-brown to grayish-brown, very stiff.							
20					38	Cal		17.7	107.4		
				Boring terminated at 20 feet. No groundwater or seepage encountered.							
25											
30											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-5

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-5

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	25.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SC	**Artificial Fill (Qaf):** Brown to light brown, very moist, loose, CLAYEY SAND.							
					12	Cal					
5			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist to very moist, medium stiff, very fine- to medium-grained, SANDY CLAY.							
					10	Cal		23.8	98.5		
10			CL	Brown to dark brown, moist, stiff, SANDY CLAY, mottled.							
					17	Cal		22.4	102.8		Con
15											
					27	Cal		20.1	108.5		
				Dark reddish-brown to grayish-brown, very stiff.							
20					40	Cal		15.9	115.4		
				Boring terminated at 20 feet. No groundwater or seepage encountered.							
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

DESSY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	FEBRUARY 2017	JOB NO.:	2160398.03
BY:	SRD	FIGURE NO.:	A-6

CHRISTIAN WHEELER
ENGINEERING

Appendix B

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
An infiltration rate assessment has been performed for the soils beneath the area of the proposed on-site storm water infiltration as presented in the Report of Geotechnical Infiltration Feasibility Study (CWE 2160398.04). The measured percolation rates were converted to infiltration rates using the Porchet Method. The City of San Diego Storm Water Standards BMP Design Manual states that "a maximum factor of safety (FOS) of 2.0 is recommended for infiltration feasibility screening such that an artificially high factor of safety cannot be used to inappropriately rule out infiltration, unless justified." Using a FOS of 2.0, the average infiltration rate for the soils below the proposed storm water BMP was 0.05 inches per hour.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	
An infiltration rate assessment has been performed for the subject site. Based on the underlying soil conditions and our recommendations presented in our report, we anticipate that infiltration greater than 0.5 inches per hour can be allowed without increasing risk of geologic hazards that cannot be mitigated to an acceptable level. C.2.1 A site specific geotechnical investigation was performed. C.2.2 The underlying old paralic deposits are expected to have a low potential for hydro collapse and consolidation. The old paralic deposits and artificial fill have a moderate potential for heave. The overlying artificial fill has a moderate to high potential for hydro collapse and consolidation. This can be mitigated by select grading and incorporating impermeable liners or cut-off walls. C.2.3 No slopes exist or are proposed in the area of the proposed infiltration facility; therefore, the risk of slope movement and slope failure due to infiltration of storm water is considered negligible. C.2.4 A vertical liner will be used to prevent lateral migration into nearby utility trenches. C.2.5 Based on the anticipated depth to groundwater, the potential for groundwater mounding is moderate. C.2.6 Where the storm water BMP is located within 10 feet of a structure, retaining wall or settlement sensitive improvement we recommended that a cut-off wall or impermeable liner be constructed around the perimeter of the BMP. The cut-off wall or impermeable liner should extend a minimum of 5 feet below proposed grade, at least 2 feet below the lowest adjacent footing and at least 2 feet below the bottom of the BMP, whichever is greater. The basins should also have an impermeable surface on the sides to prevent lateral water flow.			

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 2 of</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>3</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
Based on our review of items presented in Appendix C.3, we anticipate that infiltration greater than 0.5 inches per hour can be allowed without increasing risk of groundwater contamination that cannot be mitigated to an acceptable level.
C.3.1 The subgrade soil appears to be suitable for onsite infiltration. We have no knowledge of groundwater or soil contamination onsite or down-gradient from the site.
C.3.2 The seasonal high groundwater table is estimated to be approximately 15 feet below existing grade at the proposed BMP. The encountered seepage water is not known to have any beneficial usages.
C.3.3 No existing wellheads are known within the vicinity of the subject site.
C.3.4 The site was not previously used for industrial use.
C.3.5 We recommend that infiltration activities be coordinated with the applicable groundwater management agency.
C.3.6 There does not appear to be a high risk of causing potential water balance issues.</td></tr>
<tr><td>4</td><td>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
There does not appear to be a high risk of causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters by allowing infiltration greater than 0.5 inches per hour.</td></tr>
<tr><td>Part 1 Result*</td><td colspan="2">If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration

If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</td><td>Partial</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in
the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 3 of 4</th></tr>
<tr><td colspan="4">Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria
Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?</td></tr>
<tr><td>Criteria</td><td>Screening Question</td><td>Yes</td><td>No</td></tr>
<tr><td>5</td><td>Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.</td><td>X</td><td></td></tr>
<tr><td colspan="4">An infiltration rate assessment has been performed for the soils beneath the area of the proposed on-site storm water infiltration as presented in the Report of Geotechnical Infiltration Feasibility Study (CWE 2160398.04). The measured percolation rates were converted to infiltration rates using the Porchet Method. The City of San Diego Storm Water Standards BMP Design Manual states that “a maximum factor of safety (FOS) of 2.0 is recommended for infiltration feasibility screening such that an artificially high factor of safety cannot be used to inappropriately rule out infiltration, unless justified.” Using a FOS of 2.0, the average infiltration rate for the soils below the proposed BMP was 0.05 inches per hour.</td></tr>
<tr><td>6</td><td>Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.</td><td>X</td><td></td></tr>
<tr><td colspan="4">An infiltration rate assessment has been performed for the subject site. Based on the underlying soil conditions and our recommendations presented in our report, we anticipate that infiltration greater than 0.5 inches per hour can be allowed without increasing risk of geologic hazards that cannot be mitigated to an acceptable level.
C.2.1 A site specific geotechnical investigation was performed.
C.2.2 The underlying old paralic deposits are expected to have a low potential for hydro collapse and consolidation. The old paralic deposits and artificial fill have a moderate potential for heave. The overlying artificial fill has a moderate to high potential for hydro collapse and consolidation. This can be mitigated by select grading and incorporating impermeable liners or cut-off walls.
C.2.3 No slopes exist or are proposed in the area of the proposed infiltration facility; therefore, the risk of slope movement and slope failure due to infiltration of storm water is considered negligible.
C.2.4 A vertical liner will be used to prevent lateral migration into nearby utility trenches.
C.2.5 Based on the anticipated depth to groundwater, the potential for groundwater mounding is moderate.
C.2.6 Where the storm water BMP is located within 10 feet of a structure, retaining wall or settlement sensitive improvement we recommended that a cut-off wall or impermeable liner be constructed around the perimeter of the BMP. The cut-off wall or impermeable liner should extend a minimum of 5 feet below proposed grade, at least 2 feet below the lowest adjacent footing and at least 2 feet below the bottom of the BMP, whichever is greater. The basins should also have an impermeable surface on the sides to prevent lateral water flow.</td></tr>
</table>

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 4 of</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>7</td><td>Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:
Based on our review of items presented in Appendix C.3, we anticipate that infiltration can be allowed without increasing risk of groundwater contamination that cannot be mitigated to an acceptable level.
C.3.1 The subgrade soil appears to be suitable for onsite infiltration. We have no knowledge of groundwater or soil contamination onsite or down-gradient from the site.
C.3.2 The seasonal high groundwater table is estimated to be approximately 15 feet below existing grade at the proposed BMP. The encountered water is not known to have any beneficial usages.
C.3.3 No existing wellheads are known within the vicinity of the subject site.
C.3.4 The site was not previously used for industrial use.
C.3.5 We recommend that infiltration activities be coordinated with the applicable groundwater management agency.
C.3.6 There does not appear to be a high risk of causing potential water balance issues.
C.3.7 We do not know of any water rights downstream of the project.</td></tr>
<tr><td>8</td><td>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">We did not perform a study regarding water rights. However, these rights are not typical in the San Diego area.</td></tr>
<tr><td>Part 2 Result*</td><td colspan="2">If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.
If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</td><td>Partial Infiltration</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in
the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings

Daniel J. Flowers PG 9399

Appendix C

Porchet Method- Percolation to Infiltration Conversion Spreadsheet

Percolation to Infiltration Rate Conversion (Porchet Method)

On-Site Storm Water Infiltration - 8470 El Paseo Grande, La Jolla, CA

CWE 2160398.04

Perc Test #	Gravel Adjustment Factor	Effective Radius (inches) r	Depth of Hole Below Existing Grade (inches)	Time Interval (min.) Δt	Height of pipe above surface (feet)	Initial Water Depth without correction (feet)	Final Water Depth without correction (feet)	Initial Water Height with correction (inches) H_o	Final Water Height with correction (inches) H_f	Change in head (inches) ΔH	Average Head Height (inches) H_{avg}	Tested Infiltration Rate (inch/hour) I_t
1	0.51	3	60	30	0.00	4.04	4.08	11.52	11.04	0.48	11.28	0.06
2	0.51	3	60	30	0.00	3.99	4.09	12.12	10.92	1.20	11.52	0.14

"Initial and final water depth without correction" are measurements taken from top of pipe if pipe is sticking out of ground (most cases)

"Initial and final water height with correction" factors in the height of pipe above surface, and provides measurement of water above bottom of pipe

If measurements are taken from grade "Height of pipe above surface" = 0

Gravel Adjustment Factor:

4-inch Diameter Pipe: 1.00 - No Gravel Used (No Caving)
0.51 - 3/4 inch gravel with 8 inch diameter hole
0.56 - 3/4 inch gravel with 7 inch diameter hole
0.64 - 3/4 inch gravel with 6 inch diameter hole

3-inch Diameter Pipe: 1.00 - No Gravel Used (No Caving)
0.44 - 3/4 inch gravel with 8 inch diameter hole
0.47 - 3/4 inch gravel with 7 inch diameter hole
0.51 - 3/4 inch gravel with 6 inch diameter hole

Porchet Method - Tested Percolation Rate Conversion to Tested Infiltration Rate

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t\ (r + 2H_{avg})}$$

I_t = tested infiltration rate, inches per hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

CHRISTIAN WHEELER
ENGINEERING

July 6, 2017

Black Halibut LLC
4640 Admiralty Way, Suite 1200
Marina del Rey, California 90292
Attention: Thad Hutton

CWE 2170370.02
City Project Nbr.: 516011

Subject: **Response to LDR-Geology Cycle 8 Review**
Proposed Single-Family Residence, 8470 El Paseo Grande, La Jolla, California

Ladies and Gentlemen:

In accordance with your request and our proposal dated June 29, 2017, we have prepared this addendum report to respond to or provide comment regarding the geotechnical "issues" presented in the referenced LDR-Geology Cycle 8 review memorandum. The following presents each of the specific issues noted in the LDR-Geology review memorandum, followed by our response to, or comments regarding each issue.

City Issue #23 – Provide a geologic cross section orthogonal to the mapped fault trend that correlates the lithostratigraphic and chronostratigraphic units encountered across the project site with the lithostratigraphic and chronostratigraphic units encountered at 8466 El Paseo Grande in order to demonstrate the subsurface stratigraphy is laterally continuous and displays structural and stratigraphic continuity across both properties and therefore demonstrates the absence of faulting at the subject site.

CWE Response – Plate 2 of this report presents a geologic cross section aligned orthogonal to the mapped trend of the Scripps Fault that correlates the lithostratigraphic and chronostratigraphic units encountered across the project site with the lithostratigraphic and chronostratigraphic units encountered at 8466 El Paseo Grande. The location of this cross section is presented on our revised

3980 Home Avenue ✦ San Diego, CA 92105 ✦ 619-550-1700 ✦ FAX 619-550-1701

Site Plan and Geotechnical Map included as Plate No. 1 of this report. The cross section presents a 97-foot-long extension of CTE's (2007) cross section E-E', which now extends across the adjacent lot to the south (8466 El Paseo Grande) and the subject lot. For consistency, we have labelled our cross section E-E'.

It is worth noting that although CTE previously referred to the old paralic deposits underlying the subject area as slopewash and part of the Bay Point Formation, which was a common practice until 2005/2008 when the USGS published an updated geologic map of the area, strong lateral correlation of the individual units encountered within the old paralic deposits at both the subject site and adjacent site (where the old paralic deposits were previously referred to as slopewash and Bay Point Formational materials) is demonstrated on cross section E-E' (see Plate No. 2 of this report). Specifically, the following correlations between encountered units presented on Cross Section E-E' are clearly expressed through review of the subsurface explorations performed by both our firm and CTE (2007):

CWE Geologic Unit (2017)	**CTE Geologic Unit (2007)**
Qop2 - Light brown to tan, Sandy Clay (CL)	Qsw - See CTE Explanation (2007)
Qop3 - Brown to dark brown, clayey sand/ sandy clay (SC/CL)	Qsw/Bp1 - See CTE Explanation (2007)
Qop4 - Dark reddish-brown to greyish-brown clayey sand to sandy clay (SC/CL)	Bp2 - See CTE Explanation (2007)

Plate Nos. 3 through 7 of this report present revised logs of our subsurface explorations presented on geologic cross section E-E'. The correlations between the individual units of the old paralic deposits noted in our explorations with the labels used by CTE are included on the revised exploration logs.

A copy of CTE's explanation of geologic units encountered on the adjacent lot to the south of the subject site (at 8466 El Paseo Grande) is presented on the following page.

Explanation

Fill: Consists of loose to medium stiff, reworked Quaternary Slope Wash as described below, with loose, silty sand, abundant organics, roots, topsoil form turf and planter areas, minor debris.

Quaternary Slope Wash (Qsw): consists of loose to stiff, moist to wet, yellowish -gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

Unit 1 (Qsw/Bp1): consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

Quaternary Bay Point Formation

Unit 2 (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films Soil horizonation Btb to Btvb. Diffuse upper and lower contacts.

Unit 3 (Bp3): Bp3 consists appears to be a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit 4 (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant black mica. Unit is interpreted as a paleo-beach sand.

City Issue #24 – Submit digital copies (on CD/DVD/or USB data storage device) of the geotechnical reports listed as "References" and the requested addendum geotechnical document for our records.

CWE Response – The owner/applicant or their authorized representative should submit digital copies (on CD/DVD/or USB data storage device) of the geotechnical reports listed as "References" in the referenced LDR-Geology Review memorandum and this report to the City for their records.

If you have any questions after reviewing this report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

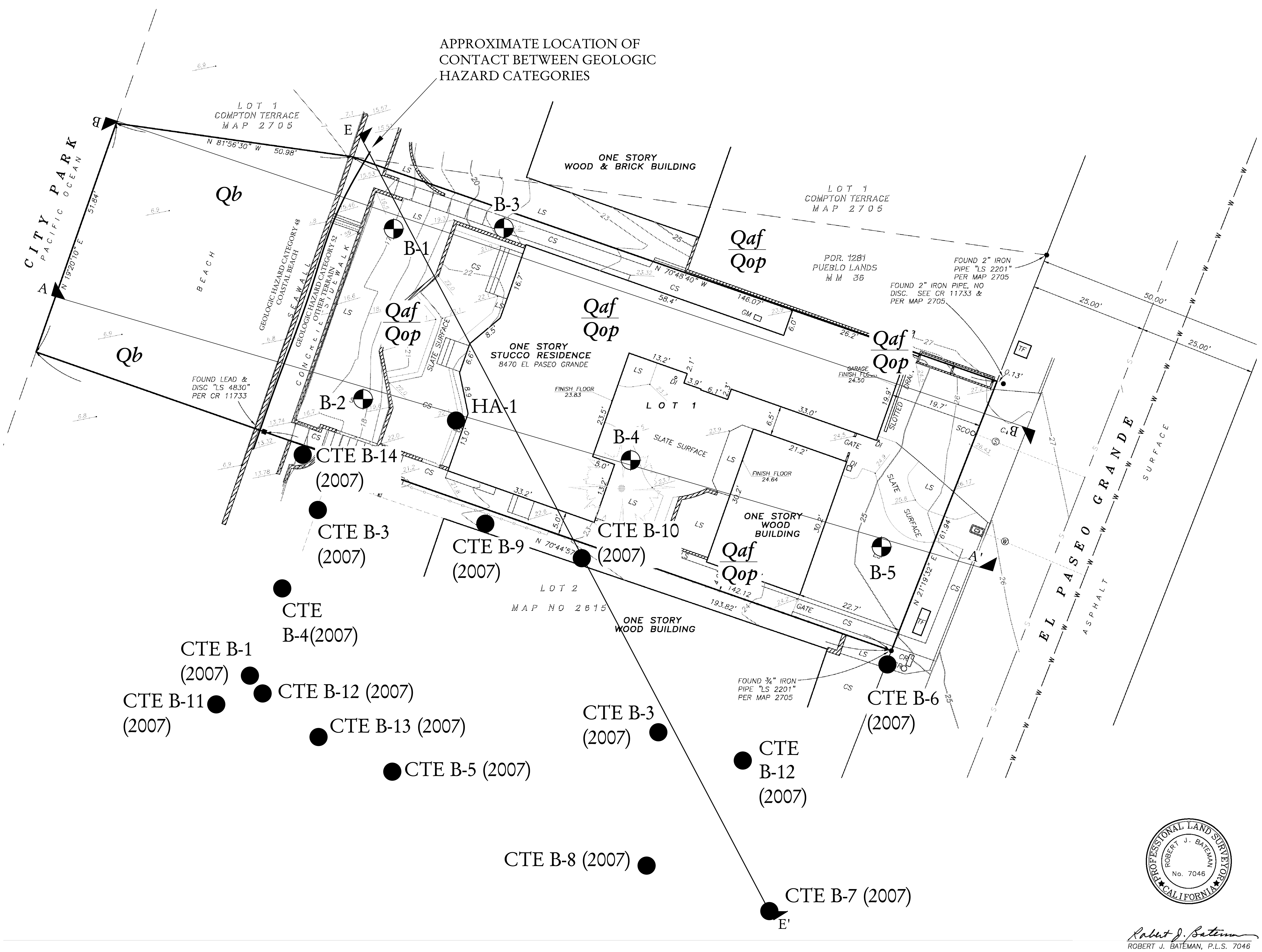
Respectfully submitted,

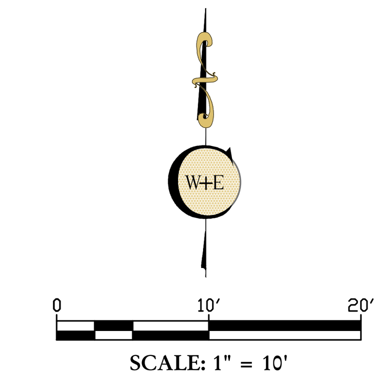
CHRISTIAN WHEELER ENGINEERING

Daniel B. Adler, RCE #36037

David R. Russell, CEG #2215

ec: cslaven@blueheron.com; thad@thadhutton.com





CWE LEGEND

B-5	APPROXIMATE BORING LOCATION
HA-1	APPROXIMATE HAND AUGER LOCATION
B-14	APPROXIMATE CTE BORING LOCATION (2007)
Qaf / Qop	ARTIFICIAL FILL OVER OLD PARALIC DEPOSITS
Qb	BEACH DEPOSITS
	GEOLOGIC CROSS SECTION (NO C-C' OR D-D')

PROFESSIONAL LAND SURVEYOR
ROBERT J. BATEMAN
No. 7046
CALIFORNIA

Robert J. Bateman
ROBERT J. BATEMAN, P.L.S. 7046

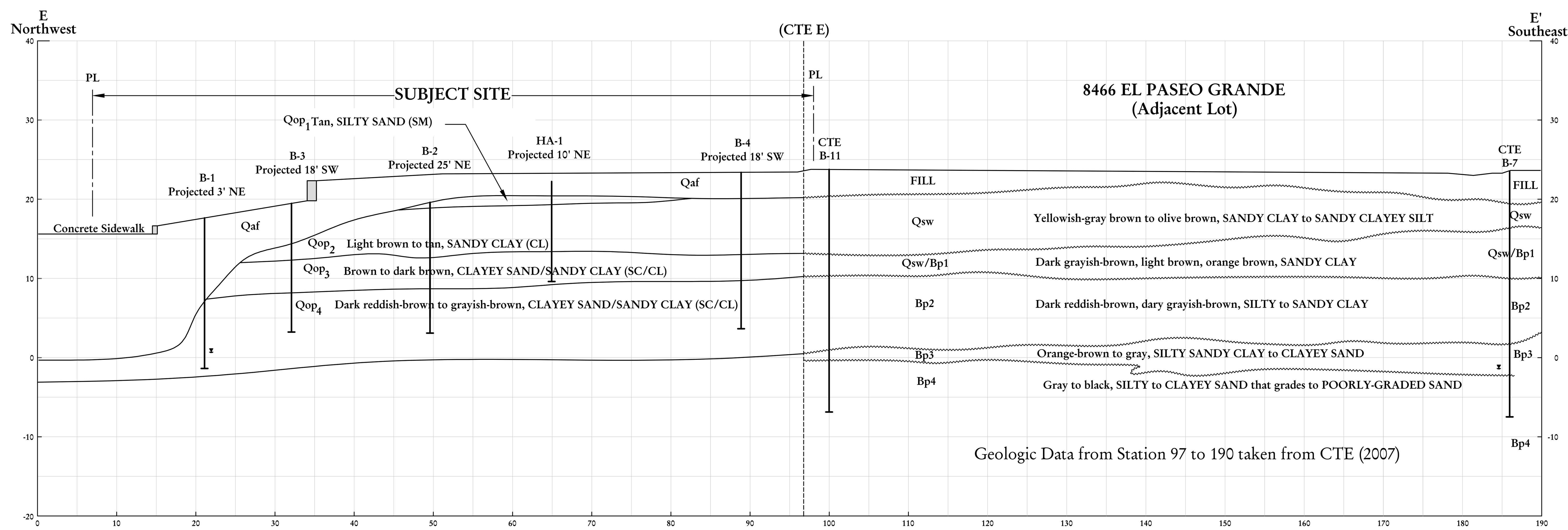
TOPOGRAPHICAL SURVEY

For the exclusive use of:
D. MARIN DEVELOPMENT
1900 WESTERN AVENUE
LAS VEGAS, NV 89102

San Diego Land Surveying & Engineering, Inc.
9665 Chesapeake Drive, Suite 445, San Diego, California 92123-1354 03-30-2016
Phone: (858) 565-8362 Fax: (858) 565-4354

Date: 06/29/2016	Revised:	Revised:
Scale: 1"=10'	Drawn by: W.P.T.	Sheet 1 of 1 Sheet
Drawing: El Paseo Grande 8470-TS	A.P.N. 346-050-01	

SITE PLAN AND GEOTECHNICAL MAP	PROPOSED SINGLE-FAMILY RESIDENCE 8470 EL PASEO GRANDE LA JOLLA, CALIFORNIA	CHRISTIAN WHEELER ENGINEERING
	DATE: JULY 2017 / JOB NO.: 2170370.02	
	BY: SRD / PLATE NO.: 1	



CROSS SECTION E - E'

PROPOSED SINGLE-FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	JULY 2017	JOB NO.:	2170370.02
BY:	SRD	PLATE NO.:	2

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-1

Date Logged:	12/1/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	17.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	16.0 feet

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0				Lawn and Associated Topsoil.							
			SC/CL	**Artificial Fill (Qaf):** Brown, very moist, loose/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY with rootlets. Expansion Index of 47 (Low).	9	Cal					SA EI MD SO4 DS
5			SP	Light gray, moist, loose, fine- to medium-grained, POORLY GRADED SAND.							
				Medium dense.	20	Cal*					
10			CL	**Old Paralic Deposits (Qop):** Dark reddish-brown and grayish-brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.	21	Cal					SA
				Medium dense/very stiff. **Correlates with CTE Bp2**	32	Cal		19.1	107.8		Con
15	▼			Saturated.							
					41	Cal		14.9	116.1		
20				Boring terminated at 18.5 feet. Groundwater at 16 feet.							
25											
30											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

PROPOSED SINGLE-FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	JULY 2017	JOB NO.:	2170370.02
BY:	SRD	PLATE NO.:	3

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-2

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

Date Logged:	12/1/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	17.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0				Lawn and Associated Topsoil.							
			SC/CL	**Artificial Fill (Qaf):** Brown, very moist, loose/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY with brick and concrete debris.							
			CL	**Old Paralic Deposits (Qop):** Tan to light brown, moist to very moist, medium stiff, SANDY CLAY with rootlets.							
5				**Correlates with CTE Qsw**	8	Cal		25.7	94.9		Con
			SC/CL	Brown to dark brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY. **Correlates with CTE Qsw/Bp1**	18	Cal		20.0	105.6		
10				Grayish-brown to orangish-brown, mottled.							
					31	Cal		19.3	108.0		
				Dark reddish-brown and grayish-brown. **Correlates with CTE Bp2**							
15					34	Cal		18.7	107.7		
				Boring terminated at 16.5 feet. No groundwater or seepage encountered.							
20											
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

PROPOSED SINGLE-FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	JULY 2017	JOB NO.:	2170370.02
BY:	SRD	PLATE NO.:	4

CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-3

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	21.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Artificial Fill (Qaf):** Dark brown, very moist, very loose, very fine- to medium-grained, CLAYEY SAND.							
5			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist to very moist, stiff, SANDY CLAY. **Correlates with CTE Qsw**	16	Cal		24.0	98.5		
			SC/ CL	Brown to dark brown, moist, medium dense/stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled. **Correlates with CTE Qsw Bp1**							
10				Very stiff /medium dense, trace gravels.	31	Cal		16.4	111.9		
15			SC	Light gray to orangish-brown, moist, medium dense, very fine- to medium-grained, CLAYEY SAND, mottled. **Correlates with CTE Bp2**	29	Cal		17.6	108.6		
			SC/ CL	Dark reddish-brown to dark brown, moist, dense/hard, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.	41	Cal		17.1	110.9		
				Boring terminated at 18 feet. No groundwater or seepage encountered.							

Notes:

Symbol Legend

- ∇ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

PROPOSED SINGLE-FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	JULY 2017	JOB NO.:	2170370.02
BY:	SRD	PLATE NO.:	5

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-4

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	6 inch Auger
Existing Elevation:	23.5 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SC	**Artificial Fill (Qaf):** Brown, very moist, loose, very fine- to medium-grained, CLAYEY SAND with abundant roots to 1.5 feet.							
				Light brown.	10	Cal					
5			CL	**Old Paralic Deposits (Qop):** Light brown to tan, moist, medium stiff, SANDY CLAY. Expansion Index of 64 (Medium).							HA EI PI SO4
					12	Cal		23.1	100.6		DS
				Correlates with CTE Qsw							
10					11	Cal		27.1	95.4		Con
			CL	Brown to dark brown, moist to very moist, medium dense/very stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled.							HA EI
				Correlates with CTE Qsw/Bp1	28	Cal		20.3	106.1		Con,DS
15											
				Dark reddish-brown to grayish-brown, very stiff.							
				Correlates with CTE Bp2							
					38	Cal		17.7	107.4		
20				Boring terminated at 20 feet. No groundwater or seepage encountered.							
25											
30											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

PROPOSED SINGLE-FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	JULY 2017	JOB NO.:	2170370.02
BY:	SRD	PLATE NO.:	6

CHRISTIAN WHEELER
ENGINEERING

LOG OF HAND AUGER HA-1

Date Logged:	12/2/16	Equipment:	Tripod
Logged By:	DJF	Bucket Type:	N/A
Existing Elevation:	22.0 feet	Drive Type:	140 lbs @ 30" drop
Proposed Elevation:	12.6 feet	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Artificial Fill (Qaf):** Brown, very moist, loose, very fine- to medium-grained, CLAYEY SAND with trace brick debris.							
			SM	**Old Paralic Deposits (Qop):** Tan, moist, loose, very fine- to medium-grained, SILTY SAND.							
5			CL	Tan to grayish-brown, moist, medium stiff, SANDY CLAY with white precipitate deposits. **Correlates with CTE Qsw**							
10			SC/CL	Brown to dark brown, moist, medium dense/medium stiff, very fine- to medium-grained, CLAYEY SAND/SANDY CLAY, mottled. Heavy seepage at 10 feet. **Correlates with CTE Qsw/Bp1**							
				Boring terminated at 12.5 feet. Heavy seepage at 10 feet.							
15											
20											
25											
30											

Notes:

Symbol Legend

- Groundwater Level During Drilling
- Groundwater Level After Drilling
- Apparent Seepage
- * No Sample Recovery
- ** Non-Representative Blow Count (rocks present)

PROPOSED SINGLE-FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	JULY 2017	JOB NO.:	2170370.02
BY:	SRD	PLATE NO.:	7

CHRISTIAN WHEELER ENGINEERING

APPENDIX A

REFERENCES

Christian Wheeler Engineering, 2017, Report of Preliminary Geotechnical Investigation, Dessy Residence, 8470 El Paseo Grande, La Jolla, California, CWE Report No. 2160398.03, dated February 2, 2017.

Christian Wheeler Engineering, 2017, Report of Geotechnical Infiltration Feasibility Study On-Site Storm Water Infiltration, Dessy Residence, 8470 El Paseo Grande, La Jolla, California, CWE Report No. 2160398.04, dated March 20, 2017.

Christian Wheeler Engineering, 2017, Response to LDR-Geology Cycle 7 Review, Proposed Single-Family Residence, 8470 El Paseo Grande, La Jolla, California, CWE Report No. 2170370.01, dated May 23, 2017.

Christian Wheeler Engineering, 2010, Report of Preliminary Geotechnical Investigation, Proposed Whitworth Residence, 8462 El Paseo Grande, La Jolla, California, CWE Report 2100443.01.

City of San Diego LDR-Geology, Cycle 7 Review Memorandum, Project Nbr. 516011, prepared by Patrick Thomas, Certified Engineering Geologist, dated April 28, 2017.

Construction Testing & Engineering, Inc., 2007, Faulting and Bluff Geologic Evaluation, Proposed Lusardi Residence, 8466 El Paseo Grande, La Jolla, California, CTE Job No. 10-8264G, dated February 12, 2007.

Earthworks Engineering, Inc., 2000, Geotechnical Investigation, Proposed Single Family Residence, 8450 El Paseo Grande, La Jolla, California, File No. EE20150, dated December 18, 2000.

CHRISTIAN WHEELER
ENGINEERING

November 29, 2017

Black Halibut LLC
4640 Admiralty Way, Suite 1200
Marina del Rey, California 90292
Attention: Thad Hutton

CWE 2170370.03
City Project Nbr.: 516011

Subject: **Clarification of Groundwater Concerns**
Proposed Single-Family Residence, 8470 El Paseo Grande, La Jolla, California

Ladies and Gentlemen:

In accordance with your request, we have prepared this addendum report to address whether or not the proposed construction will impact groundwater flow or quality and if the proposed basement will be designed to be water tight or if a basement wall drainage system is proposed.

As presented on page 7 of our referenced geotechnical report (CWE 24160398.03), based on the findings of our site specific geotechnical investigation, "free groundwater below the developed portions of the site is anticipated at elevations of about 1 foot to 3 feet, from west to east across the site." Such elevations are 8 to 10 feet below the elevation of the proposed home's partially subterranean, lower level. As such, free groundwater will not be encountered during site construction and grading and will not affect the proposed site development. Furthermore, the need for pumping of free ground water is not anticipated either during or after site construction. Given the fact that free groundwater will not be encountered during construction, the fact that the groundwater elevation at the site is 8 to 10 feet below the elevation of the proposed home's partially subterranean, lower level, that pumping of free groundwater or any localized zones of perched water (CWE 2170370.01) is not anticipated to be required either during or after the completion of the proposed construction, the proposed construction should not impact groundwater flow or quality

Based on our discussion with the project architect, we understand that, regardless of the use of below grade waterproofing, the proposed basement will be designed without incorporating hydrostatic pressures and assuming drained backfill conditions for the subterranean retaining walls. Such basement walls will include a basement wall drainage system.

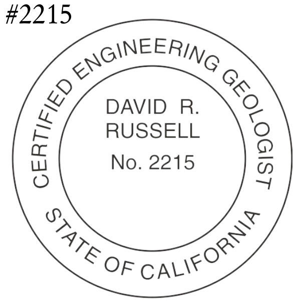
If you have any questions after reviewing this report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

Daniel B. Adler, RCE #36037

David R. Russell, CEG #2215

ec: cslaven@blueheron.com; thad@thadhutton.com



APPENDIX A

REFERENCES

Christian Wheeler Engineering, 2017, Response to LDR-Geology Cycle 7 Review, Proposed Single-Family Residence, 8470 El Paseo Grande, La Jolla, California, CWE Report No. 2170370.01, dated May 23, 2017.

Christian Wheeler Engineering, 2017, Report of Preliminary Geotechnical Investigation, Dessy Residence, 8470 El Paseo Grande, La Jolla, California, CWE Report No. 2160398.03, dated February 2, 2017.

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Christian Wheeler Engineering, 2010, Report of Preliminary Geotechnical Investigation, Proposed Whitworth Residence, 8462 El Paseo Grande, La Jolla, California, CWE Report 2100443.01.

City of San Diego LDR-Geology, Cycle 7 Review Memorandum, Project Nbr. 516011, prepared by Patrick Thomas, Certified Engineering Geologist, dated April 28, 2017.

Construction Testing & Engineering, Inc., 2007, Faulting and Bluff Geologic Evaluation, Proposed Lusardi Residence, 8466 El Paseo Grande, La Jolla, California, CTE Job No. 10-8264G, dated February 12, 2007.

Earthworks Engineering, Inc., 2000, Geotechnical Investigation, Proposed Single Family Residence, 8450 El Paseo Grande, La Jolla, California, File No. EE20150, dated December 18, 2000.

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ENGINEERING

REPORT OF GEOLOGIC RECONNAISSANCE
PROPSOED SINGLE-FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA CALIFORNIA

SUBMITTED TO

2310 C, LLC
1900 WESTERN AVENUE
LAS VEGAS, NEVADA 89102

SUBMITTED BY

CHRISTIAN WHEELER ENGINEERING
3980 HOME AVENUE
SAN DIEGO, CALIFORNIA 92105

CHRISTIAN WHEELER
ENGINEERING

August 11, 2106

2310 C, LLC CWE 2160398.01
1900 Western Avenue
Las Vegas, Nevada 89102
Attention: Mr. David Lesnick

Subject: Report of Geologic Reconnaissance
Proposed Single Family Residence, 8470 El Paseo Grande, La Jolla, California

Ladies and Gentlemen:

In accordance with your request and our Proposal dated July 27, 2016, we have performed a geologic reconnaissance of the subject site. In general, the purpose of our limited study was to evaluate the geologic and geotechnical conditions at the subject site, and to provide our professional opinion regarding the possible effect of these conditions on the existing and proposed site improvements.

SCOPE OF SERVICE

Our limited evaluation consisted of surface reconnaissance, research of readily available records and historic reports within our in-house files and on-file with the City's engineering and records department, analysis of regional, historic and current aerial photographs and topographic maps as well as geologic and geotechnical literature, and the preparation of this report. Our scope of service for this limited study did not include subsurface exploration, laboratory testing, or assessment of hazardous substance contamination.

DOCUMENTS REVIEWED

A review of available maps, photographs and literature was performed as part of this limited study. The documents reviewed included, but were not necessarily limited to the following:

- Aerial Photographs, San Diego County Department of Maps and Records for years 1928, 1953, 1972, 1973, 1978, 1983, 1986,, 1987, 1990, 1993, 1994, 1995, 2002, 2004, 2006, 2008, and 2013.

- Kennedy, M.P. and Tan, S.S., 2008, Geologic Map of the San Diego 30' X 60' Quadrangle, California; California Department of Conservation and California Geological Survey.
- Tan, S.S., and Giffen, D.G., 1995, Landslide Hazards in the Southern Part of the San Diego Metropolitan Area, San Diego County, California, California Division of Mines and Geology, Open-File Report 95-03, scale 1:24,000.
- San Diego Seismic Safety Study, Sheet No. 29, 2008 edition.
- 200-Scale Ortho & Topographic Map, City of San Diego, Sheet 254-1689: 1953, 1963, and 1977 editions.

FINDINGS

SITE DESCRIPTION

The subject site is a developed, nearly rectangular-shaped lot that is located at the address 8470 El Paseo Grande in the La Jolla Shores area of the city of San Diego, California. The property is identified as Assessor's Parcel Number 346-050-01 and is bound by El Paseo Grande to the east, La Jolla Shores beach to the west, and by developed residential properties to the north and south. The lot supports an existing single-family residence and associated appurtenances. We understand that it is proposed to raze the existing improvements on-site and to construct a new one-to two story, single-family residence at the site. Topographically, the site is relatively level with on-site elevations of about 20 feet to 26 feet. The following Figure Number 1 presents a site vicinity map showing the location of the property.

SITE HISTORY

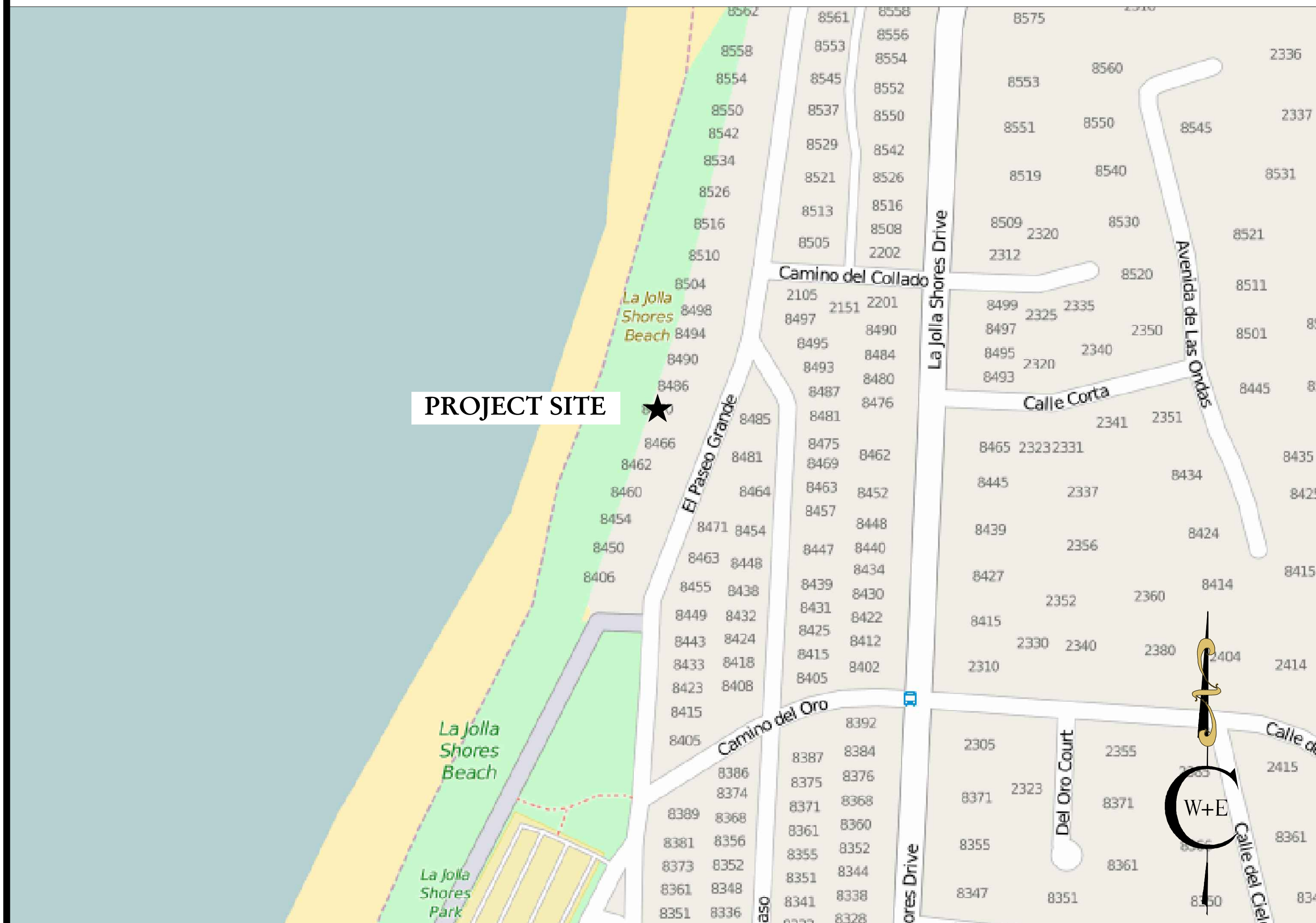
A review of the photographs for available years (1928, 1953, 1972, 1973, 1978, 1983, 1986, 1987, 1990, 1993, 1994, 1995, 2002, 2004, 2006, 2008, and 2013) revealed that the existing structure on-site was constructed over 63 years ago. Previous grading and earthwork at the subject lot appears to have been limited to the construction of the existing seawall along the west side of the property and the backfilling behind the seawall to construct the relatively level building pad area of the site.

GENERAL GEOLOGY AND SUBSURFACE CONDITIONS

GEOLOGIC SETTING: The subject site is located in the Coastal Plains Physiographic Province of San Diego County. Based on our review of the referenced geotechnical literature and our experience within the vicinity of the site, we anticipate that the subject site is underlain by Quaternary-age old paralic (terrace) deposits that are

SITE VICINITY

© OpenStreetMap contributors



SINGLE FAMILY RESIDENCE
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

DATE:	AUGUST 2016	JOB NO.:	2160398
BY:	SRD	FIGURE NO.:	1

CHRISTIAN WHEELER
ENGINEERING

overlain by Quaternary-age alluvial deposits and man-placed fill soils. A portion of the local geologic map (Kennedy and Tan, 2008) is presented on the following Figure No. 2.

ARTIFICIAL FILL (Qaf): Our surficial reconnaissance of the site and review of the referenced topographic maps suggests that portions of the site may be underlain by up to 10 feet of man-placed fill soils associated with the development of the site. Generally, similar fills in the vicinity of the site are noted to consist of a heterogeneous mixture of sands and clays of varying degrees of compaction.

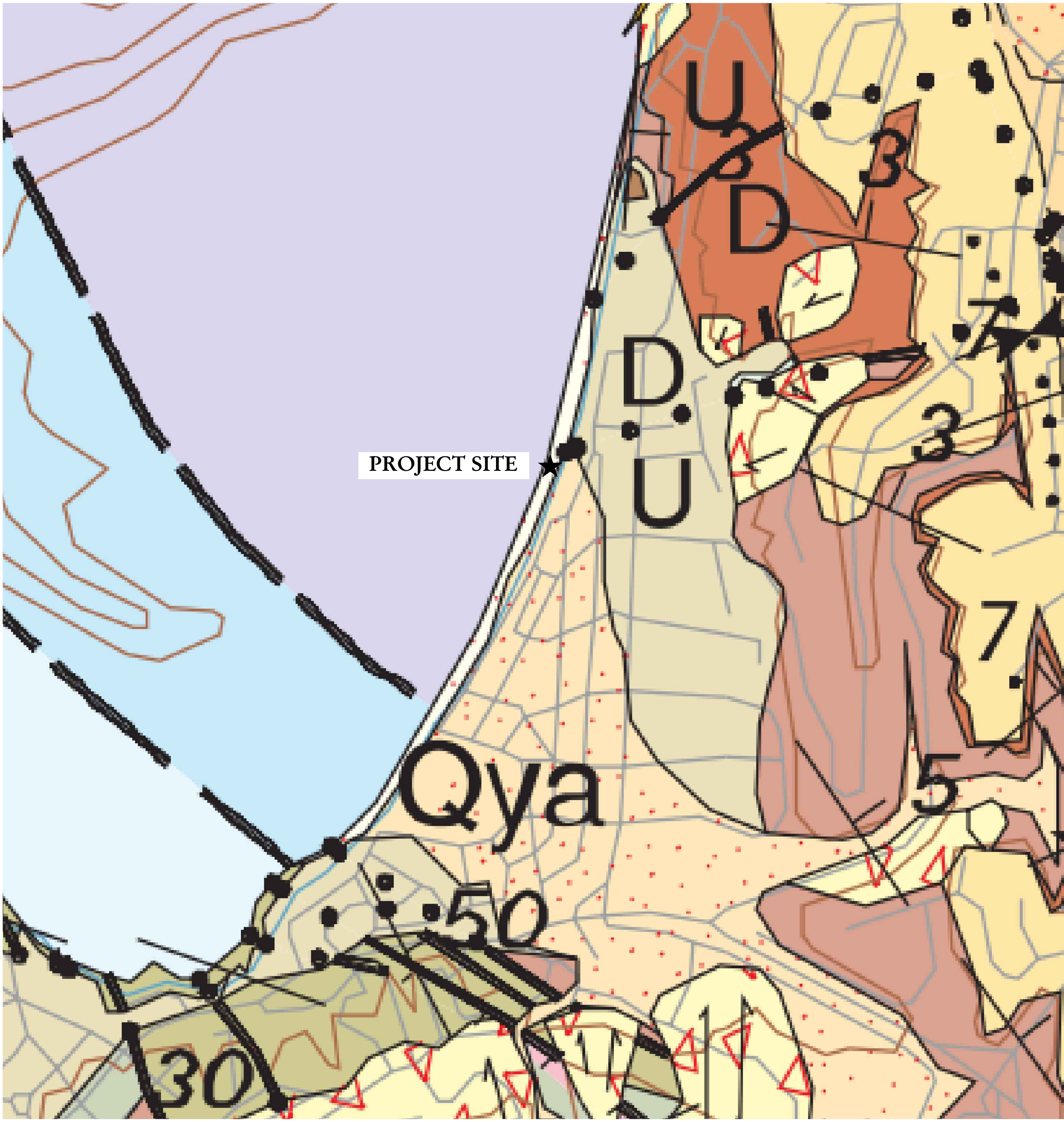
ALLUVIUM (Qal): Quaternary-age alluvial deposits are anticipated to underlie the existing fill across much of the site. Typically, alluvial deposits in the area of the site consist of interbedded layers of sands and clays of generally low relative densities, which are considered to be somewhat compressible and to possess generally low strength characteristics with regards to bearing value.

OLD PARALIC DEPOSITS (Qop): Quaternary-age old paralic (terrace) deposits underlie the existing fills and alluvium at the site. The old paralic deposits (locally referred to as the Bay Point Formation) in the vicinity. The old paralic deposits on-site are considered to possess moderate strength parameters with regards to the support of settlement sensitive structures.

GEOLOGIC STRUCTURE: Based on our review of the referenced geologic maps and our experience in the vicinity of the subject site, the old paralic deposits that underlie the site are expected to be generally massive, with faint bedding that dips gently ($<5°$) to the west-southwest.

GROUNDWATER: No regional, free groundwater is expected within fifteen to twenty feet from existing grades at the site. It should, however, be recognized that minor groundwater seepage problems might occur after construction and landscaping at a site even where none were present before construction. These are usually minor phenomena and are often the result of an alteration in drainage patterns and/or an increase in irrigation water. Based on the anticipated construction and landscaping, it is our opinion that any near surface seepage problems that may occur will be minor in extent. It is further our opinion that these problems can be most effectively corrected on an individual basis if and when they occur.

TECTONIC SETTING: Much of Southern California, including the San Diego County area, is characterized by a series of Quaternary-age fault zones that consist of several individual, en echelon faults that generally strike in a northerly to northwesterly direction. Some of these fault zones (and the individual faults within the zone) are classified as “active” according to the criteria of the California Division of Mines and Geology. Active fault



PORTION OF THE GEOLOGIC MAP OF SAN DIEGO 30'X60' QUADRANGLE, 2008	**SINGLE FAMILY RESIDENCE** 8470 EL PASEO GRANDE LA JOLLA, CALIFORNIA DATE: AUGUST 2016 — JOB NO.: 2160398 BY: SRD — FIGURE NO.: 2	CHRISTIAN WHEELER ENGINEERING

zones are those that have shown conclusive evidence of faulting during the Holocene Epoch (the most recent 11,000 years). The Division of Mines and Geology used the term "potentially active" on Earthquake Fault Zone maps until 1988 to refer to all Quaternary-age (last 1.6 million years) faults for the purpose of evaluation for possible zonation in accordance with the Alquist-Priolo Earthquake Fault Zoning Act and identified all Quaternary-age faults as "potentially active" except for certain faults that were presumed to be inactive based on direct geologic evidence of inactivity during all of Holocene time or longer. Some faults considered to be "potentially active" would be considered to be "active" but lack specific criteria used by the State Geologist, such as *sufficiently active* and *well-defined*. Faults older than Quaternary-age are not specifically defined in Special Publication 42, Fault Rupture Hazard Zones in California, published by the California Division of Mines and Geology. However, it is generally accepted that faults showing no movement during the Quaternary period may be considered to be "inactive". The City of San Diego guidelines indicate that since the beginning of the Pleistocene Epoch marks the boundary between "potentially active" and "inactive" faults, unfaulted Pleistocene-age deposits are accepted as evidence that a fault may be considered to be "inactive".

A review of available geologic maps indicates that the nearest active fault is the Rose Canyon Fault Zone, located approximately ½ mile (¾ km) to the southwest. Other active fault zones in the region that could possibly affect the site include the Newport-Inglewood, Coronado Bank and the Palos Verde Fault Zones to the northwest; the Elsinore, San Jacinto, and San Andreas Fault Zones to the northeast; and the Earthquake Valley Fault to the east.

The Scripps Fault, which is a relatively small, southwest to northeast trending fault, has been mapped by others to at or near the northern perimeter of the site (Kennedy and Tan, 2008). Where exposed in the canyon approximately ½ mile (¾ km) to the northeast of the subject site, the Scripps Fault juxtaposes Tertiary-age sedimentary deposits of the Scripps Formation and Ardath Shale. The Scripps Fault has not been mapped as bisecting the middle to early Pleistocene-aged very old paralic deposits that crop out approximately 0.6 miles (1 km) to the northeast of the subject site. As such, it is our professional opinion and judgment that the Scripps Fault may be considered inactive.

The following Table I presents the active faults that are considered most likely to significantly affect the proposed residence over the anticipated economic lifetime of the structure.

TABLE I: PROXIMAL FAULT ZONES

Fault Zone	Distance	Max. Magnitude Earthquake
Rose Canyon	< 1 km	7.2 Magnitude
Coronado Bank	21 km	7.6 Magnitude
Newport-Inglewood	37 km	7.1 Magnitude
Elsinore	62 km	7.1 Magnitude
Earthquake Valley	72 km	6.5 Magnitude

GEOLOGIC HAZARDS

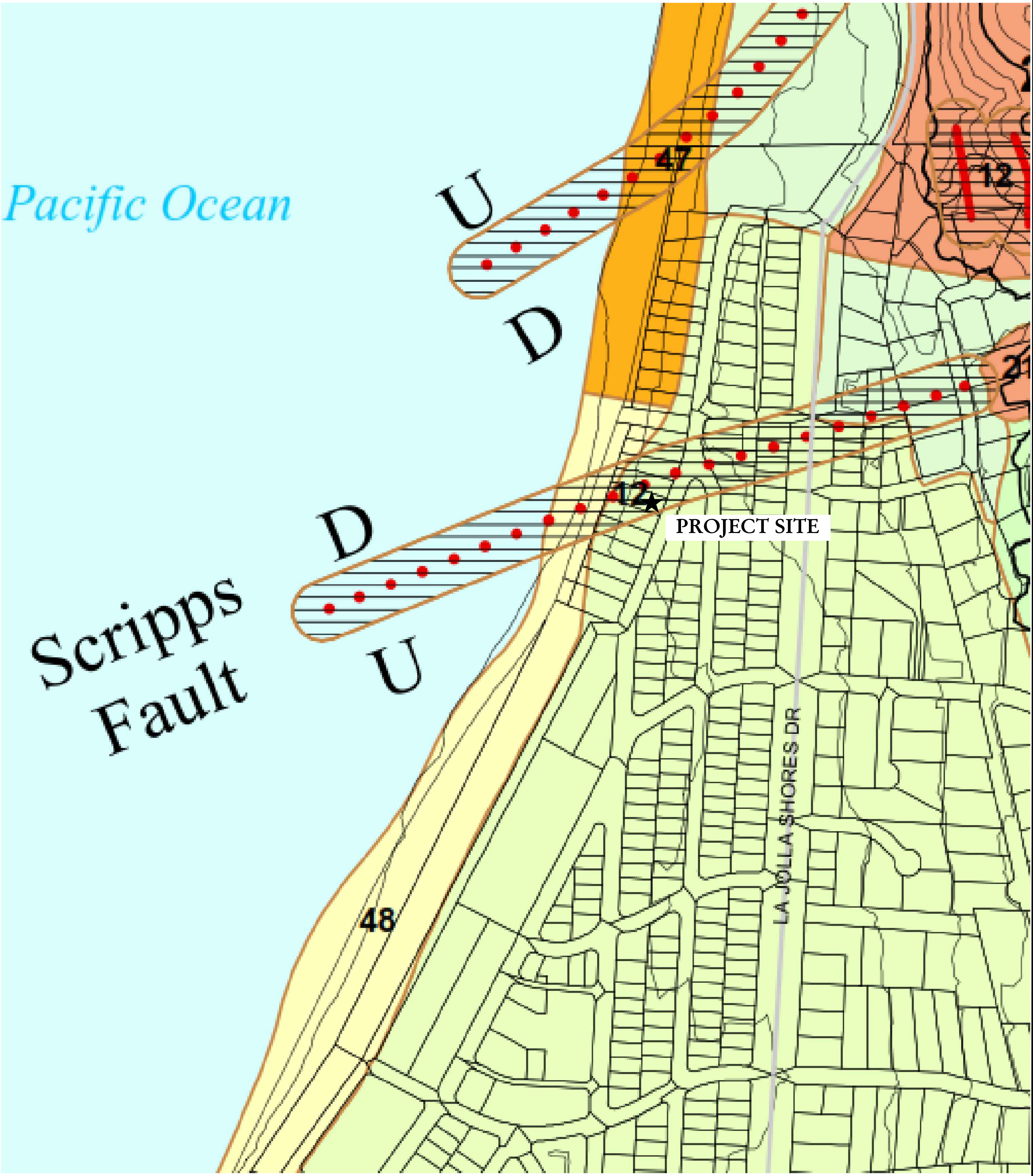
GENERAL: No geologic hazards of sufficient magnitude to preclude the continued residential use or redevelopment of the site are known to exist. In our professional opinion and to the best of our knowledge, the site should be suitable for continued residential use or future redevelopment, provided sound engineering, construction, and site maintenance procedures are followed should the site be redeveloped.

CITY OF SAN DIEGO SEISMIC SAFETY STUDY: As part of our services, we have reviewed the City of San Diego Seismic Safety Study. This study is the result of a comprehensive investigation of the City that rates areas according to geological risk potential (nominal, low, moderate, and high) and identifies potential geotechnical hazards and/or describes geomorphic conditions.

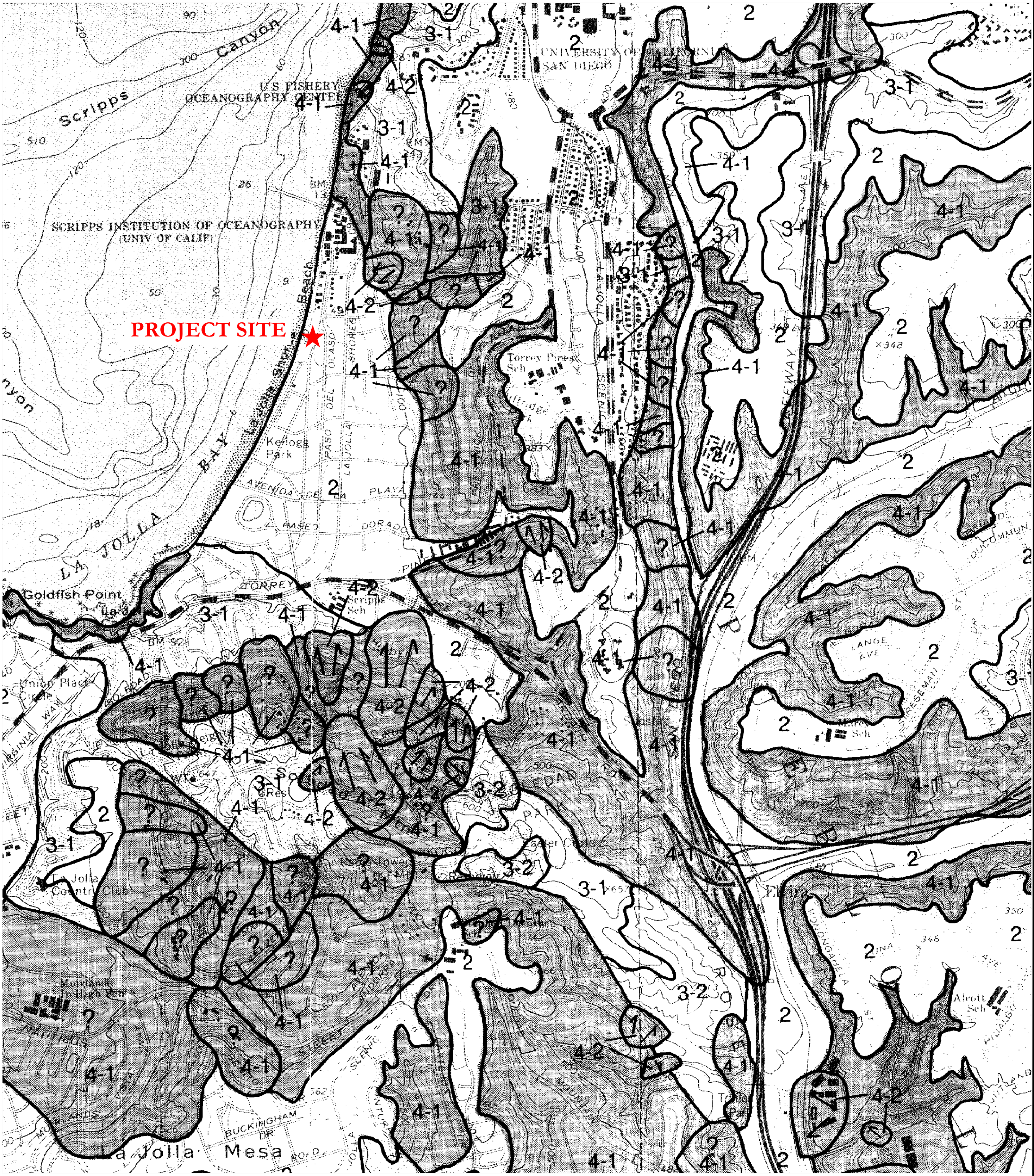
According to the San Diego Seismic Safety Map No. 29, the site is located in Geologic Hazards Category 52, which is assigned to level to sloping areas with generally favorable geologic structure, where the level of geologic risk is generally considered to be "low." The majority of the site is also located within Geologic Hazards Category 12, which is assigned to areas underlain by or in close proximity to faults that considered to be potentially active, inactive, presumed inactive or of unknown activity.

LANDSLIDE POTENTIAL AND SLOPE STABILITY: The site is identified as being in an area that is considered "most susceptible" to slope stability hazards due to such factors as the character of the geologic units, the presence of joints, fractures or other planes of weakness within the formational materials, and the presence of questionable landslides and steep slopes.

The Relative Landslide Susceptibility and Landslide Distribution Map of the La Jolla Quadrangle prepared by the California Division of Mines and Geology indicated that the site is situated within Relative Landslide Susceptibility Area 2. Area 2 is considered to be "marginally susceptible" to slope failures. Based on the generally level area of the subject site and surrounding areas, the risk of slope failures affecting the existing and proposed improvements at the site is considered to be negligible.



SEISMIC SAFETY STUDY **Geology Hazard & Faults**	SINGLE FAMILY RESIDENCE 8470 EL PASEO GRANDE LA JOLLA, CALIFORNIA		CHRISTIAN WHEELER ENGINEERING
	DATE: AUGUST 2016	JOB NO.: 2160398	
	BY: SRD	FIGURE NO.: 3	



RELATIVE LANDSLIDE SUSCEPTIBILITY AND LANDSLIDE DISTRIBUTION MAP *(LA JOLLA QUADRANGLE)*	**SINGLE FAMILY RESIDENCE** 8470 EL PASEO GRANDE LA JOLLA, CALIFORNIA		CHRISTIAN WHEELER ENGINEERING
	DATE: AUGUST 2016	JOB NO.: 2160398	
	BY: SRD	FIGURE NO.: 4	

LIQUEFACTION: Portions of the near surface earth materials underlying the site may be subject to soil liquefaction in the event of a major, proximal seismic event due to the presence of a sallow groundwater table and the anticipated consistency and density of the near surface soils. A quantitative evaluation of the site's liquefaction potential should be conducted during the design phase of the subject project.

EXPANSIVE SOILS: The majority of the near surface soils at the site are anticipated to possess a low to medium expansive potential. However, the presence of detrimentally expansive soils (having an Expansion Index in excess of 50), if present, may be mitigated, should future development occur, by proper foundation reinforcing and design.

FLOODING: As delineated on the referenced Flood Insurance Rate Map (FIRM), panel 06073C1582G prepared by the Federal Emergency Management Agency, the site is not located within either the 100-year flood zone or the 500-year flood zone.

TSUNAMIS: Tsunamis are great sea waves produced by a submarine earthquake or volcanic eruption. Historically, the San Diego area has been free of tsunami-related hazards and tsunamis reaching San Diego have generally been well within the normal tidal range. The site is not mapped within a potential tsunami inundation area on the La Quadrangle of the Tsunami Inundation Map for Emergency Planning (CalEMA, 2009). However, the adjacent portions of La Jolla Shores Beach are mapped within a tsunami inundation area and the sea wall along the west site of the subject site is mapped as the tsunami inundation line.

SEICHES: Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays or reservoirs. Due to the site's location, it is considered to have a negligible risk potential for seiches.

OTHER POTENTIAL GEOLOGIC HAZARDS: Other potential geologic hazards such as, volcanoes or seismic-induced settlement should be considered to be negligible or nonexistent.

CONCLUSIONS

1) Based on our review of the referenced topographic maps and aerial photographs, the entirety of the site appears to have first developed prior to 1953.

2) No geologic hazards of sufficient magnitude to preclude the future residential usage of the site or future redevelopment of the site are known to exist. The site can be considered to be average with respect to potential geologic hazards compared to other, similar sites in the immediate area.

3) The Relative Landslide Susceptibility and Landslide Distribution Map of the La Jolla Quadrangle prepared by the California Division of Mines and Geology indicated that the site is situated within Relative Landslide Susceptibility Area 2. Area 2 is considered to be "marginally susceptible" to slope failures. However, no significant slopes exist on or with the proximity of the site. As such, the risk of slope failures affecting the site is considered to be negligible.

4) No known active faults are mapped as bisecting the site. The Scripps Fault, which is considered to be inactive and which trends from southwest to northeast, has been mapped by others at or near the northern perimeter of the site.

5) Any and all future site development should be constructed in accordance with the minimum requirements of the most recent edition of the California Building Code and/or the recommendations of a qualified geotechnical engineer. Any future structures should be constructed in accordance with the requirements of the City of San Diego.

If you have any questions after reviewing this report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,

CHRISTIAN WHEELER ENGINEERING

David R. Russell, CEG #2215
ec: davidlessnick@mac.com

REFERENCES

Anderson, J.G., Rockwell, R.K. and Agnew, D.C., 1989, Past and Possible Future Earthquakes of Significance to the San Diego Region, Earthquake Spectra, Volume 5, No. 2, 1989

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Federal Emergency Management Agency, Flood Map 06073C1582G, FIS date May 16, 2012.

Hart, E. W. and Bryant, W. A., 1997, Fault-Rupture Hazard Zones in California; California Division of Mines and Geology Special Publication 42.

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Tan, S.S., 1995, Landslide Hazards in the Southern Part of the San Diego Metropolitan Area, San Diego County, California, California Division of Mines and Geology Open-File Report 95-03.

Wesnousky, S.G., 1986, "Earthquakes, Quaternary Faults, and Seismic Hazards in California"; in Journal of Geophysical Research, Vol. 91, No. B12, pp 12,587 to 12, 631, November 1986.

TOPOGRAPHIC MAPS

City of San Diego, 1953, 200-Scale Topographic Map, Sheet 254-1689.

City of San Diego, 1963, 200-Scale Topographic Map, Sheet 254-1689.

City of San Diego, 1977, 200-Scale Ortho-Topographic Map, Sheet 254-1689.

U.S. Geological Survey, 1967, 7 ½-Minute Topographic Maps, La Jolla Quadrangle

U.S. Geological Survey, 1975, 7 ½-Minute Topographic Maps, La Jolla Quadrangle

PHOTOGRAPHS

Aerial Fotobank, 1995-96, Aerial Foto-Map Book, San Diego County, Sheet 1227; Scale 1" = 1000 feet (approximate).

Aerial Graphics, 1982, Aerial Foto-Map Book; Scale 1" = 2000 feet (approximate).

California Coastal Project, Oblique Aerial Photographs, 1972, 1979, 1986, 1987, 1993, 2002, 2004, 2006, 2008, and 2013.

San Diego County, 1928, Flight 52A; Scale: 1 inch = 1000 feet (approximate).

San Diego County, 1973, Flight 31, Photographs 18 through 20; Scale: 1" = 1000 feet (approximate).

San Diego County, 1978, Flight 17B, Photographs 52 and 53; Scale: 1" = 1000 feet (approximate).

San Diego County, 1983, Photographs 553 and 554; Scale: 1" = 2000 feet (approximate).

San Diego County, 1990, Flight WAC (West), Photograph 1-201; Scale: 1" = 1000 feet (approximate).

CHRISTIAN WHEELER
ENGINEERING

May 23, 2017

Black Halibut LLC
4640 Admiralty Way, Suite 1200
Marina del Rey, California 90292
Attention: Thad Hutton

CWE 2170370.01
City Project Nbr.: 516011

Subject: **Response to LDR-Geology Cycle 7 Review**
Proposed Single-Family Residence, 8470 El Paseo Grande, La Jolla, California

Ladies and Gentlemen:

In accordance with your request and our proposal dated May 23, 2017, we have prepared this addendum report to respond to or provide comment regarding the geotechnical "issues" presented in the referenced LDR-Geology Cycle 7 review memorandum. The following presents each of the specific issues noted in the LDR-Geology review memorandum, followed by our response to, or comments regarding each issue.

City Issue #16 – Submit an addendum geotechnical report that provides the information requested herein.

Geotechnical reports must be prepared in accordance with the City's "Guidelines for Geotechnical Reports." http://www.sandiego.gov/development-services/industry/pdf/geoguidelines.pdf

CWE Response – This report, which specifically addresses the referenced development plans, has been prepared as an addendum to our referenced geotechnical reports. As such, unless specifically modified herein, all of the findings, conclusions, and recommendations presented in our referenced geotechnical reports remain applicable to the proposed project.

City Issue #17 – The geotechnical consultant must provide an explicit opinion whether or not an "active" or "potentially active" fault trace passes beneath the proposed development and whether or not structural setbacks are recommended. The opinion must be supported by adequate data. The consultant could consider presenting all information utilized to support opinions regarding the location and existence (or absence) of hazardous faults on or adjacent to the site.

CWE Response – As presented on pages 8 and 9 of our referenced Report of Preliminary Geotechnical investigation (CWE, 2160398.03):

> "The Scripps Fault, which is a relatively small, southwest to northeast trending fault, has been mapped by others at or near the northern perimeter of the site (Kennedy and Tan, 2008). Where exposed in the canyon approximately ½ mile (¾ km) to the northeast of the subject site, the Scripps Fault juxtaposes Tertiary-age sedimentary deposits of the Scripps Formation and Ardath Shale. The Scripps Fault has not been mapped as bisecting the middle to early Pleistocene-aged very old paralic deposits that crop out approximately 0.6 miles (1 km) to the northeast of the subject site. As such, it is our professional opinion and judgment that the Scripps Fault may be considered inactive."

Included as Appendix B of this report is a previous fault hazard study performed by others on the adjacent residential lot located to the south of the subject lot (CTE, 2007). Comparison of the subsurface data presented in that report with the findings of our site specific investigation indicate lateral continuity of the old paralic deposits beneath the subject site and the adjacent lot located at 8466 El Paseo Grande. Based on this condition and the fact that the Scripps Fault is not known to bisect or displace the mid to early Pleistocene-aged very old paralic deposits in the vicinity of the site, it is our professional opinion and judgment that the Scripps Fault is not active or potentially active. As such, no structural setbacks from the Scripps Fault are considered necessary for the proposed site development.

City Issue #18 – Clarify the ground water conditions at the site with respect to "free groundwater" and "perched water" as they relate to San Diego Municipal Code Section 1510.0403.

CWE Response – As presented on page 7 of our referenced geotechnical report (CWE 24160398.03), based on the findings of our site specific geotechnical investigation, "free groundwater below the developed portions of the site is anticipated at elevations of about 1 foot to 3 feet, from west to east across the site." Such elevations are 8 to 10 feet below the elevation of the proposed home's partially subterranean, lower level. As such, free groundwater will not be encountered during site construction and grading and will not affect the proposed site development. Furthermore, the need for pumping of free ground water is not anticipated either during or after site construction.

Heavy seepage (perched ground water) was encountered within one of our pervious subsurface explorations (HA-1) at an approximate depth of 10 feet below existing site grades (approximate elevation of 12 feet). Given the clayey nature of much of the old paralic deposits underlying the site as well as the very moist nature of most of the fill soils encountered on-site, additional zones of perched water may be anticipated. Such localized seepage conditions may result in soils that are excavated during the proposed site development that are too wet to immediately be replaced as compacted fill. Additionally, the project architect or waterproofing consultant should consider the effect of interment and localized seepage conditions in the design of any proposed sub-slab vapor retarder or waterproofing systems. The need for pumping of perched water is not anticipated either during or after site construction.

City Issue #19 – Clarify the need to incorporate hydrostatic pressures into the proposed basement retaining wall design with consideration to San Diego Municipal Code Section 1510.0403.

CWE Response – As presented on page 13 of our referenced geotechnical report (CWE 2160398.03), "it is our opinion that hydrostatic pressures do not have to be considered for foundation and retaining wall design."

City Issue #20 – Submit original quality prints and digital copies (on CD/DVD/or USB data storage device) of the geotechnical reports listed as "References" and the requested addendum geotechnical document for our records.

CWE Response – The owner/applicant or their authorized representative should submit original quality prints and digital copies (on CD/DVD/or USB data storage device) of the geotechnical reports listed as "References" in the referenced LDR-Geology Review memorandum and this report to the City for their records.

If you have any questions after reviewing this report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
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APPENDIX A

REFERENCES

Christian Wheeler Engineering, 2017, Report of Preliminary Geotechnical Investigation, Dessy Residence, 8470 El Paseo Grande, La Jolla, California, CWE Report No. 2160398.03, dated February 2, 2017.

Christian Wheeler Engineering, 2017, Report of Geotechnical Infiltration Feasibility Study On-Site Storm Water Infiltration, Dessy Residence, 8470 El Paseo Grande, La Jolla, California, CWE Report No. 2160398.04, dated March 20, 2017.

Christian Wheeler Engineering, 2010, Report of Preliminary Geotechnical Investigation, Proposed Whitworth Residence, 8462 El Paseo Grande, La Jolla, California, CWE Report 2100443.01.

City of San Diego LDR-Geology, Cycle 7 Review Memorandum, Project Nbr. 516011, prepared by Patrick Thomas, Certified Engineering Geologist, dated April 28, 2017.

Construction Testing & Engineering, Inc., 2007, Faulting and Bluff Geologic Evaluation, Proposed Lusardi Residence, 8466 El Paseo Grande, La Jolla, California, CTE Job No. 10-8264G, dated February 12, 2007.

Earthworks Engineering, Inc., 2000, Geotechnical Investigation, Proposed Single Family Residence, 8450 El Paseo Grande, La Jolla, California, File No. EE20150, dated December 18, 2000.

APPENDIX B

Faulting and Bluff Geologic Evaluation, Proposed Lusardi Residence, 8466 El Paseo Grande, La Jolla, California, prepared by Construction Testing & Engineering, Inc., dated February 12, 2007.

FAULTING AND BLUFF GEOLOGIC EVALUATION
PROPOSED LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

PREPARED FOR:

LUSARDI CONSTRUCTION
ATTENTION: MR MIKE RAMSEY
1570 LINDA VISTA DRIVE
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PREPARED BY:

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CTE JOB NO. 10-8264G

FEBRUARY 12, 2007

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1.0 INTRODUCTION AND SCOPE OF SERVICES

1.1 Introduction

Construction Testing & Engineering, Inc. (CTE) has completed the requested fault and bluff evaluation for the proposed Lusardi residence, located at 8466 El Paseo Grande, in La Jolla, California. Figure 1 is an index map showing the approximate location of the site. It is our understanding that the proposed project calls for the demolition of the existing residence, and the construction of a new two-story residential structure, and associated improvements, including a retaining wall along the western side of the property landward of the existing seawall. It is also our understanding that the existing seawall is to remain as constructed.

A portion of the subject site is situated within the City of San Diego Seismic Safety Study, Hazard Category 12 for fault zones, and Category 48 for Coastal Bluffs. The remaining portion of the site is zoned as other terrain, Category 52. Figure 2 shows the location of the site and associated zone boundaries. The Category 12 zones are for faults considered potentially active, inactive, or activity level unknown, and a zone has been established around the interpreted location of the Scripps Fault that transects the northwestern corner of the site (Figure 2). A surface rupture hazard evaluation was requested by the City of San Diego for the subject site in their cycle review comments dated, July, 19, 2006.

Category 48 is a zone delineating generally stable broad beach areas. Category 52 zones are classified as other level areas, gently sloping to steep terrain with favorable geologic structure, and low risk.

The City of San Diego has published the "Coastal Bluffs and Beaches Guidelines", and the "Steep Hillside Guidelines" documents to assists in the interpretation and implementation of the Environmentally Sensitive Lands Regulations regarding proposed developments. Combined, these documents provide the criteria used to classify and establish appropriate regulations for the low lying cliffs delineating the boundary between the coastal beach and other terrain.

The purpose of our investigation and evaluation was to: 1) establish if faulting associated with Scripps fault transected the subject site, and if so, is there a surface rupture hazard and are associated structural setbacks required for the site; 2) Evaluate if the western margin (landward of the coastal beach) classifies as a sensitive coastal bluff, coastal bluff, or does not meet the criteria of either following the definitions of the Environmentally Sensitive Lands Regulations, the criteria outlined in the Coastal Bluffs and Beaches, and Steep Hillside Guidelines.

Based on the data available for review and the data from our investigation, it is our professional opinion that the site is not underlain by active faults and there is no indication of faulting from potentially active faults to the depths of our investigation. Therefore, we are not recommending any structural setbacks from the interpreted location of the Scripps fault at the northwest corner of the property.

Based on our interpretation of the height and location of the bluffs prior to previous site development, as well as our review and understanding of the Coastal Bluffs and Beaches and Steep Hillside Guidelines, it is our professional opinion that the site does not fall under the jurisdiction of the Sensitive Coastal Bluffs and does not classify as a Coastal Bluff (Steep Hillside).

CTE previously completed a preliminary geotechnical investigation of the site and presented the findings and geotechnical recommendations in our report, dated March 24, 2006. The Preliminary Geotechnical Investigation report included previous field exploration, laboratory testing, geologic hazard evaluation, and engineering analysis. Specific recommendations for site grading and structure design for the proposed improvements were presented in our previous report. Information from our preliminary geotechnical investigation was used to supplement our current fault and bluff evaluation. The additional field exploration and laboratory testing completed for this report can also be used to supplement the findings from our preliminary investigation. However, the specific recommendations for site grading and structure design for the proposed improvements previously presented remain unchanged.

1.2 Scope of Services

The scope of services provided included:

- A review of available geologic and soils reports pertinent to the site and adjacent areas. References reviewed are presented in Appendix A.
- Evaluate potential faulting by establishing structural and stratigraphic continuity across the site, or lack thereof.
- Establish the geomorphology and topographic relief of the site area, prior to the construction of the seawall, to establish the bluff geometries prior to modification resulting from past construction.
- Laboratory testing of representative soil samples to provide data to substantiate field classifications and evaluate the geotechnical design characteristics of the soils.
- Preparation of this summary report of the investigations performed including at least three geologic cross-sections perpendicular to the bluff face.

2.0 SITE DESCRIPTION

2.1 General Conditions

The site is located at 8466 El Paseo Grande, in La Jolla, California. The property consists of an ocean front parcel located north of Kellogg Park on the west side of El Paseo Grande (Figure 1). Based upon available site plans, proposed improvements for the currently developed residential site include razing of the existing structure in order to construct a new two-story, single-family residence and associated improvements. The residential structure is expected to be supported by conventional shallow spread foundations with slabs-on-grade construction. Grading is expected to be limited to the elevation of the proposed structure. However, overexcavation and recompaction will be required.

It is our understanding that proposed design plans have been drawn under the assumption that the site does not classify as a sensitive coastal bluff, or coastal bluff based on previously completed projects of similar scope to the north and south of the subject site.

2.2 Site Topography

The site is situated at approximate elevations ranging from 25-feet above mean sea level near El Paseo Grande, to approximately 14–feet above mean sea level along the sidewalk behind the existing seawall. The property parcel extends across the coastal beach to the mean low water, with beach elevations ranging from approximately eight-feet below mean sea level at the base of the seawall to sea level. The present surface, east of the seawall, is generally flat with a slight westward slope ranging between two to three degrees. The beach profile at the time of this study also has a gentle westward slope of approximately three degrees. A more detailed discussion of the site topography is presented in Section 6.1.

3.0 FIELD AND LABORATORY INVESTIGATIONS

3.1 Field Investigations

Field explorations were conducted on February 9, 2006 as part of the preliminary geotechnical investigation, and included site reconnaissance and the excavation of two subsurface exploratory borings, Borings B-1 and B-2, using a limited access portable drill-rig. The borings were advanced to a maximum depth of just less than twenty feet below grade (fbg), and sampled on approximately five-foot intervals.

Field explorations conducted as part of this study were completed from October 2 through October 12, 2006 and included the advancement of 13 additional borings (B-3 through B-15) that were either continuously sampled or sampled at select intervals to define the subsurface stratigraphy. The borings were advanced to maximum depths ranging between 11 and 41 feet below exiting grade. A geologist visually classified and logged soils in the field using the Unified Soil Classification System.

The field descriptions have been modified, where appropriate, to reflect laboratory test results. Exploration logs, including descriptions of the soil, are included in Appendix B. Approximate exploration locations are shown on Figure 2.

As shown on Figure 2, the borings were located around the perimeter of the existing structures with a distribution that provided the correlation of subsurface stratigraphy along three east-west oriented cross-section lines, A-A', B-B', and C-C' (Figures, 3, 4, and 5 respectively), and two additional cross-sections, D-D', along a north-south orientation, and E-E' along a northwest-southeast orientation (Figures 6 and 7, respectively).

Bulk and ring soil samples were collected from the borings, B-1 and B-2, for geotechnical laboratory analysis. Borings B-3 through B-15 were sampled with a Standard Penetration Sampler (SPT). Select soil samples were collected and placed in sealed plastic bags and transported to the CTE geotechnical laboratory for analysis.

3.2 Laboratory Investigation

Select soil samples were collected as part of this investigation for classification purposes and to provide supplemental data of the physical properties and engineering characteristics that were characterized during the preliminary investigation. The laboratory tests performed on the soil samples collected for this investigation included, Particle-Size Analysis, Atterberg Limits, Hydrometer, and Expansion Index Testing. Test method descriptions and laboratory results are included in Appendix C. Previous Laboratory tests were reported in the Preliminary Geotechnical Investigation dated March 24, 2006

4.0 GEOLOGY

4.1 General Geologic Setting

San Diego is located within the Peninsular Ranges physiographic province that is characterized by its northwest-trending mountain ranges, intervening valleys, and predominantly northwest-trending active regional faults. The San Diego Region can be further subdivided into the coastal plain area, a central mountain–valley area and the eastern mountain valley area. The project site lies within the coastal plain area of low relief that slopes gently toward the Pacific Ocean.

The coastal plain is characterized by geomorphic landforms known as marine terraces, which are ancient erosion surfaces or abrasion platforms cut by ocean –wave processes along past coastlines. These surfaces are recognized today as the relatively flat-lying mesas and terraces that range in elevation across the coastal plain of San Diego. The elevation differences of these marine terraces are the result of sea level changes that are associated with glacial retreat and advance throughout the Pleistocene, and uplift associated with activity on the Rose Canyon Fault Zone over the past two million years. The mesas or terraces have been incised by westward flowing drainages that have adjusted to the relative sea level changes in elevation. The combined effect of these processes is that older marine terraces are found at progressively higher elevations. Several distinct marine terraces present in the San Diego area include the Linda Vista Mesa (cut approximately 1.3 million years ago), the Nestor Terrace (cut approximately 120,000 years ago), and the Bird Rock Terrace (cut approximately 80,000 years ago). The marine terraces are typically covered with marine sediments, overlain by younger non-marine terrestrial deposits.

4.2 Site Geologic Conditions

According to mapping by Kennedy (1975), soils at the site consist of units of Quaternary Beach Deposits, Undifferentiated Quaternary-aged Alluvium and Slopewash deposits, and deposits of the Quaternary Bay Point Formation. The findings from our investigation were consistent with the mapping completed by Kennedy (1975). The sequence of deposits observed at the site included from the existing surface downward; Fill and disturbed material, Quaternary Slopewash (Qsw), a transitional unit between the slopewash and underlying Bay Point Formation (Qsw/QBp-1), and Quaternary Bay Point Formation.

4.2.1 Fill

This unit consists loose to medium stiff, re-worked Quaternary Slopewash as described below, with loose, silty sand, abundant organics, roots, and topsoil from turf and planter areas, with minor debris. Based on our aerial photograph review, the area behind the existing seawall consists of fill material. However, this area was not drilled during our investigation. Fill thicknesses are interpreted to typically range between two and five feet, with thicknesses up to eleven feet behind the seawall.

Depths of fill material ranging up to ten feet were reported in the geotechnical investigation completed for the residence just south of the subject site at 8450 El Paseo Grande by Earthworks Engineering, Inc., dated December 18, 2000. The description of this material appears to correlate with the base of the material we interpreted as Slopewash deposits.

4.2.2 Quaternary Slopewash (Qsw)

Quaternary Slopewash deposits were encountered near surface and in gradational contact with the overlying Fill material. The thickness of this deposit ranged between four to eight feet, and extended from the fill to depths of approximately 10 feet below existing grade. The lower contact is gradational with the underlying Bay Point Formation. Our current interpreted base of the slopewash material differs from our initial investigation, where the base of the slopewash material was the top of a distinctive "beach' sand. This "beach" sand is presently considered a unit within the underlying Quaternary Bay Point Formation, Unit Qbp- 4 on the geologic cross-sections.

The Quaternary Slopewash consists of a homogeneous deposit of loose to stiff, moist to wet, yellowish –gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

4.2.3 Transitional (?) Quaternary Slopewash/Bay Point Formation; (Qsw / QBp-1)

Map Unit Qsw /QBp-1 is considered a transitional unit between the overlying Quaternary Slopewash and underlying Quaternary Bay Point Formation. The upper and lower contacts are both gradational. The stratigraphic position of unit, above a moderately well developed paleosol, the higher sand content and scattered pebbles indicate that this unit is the basal unit to the Quaternary Slopewash material. However, an overall increased density, change in color, degree of mottling, locally weak soil development, and gradational nature of the lower contact suggest it is part of the Bay Point Formation. Regardless of the interpretation, the unit could be mapped and correlated as distinct stratigraphic layer across the site.

Qsw /Bp1: consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

4.2.3 Bay Point Formation; (QBp-2 to QBp-4)

Quaternary-aged sedimentary deposits identified as the Bay Point Formation were encountered within our subsurface explorations beneath the slopewash. These soils were divided into three, map units based on lithologic differences, and degree of soil development. Contacts were gradational with overlying and underlying units. The units are described below and depicted on the geologic-cross-sections (Figures 3 through 7).

Map Unit (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films. Soil horizonation Btb to Btvb. Diffuse upper and lower contacts.

Map Unit (Bp3): Bp3 is a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant mafic mineral concentrations consisting primarily of black (biotite) mica. Unit is interpreted as a paleo-beach sand.

4.3 Groundwater Conditions

Groundwater was encountered within our subsurface explorations at the time of drilling at elevations consistent with the contact between map units Bp-3 and Bp-4 at an approximate elevation ranging between -2 feet below mean sea level to mean sea level. Perched groundwater was encountered during drilling locally along the top of map unit Bp-2 (paleosol) at approximate elevations ranging between 7- to 10- feet above mean sea level. The deposits above Bp-2, within Qsw/Bp-1 were loose to soft where the perched groundwater was observed. Although groundwater conditions will likely vary, especially during periods of sustained precipitation, and tidal fluctuations it is not expected to affect the proposed development if recommendations regarding site drainage are carried out during design and construction.

5.0 LOCAL AND REGIONAL FAULTING

5.1 Regional Faulting

According to the California Geologic Survey, a fault is considered active if it displays evidence of activity in the last 11,000 years (Hart and Bryant, revised 1997). A potentially active fault displays evidence of activity prior to 11,000 years, but within the last 1.6 million years; or when supporting geologic evidence indicates timing of faulting as potentially active or non-active, but direct geologic evidence is lacking that could unequivocally prove timing of activity.

The onshore portion of the Rose Canyon Fault Zone (RCFZ) is located approximately 0.6 kilometers to the southwest of the subject site, and is the closest known active fault. The RCFZ generally extends southeastward along the eastern slopes of Mount Soledad, and along the eastern shore of Mission Bay. Further to the south, north of downtown San Diego, the fault appears to diverge into three distinct strands, the Coronado, Spanish Bight, and Silver Strand faults. These strands generally extend to the south and southwest, through San Diego Bay, into Coronado, and eventually to the Pacific Ocean.

Evidence of Holocene (within the last 11,000 years) surface rupture on strands of the RCFZ has been discovered and summarized in Treiman, 1993. In addition, several recent studies, including; Woodward-Clyde Consults [WCC] 1994; Rockwell and Murbach, 1998; Leighton and

Associates, 1998; Kleinfelder, 1999 and 2001 have further substantiated activity along the RCFZ.

Other principal active faults in this region include the Elsinore, Coronado Banks, San Jacinto, and San Andreas faults as shown on the Regional Fault Map, Figure 8. Epicenters of earthquakes with magnitudes greater than 5.0 that occurred between 1800 to 1999 are shown on Figure 8, (Toppazada and others, 2000).

5.2 Site Specific Faulting

The site is not located within a State of California defined Alquist-Priolo Earthquake Fault Zone. However, based on our review of the City of San Diego Seismic Safety Study, it appears that a concealed segment of the Scripps Fault is mapped across the extreme northwest corner of the property (Figure 9). The Scripps fault is considered to be a potentially active fault, and has been zoned as a Category 12 seismic hazard, according to the City of San Diego Seismic Safety Study. Category 12 zones are for faults considered potentially active, inactive, or activity level unknown. A surface rupture hazard evaluation was requested by the City of San Diego for the subject site in their cycle review comments dated, July, 19, 2006.

Excavation of fault trenches is considered to be the best method to investigate faulting. However, fault trench excavations were not feasible at the subject site due to limited access, and groundwater elevations that would prohibit trenching to the anticipated depths needed to expose the stratigraphy of sufficient age to evaluate the timing of faulting. Given these restraints, the faulting was evaluated by advancing and continuous sampling borings to sufficient depths to establish stratigraphic and structural continuity across the site. This is considered a standard of practice methodology according the Note 49, "Guidelines For Evaluating Surface Rupture" (California Geological Survey, 2002).

A total of 15 borings were advanced at the site (B-1 through B-15) to depths ranging from 11 to 41 feet below existing grades. As shown on Figure 2, the borings were located around the perimeter of the existing structures with a distribution that provided the correlation of subsurface stratigraphy along three east-west oriented cross-section lines, A-A', B-B', and C-C' (Figures, 3, 4, and 5, respectively), and two additional cross-sections, D-D', along a north-south orientation, and E-E' along a northwest-southeast oriented (Figures 6 and 7, respectively). Lithostratigraphic (similar lithology) and a chronostratigraphic (time boundary) horizon could be correlated across the entire site. The cross-sections were correlated at there intersection points to provide internal consistency of the geologic interpretations. The lithostratigraphic horizons include the contact between map units Qsw and Qsw/Bp1, Bp-2 and Bp-3, Bp-3 and Bp-4. The chronostratigraphic horizon is the contact between map units Qsw/Bp-1 and Bp-2. This is based on the buried soil profile (paleosol) that represents the top of unit Bp-2. The correlations of these units are depicted on the Geologic cross-section A-A' through E-E' (Figures 3 through 7, respectively).

Based on our interpretation, the subsurface stratigraphy is laterally continuous and displays structural and stratigraphic continuity across the entire site. The mapped units have a slight westward dip of approximately three degrees, similar to the present slope of the coastal beach and terrace surface. This slope is probably best represented by the contact between units Qsw/Bp-1 and Bp-2, with the top of Bp-2 at average elevation of 12 feet above mean sea level at the eastern end of the property, sloping westward to approximately mean sea level at the western end of the property adjacent to the seawall. This is a distance of approximately 160 feet with 12 feet of fall that equates to a gradient of 0.075, or approximately three degrees from horizontal. All the mapped contacts had similar gradients and therefore this gradient was taken as the average slope used to estimate the bluff edge (discussed below).

The Bay Point Formation is considered to have formed approximately 120,000 to 80,000 years before present in this area (Kennedy, 1975). Kuhn, 1984, reported that a fossil horse bone was found to the north within the alluvial bluffs, and yielded an age of 55,000 years as determined by amino acid dating techniques (Bada, et al. 1974). In addition, based on Carbon -14 dating, 5,460 to 7,370 year old remains from Indian burial sites were discovered in the bluffs north of the Scripps Biology buildings (Shumway et.al. 1961; as reported in Kuhn, 1984). These bluffs, referred to as the low-lying alluvial bluffs, extend from just north of Scripps to Kellogg Park, and include the bluffs present at the subject site.

Based on the lateral and vertical stratigraphic and structural continuity of the deposits across the site, as depicted in Figures 3 through 7, and the age-constraints discussed above, it is clear that active faults do not cross the site. The existence of potentially active faults (faults older than 10,000 years and younger than 1.6 million years) could be present at depths below the limits of our investigation. However, there is no indication of faulting within the depths explored and it is our professional opinion that the risk of surface rupture is very low to nil. Furthermore, because we found no evidence of faulting, such as offset lithology, structural warping, thickness changes or steps in lithologic units, we are not recommending any structural setbacks from the interpreted trace of the Scripps fault along the northwest property corner.

6.0 BLUFF EVALUATION

6.1 Review of Historic Topography

A series of topographic maps of the La Jolla Quadrangle were collected from EDR Environmental Data Resources, Inc., and from the County of San Diego Public Works. The topographic maps reviewed are presented in the table below.

TABLE 1

Quadrangle	Year	Series	Scale
La Jolla	1930	15 minute	1:62500
La Jolla	1953	7.5 minute	1:24000
La Jolla	1967	7.5 minute	1:24000
La Jolla	1975	7.5 minute	1:24000
La Jolla	1977	1" = 200'	1:2400
La Jolla	1996	7.5 minute	1:24000

Based on our review, it appears that the site surface elevation was lower than 25 feet msl, and possibly lower than 20 feet msl on the 1930 and 1953 maps. The 1967, 1975, and 1996 maps indicate the surface elevation was between 20 to 25 feet msl. The 1977 map at a smaller scale than the other maps reviewed, indicated the surface elevation was between 15 to 25 feet from west to east across the site. The present surface elevations, as shown on Figure 2, range from 14 feet on the sidewalk behind the seawall, then approximately 17 feet msl from behind the retaining wall to 24 feet msl at the eastern end of the existing structures. Copies of the topographic maps are presented in Appendix D.

6.2 Review of Historic Photography

Aerial and surface photographs of the site and surrounding area were reviewed to help re-construct the site development history and provide correlative data with the review of the historic topographic maps. Aerial photographs were collected from the California Coastal Records Project (www.californiacoastline.org), (Appendix E), and a data search completed by EDR Environmental Data Resources Inc., (Appendix F), and historic surface photographs of the general site area were collected from Kuhn and Shepard, 1984 (Appendix G).

6.2.1 Aerial Photographs

Oblique aerial photographs of the La Jolla Shores area available from the California Coastal Project included photographs from 1972, 1979, 1987, 1989, 1995, and 2004. Aerial photographs from the EDR data search included photographs from 1948, 1953, 1963, 1974, 1989, 1994, and 2002.

Review of the aerial photographs shows the seawall and the residences south of the intersection of El Paseo Grande and Paseo Del Ocaso were constructed between the years of 1948 to 1953. It appears that some grading occurred at the subject site prior to or during 1948. Interpretation of the 1948 photograph suggests that the grading was to create beach access for the construction of the seawall. Parcels north of the subject site appeared to have been affected more from the grading, and only the western portion of the subject site appears to have been graded. It is apparent that the seawall was constructed on the coastal beach, seaward of the bluff face as it existed at that time. Indicating that fill was placed behind the seawall and in front of the bluff face.

6.2.2 Historic Area Photographs

Historic photographs of the area were collected from Kuhn and Sheppard, 1984. These photographs show the general La Jolla Shores area and particularly a section of the bluffs north of the subject site (approximately eight houses/parcels north of the subject site). A series of photographs at this location were taken in 1936, and during the winter storms of 1978, and subsequently in 1979. The 1936 photographs shows that the bluffs were steeply faced, with steps, gullies, and uneven surface topography, with a slope decreasing in elevation toward the south, consistent with historic and present day topography. Portions of the seawall were destroyed, but the seawall to the south remained intact. The step in the seawall in the 1979 photograph is a good reference point for location of the area in the more recent photographs collected from the California Coastal Records Protect Photographs.

According to Kuhn (1984), climatic conditions prior to 1978 were milder and the bluff faces became rounded and more vegetated than the steep faces show in the 1936 photograph. This implies the gradient of the bluff faces decreased during this time of mild climatic conditions.

6.3 Bluff Profiles

Three cross-sections were constructed perpendicular to the bluff, Cross-Section A-A', B-B' and C-C' (Figures 4, 5, and 6). The locations of the sections are shown on the Site Exploration and Location Map (Figure 3). Estimates of the coastal bluff edge were made following the Coastal Bluffs and Beaches Guidelines, and estimates of the toe of bluff were interpreted based on information from the western most boring on each section, the estimated location of the present day abrasion platform, and estimates of the width of fill placed behind the constructed seawall based on our aerial photograph and literature reviews. Additionally, it is our understanding, substantiated from conversations with the representatives of the City of San Diego Land Development Review Department, that the coastal bluff height criteria is not an elevation above mean sea level, but the actual vertical relief of the bluff between the toe of bluff and bluff edge.

Previous studies along the San Diego coastline have established the toe of bluff at the intersection of the bluff face with the top of present day beach deposits. Based on our review of historical topography, the coastal beach deposits within the site vicinity typically range in elevation from 7 to 10 feet above msl. During typical years, the vertical relief of the bluff – as measured from the top of the coastal beach deposits intersection with the bluff face to the top of bluff edge – varies from 2 to 5 feet.

In an atypical year, such as in severe storm years, like those in 1978, the beach deposits may be removed to the elevation of the abrasion platform. In such years, the vertical relief of the bluff as measured from the intersection of the present day abrasion platform with the bluff face to the top of the bluff would be approximately 10-feet along the western margin of the property.

6.4 Regulations

As previously mentioned, The City of San Diego Land Development documents "Coastal Bluffs and Beaches Guidelines", and the "Steep Hillside Guidelines" classify and establish appropriate regulations for the low-lying cliffs delineating the boundary between the coastal beach and other terrain at the site.

The subject site is located immediately adjacent to the La Jolla Shoes beach and is within The City of San Diego Seismic Safety Category 48, "Generally stable, board beach areas, coastal harbors". As a designated Coastal Beach area, the site first falls under the Coastal Bluffs and Beach Guidelines. The Steep Hillside guidelines apply to coastal bluffs that are not sensitive coastal bluffs and landforms that meet different criterion for steep hillsides than the coastal bluff criterion.

6.4.1 Coastal Beach

The Environmentally Sensitive Lands Regulations define a Coastal Beach as:

Coastal Beach means the land between the edge of the sea and the first line of terrestrial vegetation or development or the toe of an adjacent sensitive coastal bluff, whichever is most seaward.

In addition, the Coastal Bluffs and Beaches Guidelines state that "if a seawall exists, the landward limit of the beach is still the toe of the bluff. The seawall would represent encroachment onto the beach".

The subject site parcel extends from El Paseo Grande on the east to the mean low water line on the west, and therefore a portion of the site contains a coastal beach. Based on our interpretation, the eastward extent of the coastal beach is approximately five to seven feet east of the seawall. A line connecting the interpreted toe of bluff along the site is depicted on Figure 3. This line delineates the boundary between the City of San Diego Seismic Safety Study Category 48 (coastal beach) and Category 52 (other terrain).

6.4.2 Coastal Bluff verses Sensitive Coastal Bluff

As Shown on Figure 4, 5, and 6, an escarpment exists between the coastal beach and other terrain boundary at the site. To address the questions of whether this escarpment classifies as a Coastal Bluff, Steep Hillside, or a Sensitive Coastal Bluff the pre-modified (pre-grading, pre-seawall construction) geometry of the escarpment was required to be established and compared to the geometric criteria as defined in the Coastal Bluff and Beach and Steep Hillside Guidelines.

An escarpment located along the shoreline and adjacent to coastal beaches must qualify as a coastal bluff before it can qualify as a sensitive coastal bluff.

6.4.2.1 Definition of Coastal Bluff

The Environmentally Sensitive Lands Regulations define a Coastal Bluff as:

Coastal Bluff means an escarpment or steep face of rock, decomposed rock, or soil resulting from erosion, faulting, or folding of the land mass that has a vertical relief of 10 feet or more and is located in the coastal zone.

In addition, a "coastal bluff is a naturally formed precipitous landform that generally has a gradient of at least 200 percent (1:2 slope) with a vertical elevation of at least 10 feet."

Based on our analysis, the vertical relief along the escarpment varies from 2 to 5 feet if measured from the top of the coastal beach deposits intersection with the bluff face to the top of bluff edge or approximately 10 feet if measured from the abrasion platform along the western (seaward) portion of the property. The elevation change across the entire parcel ranges from sea level (measured from the abrasion platform) to approximately 25 feet above mean sea level.

For the escarpment to meet the classification of a coastal bluff, some portion of the vertical relief along the site has to have a gradient of at least 200 percent. To address this criterion, the site gradient was calculated across the area of the bluff face, between the abrasion platform and the bluff edge. This area is the potential steep hillside (discussed below), or coastal bluff portion of the site. As shown on Cross –Sections A-A`, B-B' and C-C' (Figures 4, 5 and 6, respectively) the gradients range from approximately 154 percent on Cross-Section A-A', to 166 percent on Cross-Section B-B', and 182 percent along Cross-Section C-C'. The average gradient across the entire site, from the base of the seawall to the eastern property limit, is approximately 17 percent.

The above calculated gradients across the site do not meet the criteria for a coastal bluff.

6.4.2.2 Definition of Sensitive Coastal Bluff

The Environmentally Sensitive Lands Regulations define a Sensitive Coastal Bluff as: "*Sensitive Coastal Bluff means a coastal bluff that is designated within Hazard Category Numbers 41 through 47, inclusive, on the City's Geologic Hazard Maps, plus an additional 100-foot landward strip located and contiguous to the coastal bluff edge.*"

Also according to the Coastal Bluff and Beach Guidelines, "[s]ensitive coastal bluffs are a form of coastal bluffs that are generally located along the shoreline and adjacent to coastal beaches.

As previously mentioned, our review of the City's Geologic Hazard Maps show the site falls within Hazard Categories 48 and 52, "coastal beaches" and "other terrain", respectively. Based on the City of San Diego classification of the site area as Categories 48 and 52, the escarpment at the site does not classify as a sensitive coastal bluff, and therefore not as a coastal bluff, based on the site's location adjacent to a coastal beach. The City of San Diego Geologic Hazard Categories in the site area are shown on Figure 9.

Our interpretation that the escarpment at the site does not meet the criteria of a coastal bluff, based on the findings of our site specific investigation, is consistent with City of San Diego's more general classification of the site area that the escarpment is not a sensitive coastal bluff.

6.4.2.3 Definition of Steep Hillsides

According to the Environmentally Sensitive Lands Regulations, there are two criteria used to establish when steep hillside regulations are applicable to a proposed development. The first criterion is applicable if any portion of the site contains a natural gradient of at least 200 percent (200 feet of vertical distance for every 100 feet of horizontal distance) and a vertical elevation (vertical relief) of at least 10 feet. This is the same criteria for a coastal bluff, as described in the Coastal Bluff and Beach Guidelines, and discussed above in section 6.4.2.2.

The second criterion is when a development is proposed on a site containing any portions with a natural gradient of 25 percent (25 feet of vertical distance for every 100 feet of horizontal distance) and a vertical elevation of at least 50. This criterion is not applicable to the subject site, because the site elevation has been and is presently today below 25 feet in elevation based on our review of historical topographic maps, and the present surveyed site topography.

Therefore, it is our professional opinion that the site does not classify as a steep hillside and is not subject to the steep hillside regulations. This finding is consistent with previous findings and rulings by the City of San Diego for similar projects to the north and south of the subject site.

7.0 CONCLUSION AND RECOMMENDATIONS

Based on the data available for review, as well as the data from our investigations, it is our professional opinion that the site is not underlain by active faults and there is no indication of faulting from potentially active faults to the depths of our investigation. Therefore, we are not recommending any structural setbacks from the interpreted location of the Scripps fault at the northwest corner of the property.

Based on the information obtained from our investigations, our interpretation of the height and location of the bluffs prior to development of the site, the calculated site gradients, and our review and understanding of the Coastal Bluffs and Beaches and Steep Hillside Guidelines, it is our professional opinion that the site does not fall under the jurisdiction of the Sensitive Coastal Bluffs and does not classify as a Coastal Bluff or Steep Hillside. These site specific findings support the regional Seismic Safety Study Category boundaries established City of San Diego for the site area.

8.0 LIMITATIONS OF INVESTIGATION

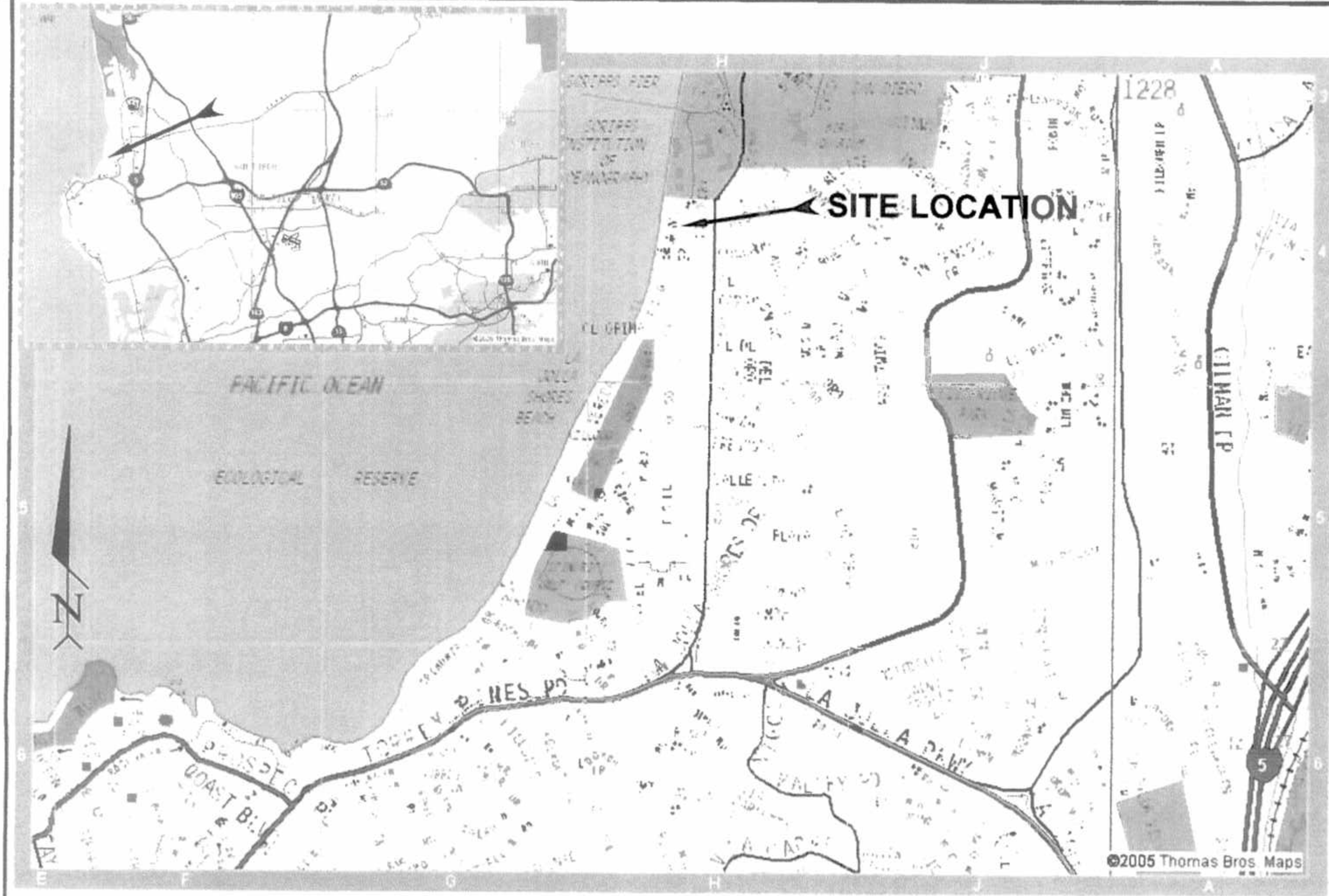
The field evaluation, laboratory testing and geotechnical and geologic analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction.

Our conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if required, will be provided upon request. We appreciate this opportunity to be of service on this project. If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,
CONSTRUCTION TESTING & ENGINEERING, INC.

Martin E. Siem CEG #2311
Senior Engineering Geologist

Dan T. Math, GE#2665
Principal Engineer



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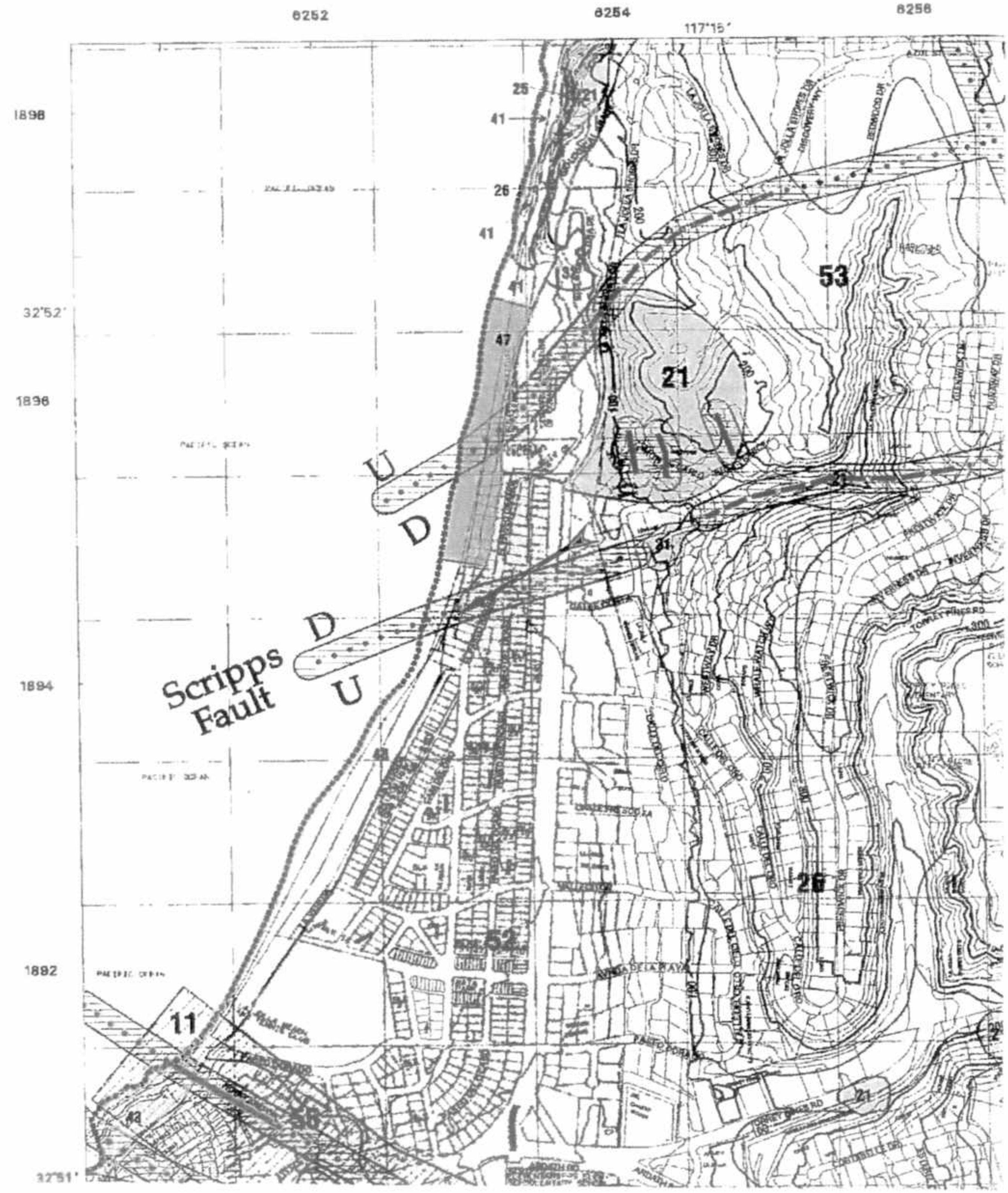
SITE INDEX MAP
PROPOSED LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO	10-8264G
SCALE	NO SCALE
DATE 1/07	FIGURE 1



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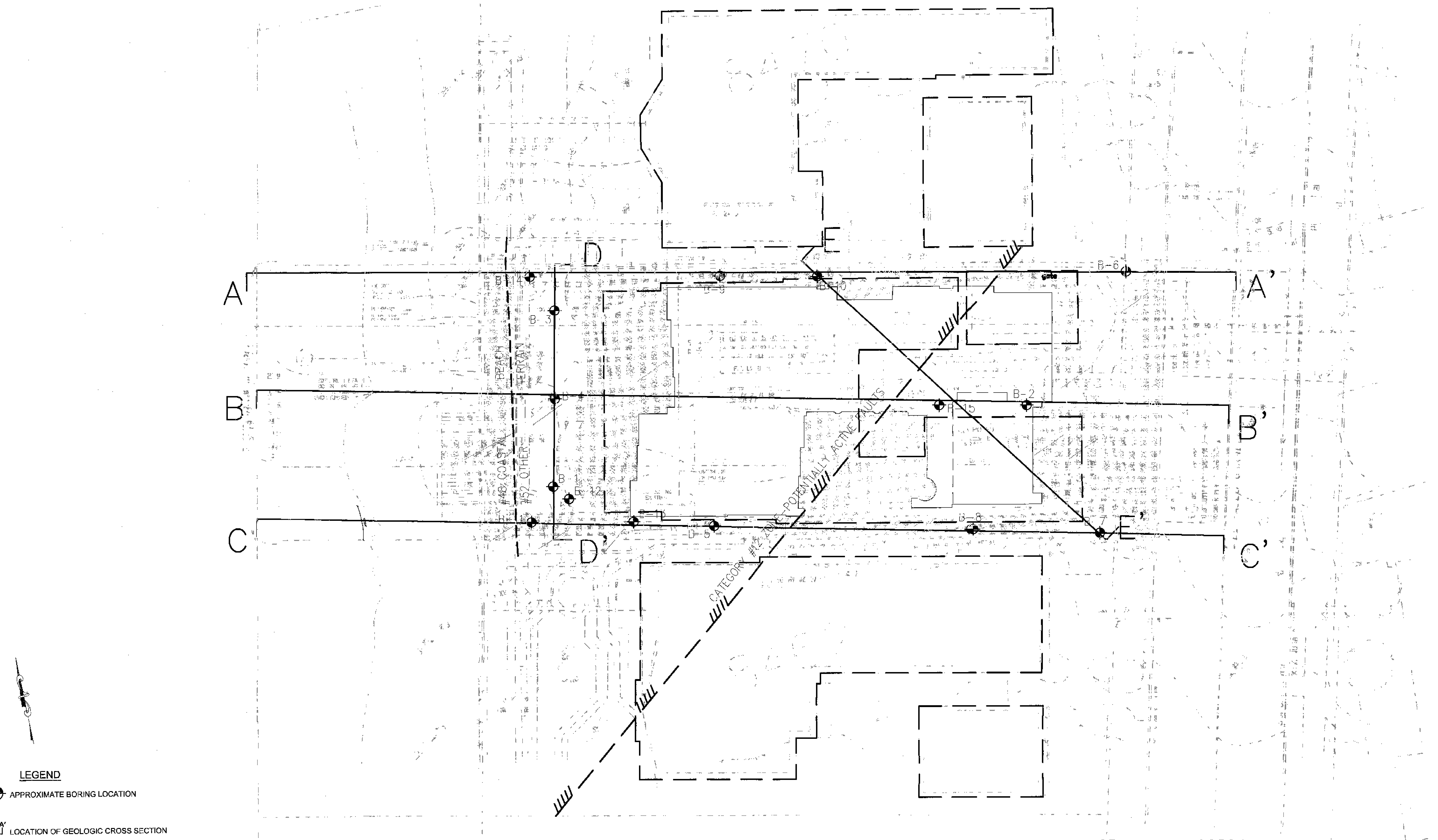
SEISMIC SAFETY STUDY MAP

LUSARDI RESIDENCE

LA JOLLA, CALIFORNIA

CTE JOB NO: 10-8264G	
SCALE: NO SCALE	
DATE: 1/07	FIGURE: 2



LEGEND

B-1 APPROXIMATE BORING LOCATION

A A' LOCATION OF GEOLOGIC CROSS SECTION

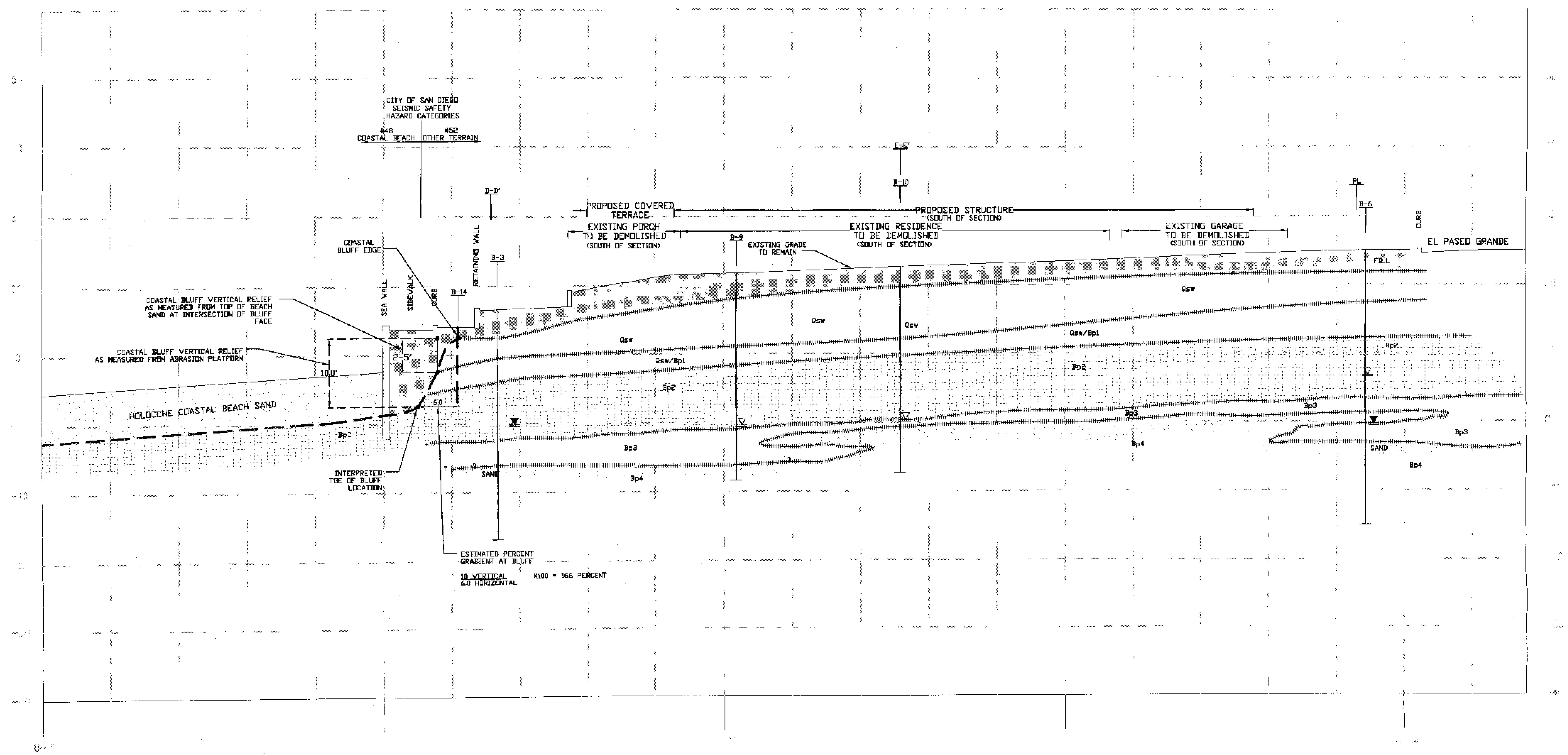
CITY OF SAN DIEGO SEISMIC SAFETY HAZARD CATEGORY BOUNDARY
#48 COASTAL BEACH
#52 OTHER TERRAIN

#12 POTENTIALLY ACTIVE FAULTS
ZONED ON HATCHERED SIDE OF BOUNDARY LINE

NOTE:SOURCE DRAWING FROM HAYER ARCHITECTURE

CONSTRUCTION TESTING & ENGINEERING, INC. PLANNING - CIVIL ENGINEERING - LAND SURVEYING - GEOTECHNICAL 1441 MONTIEL ROAD, SUITE 115 ESCONDIDO CA. 92026 PH:(760) 746-4955	SITE EXPLORATION LOCATION MAP LUSARDI RESIDENCE 8466 EL PASEO GRANDE LA JOLLA, CALIFORNIA	SCALE: 1"=10' CTE Job No.: 10-8264G	DATE: 01/07 FIGURE: 3

VIEW LOOKING NORTH



Explanation

Fill: Consists of loose to medium stiff, reworked Quaternary Slope Wash as described below, with loose, silty sand, abundant organics, roots, topsoil form turf and planter areas, minor debris.

Quaternary Slope Wash (Qsw): consists of loose to stiff, moist to wet, yellowish -gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

Unit 1 (Qsw/Bp1): consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

Quaternary Bay Point Formation

Unit 2 (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films Soil horizonation Bth to Btvb. Diffuse upper and lower contacts.

Unit 3 (Bp3): Bp3 consists appears to be a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit 4 (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant black mica. Unit is interpreted as a paleo-beach sand.

Gradation contact between mapped units.

? Approximate location or inferred (?) location of geologic contacts

c c c c Zones of carbonate accumulation

Existing Grade

Proposed Final grade

∇ Perched groundwater observed

$\blacktriangledown$ Groundwater at time of drilling

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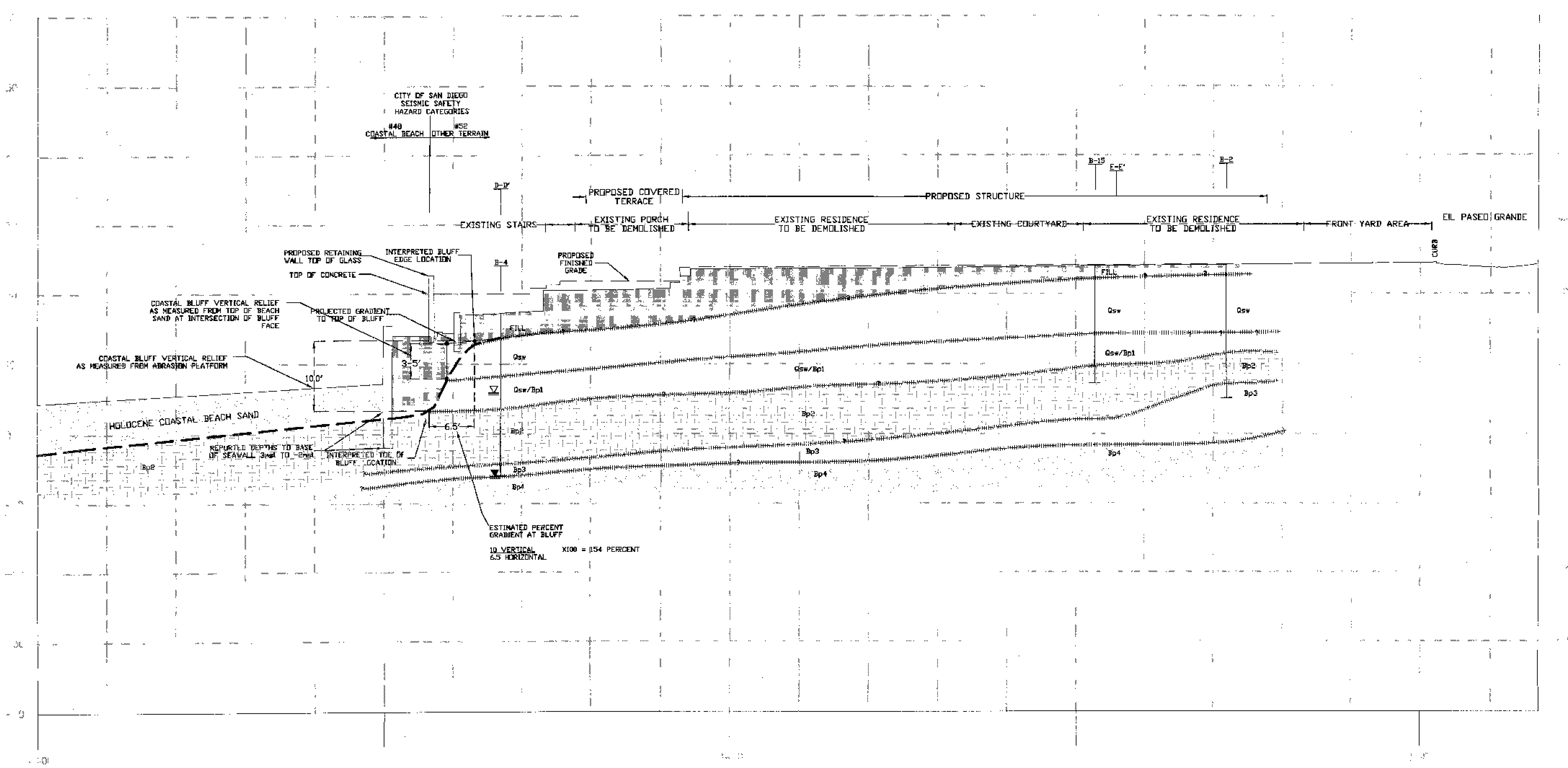
VIEW LOOKING NORTH



Explanation

Fill: Consists of loose to medium stiff, reworked Quaternary Slope Wash as described below, with loose, silty sand, abundant organics, roots, topsoil form turf and planter areas, minor debris.

Quaternary Slope Wash (Qsw): consists of loose to stiff, moist to wet, yellowish -gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

Unit 1 (Qsw/Bp1): consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

Quaternary Bay Point Formation

Unit 2 (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films Soil horizonation Btb to Btvb. Diffuse upper and lower contacts.

Unit 3 (Bp3): Bp3 consists appears to be a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit 4 (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant black mica. Unit is interpreted as a paleo-beach sand.

Gradation contact between mapped units.

Approximate location or inferred (?) location of geologic contacts

Zones of carbonate accumulation

Existing Grade

Proposed Final grade

Perched groundwater observed

Groundwater at time of drilling

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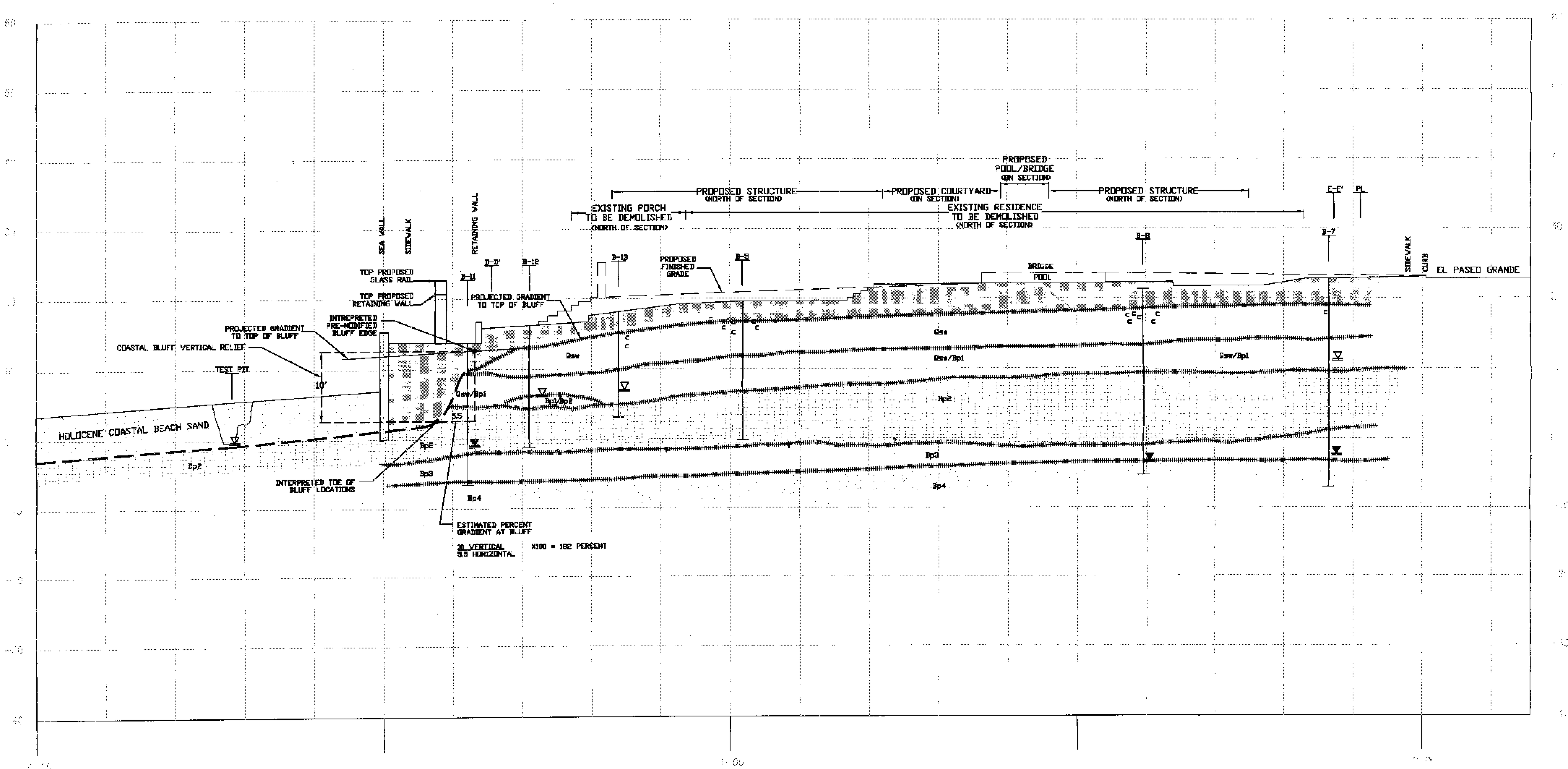
CROSS SECTION B-B'
LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

SCALE: 1"=10'	DATE: 01/07
CTE Job No.: 10-8264G	FIGURE: 5



Explanation

Fill: Consists of loose to medium stiff, reworked Quaternary Slope Wash as described below, with loose, silty sand, abundant organics, roots, topsoil form turf and planter areas, minor debris.

Quaternary Slope Wash (Qsw): consists of loose to stiff, moist to wet, yellowish -gray brown to yellowish - olive brown, slightly mottled, silty to sandy Clay, varying to sandy clayey Silt, with rootlets, locally developed pinhole structure, some carbonate near the upper contact, and occasional carbon fragments. The unit is massive with locally developed weak discontinuous laminations. Upper and lower contacts are gradational.

Unit 1 (Qsw/Bp1): consists of medium stiff to stiff, locally loose when saturated, moist to wet, dark gray brown, light brown, orange brown, black, variably mottled, sandy Clay with visually estimated medium to coarse grained sand percentages up 30 percent, scattered pebbles, abundant organics (carbon fragments and disseminated carbon) throughout. Upper contact is locally gradational to distinct, and the lower contact is gradational with Bp2.

Quaternary Bay Point Formation

Unit 2 (Bp2): Bp2 consists of stiff to very stiff, locally hard, moist to wet, dark reddish brown, dark gray-brown, black, dark orange-brown, extensively mottled, silty to sandy Clay, with distinctive coarse-red sand grains throughout, scattered organics (carbon fragments, disseminated carbon, massive to moderate, subangular- blocky soil structure, with clay films Soil horizonation Btb to Btvb. Diffuse upper and lower contacts.

Unit 3 (Bp3): Bp3 consists appears to be a transitional unit between the overlying (Bp2) clay and sands of the underlying unit (Bp4). Bp3 is stiff to very stiff silty sandy Clay to medium dense clayey Sand, moist to wet, mottled brown, orange-brown, gray, with black, weaker soil structure than overlying unit Bp2, granular to massive, with locally moderate subangular-blocky soil structure.

Unit 4 (Bp4): Bp4 consists of a distinctive change in lithology from the clay and silt of the overlying units to medium dense to dense, wet, gray to black, fine-to coarse-grained silty to clayey Sand that grades downward into a poorly graded Sand with silt, abundant black mica. Unit is interpreted as a paleo-beach sand.

Gradation contact between mapped units.

? Approximate location or inferred (?) location of geologic contacts

c c c c Zones of carbonate accumulation

Existing Grade

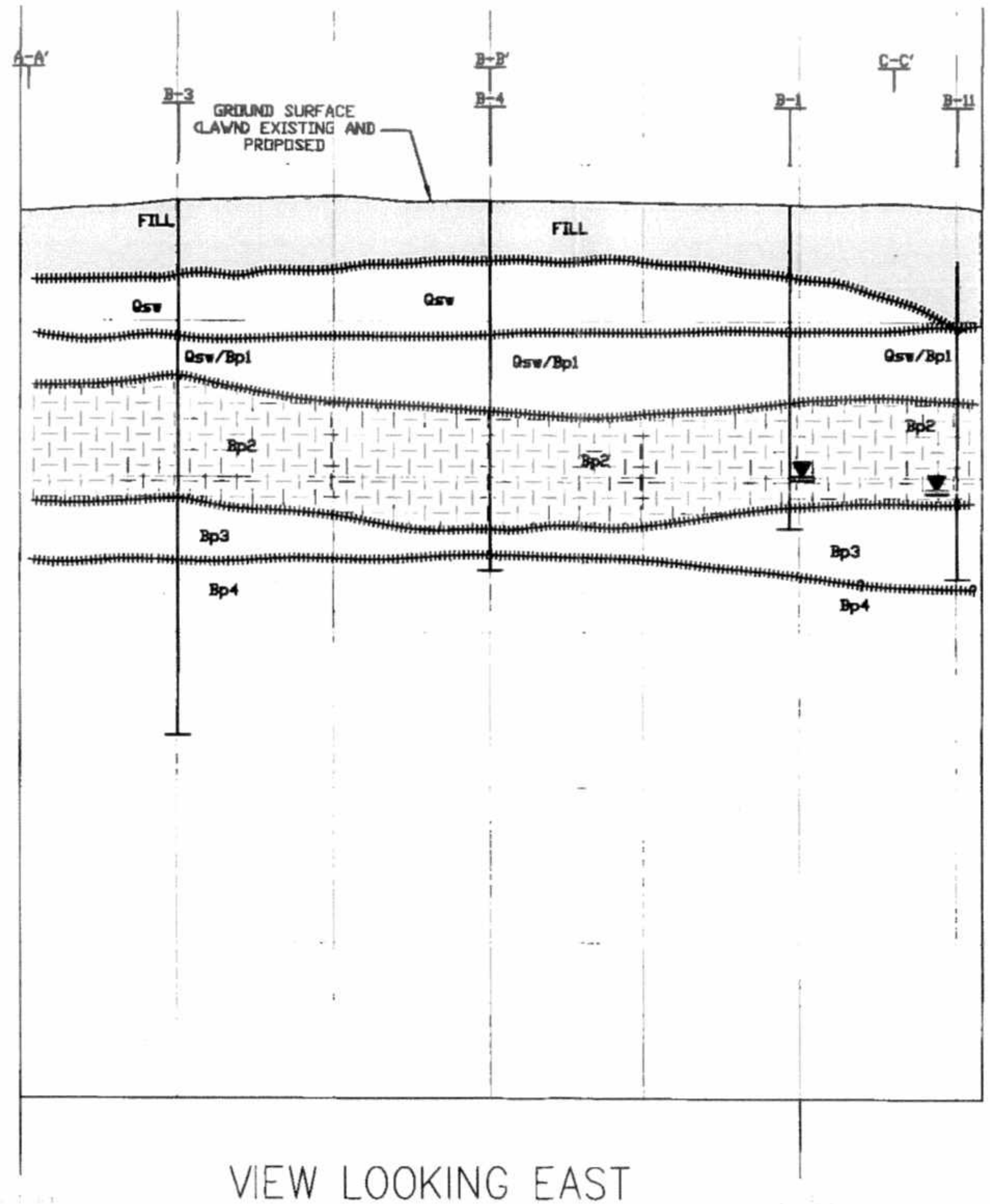
Proposed Final grade

Perched groundwater observed

Groundwater at time of drilling

CONSTRUCTION TESTING & ENGINEERING, INC. PLANNING - CIVIL ENGINEERING - LAND SURVEYING - GEOTECHNICAL 1441 MONTIEL ROAD, SUITE 115 ESCONDIDO CA. 92026, PH:(760) 746-4955	**CROSS SECTION C–C'** LUSARDI RESIDENCE 8466 EL PASEO GRANDE LA JOLLA, CALIFORNIA	SCALE: 1"=10' CTE Job No.: 10-8264G	DATE: 01/07 FIGURE: 6

\\Cte_server\projects\10-8264G\cross section C.dwg 1/24/2007 2:59:17 PM PST



SEE FIGURE 3 FOR EXPLANATION

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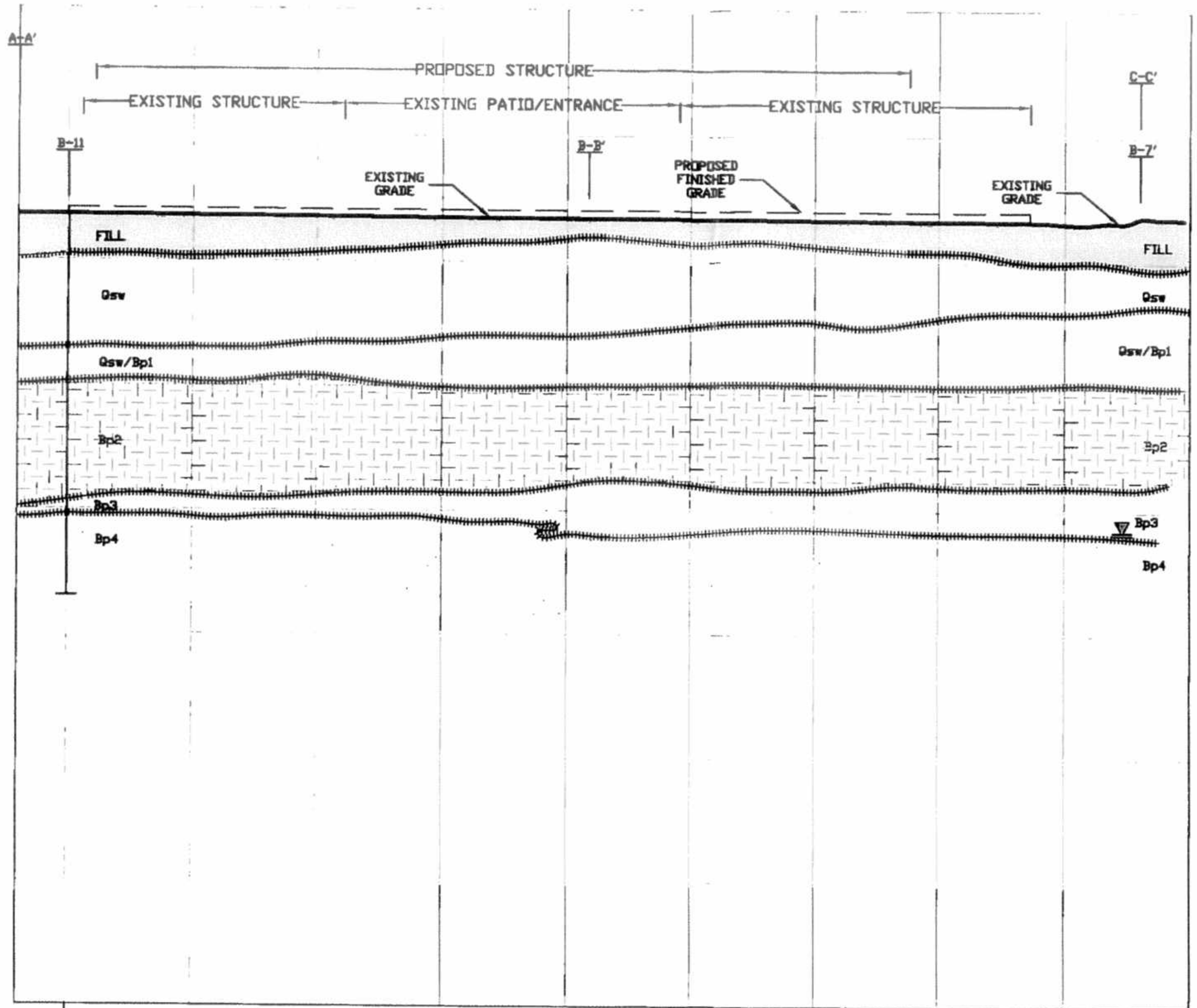
CROSS SECTION D-D'
LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO: 10-8264G	
SCALE: 1"=10'	
DATE: 01/07	FIGURE: 7



VIEW LOOKING NORTHEAST

SEE FIGURE 3 FOR EXPLANATION

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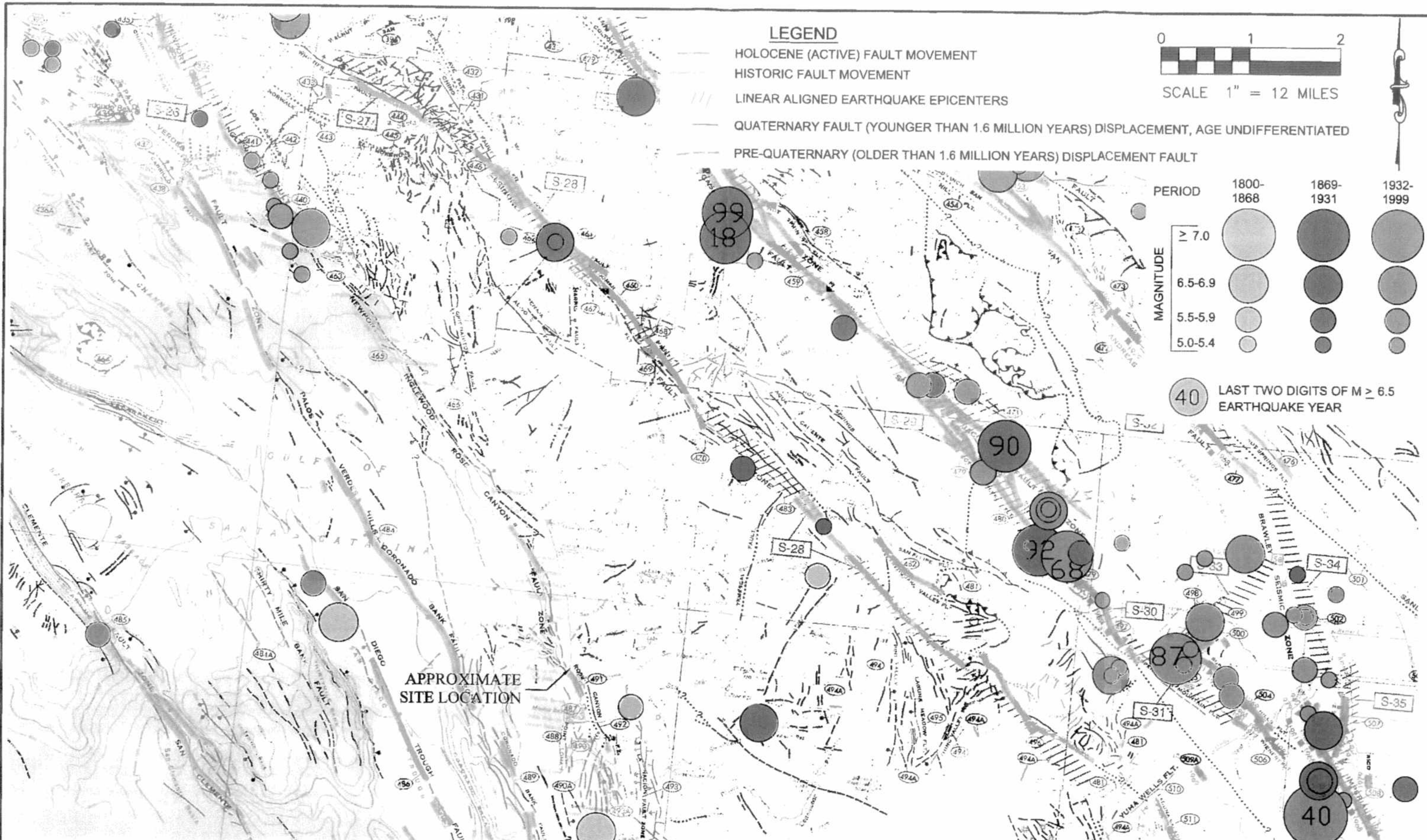
CROSS SECTION E-E'
LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO: 10-8264G	
SCALE: 1"=10'	
DATE: 01/07	FIGURE: 8



NOTES: FAULT MAP ADAPTED AFTER JENNINGS, 1994, CDMG MAP NO. 6; REFERENCE FOR ADDITIONAL EXPLANATION

EPICENTERS OF AND AREAS DAMAGED BY M≥5 CALIFORNIA EARTHQUAKES, 1800-1999 ADAPTED AFTER TOPPOZADA, BRANUM, PETERSEN, HALLSTORM, CRAMER, AND REICHLE, 2000, CDMG MAP SHEET 49

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REGIONAL FAULT AND SEISMICITY MAP
LUSARDI RESIDENCE
8466 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

CTE JOB NO: 10-8264G	
SCALE: 1 inch = 12 miles	
DATE: 01/07	FIGURE: 9

APPENDIX A

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REFERENCES CITED

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2. Martin, Ross, 2000, "Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region," California Division of Mines and Geology, CD 2000-003.

3. Tan, S.S. and Giffen, D.G., 1995, "Landslide Hazards in the Southern Part of the San Diego Metropolitan Area, San Diego County, California," California Division of Mines and Geology, Landslide Hazard Identification Map No. 33.

4. Tan, S. S. and M. P. Kennedy, 1975, "Geology of the San Diego Metropolitan Area, California", La Jolla Quadrangle, California Division of Mines and Geology, DMG Bulletin 200.

APPENDIX B

EXPLORATION LOGS

CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL | CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, SUITE 115 | ESCONDIDO, CA 92026 | 760 746 4955

PROJECT: LUSARDI RESIDENCE
CTE JOB NO: 10-8264G
LOGGED BY: STEVE H.
DRILLER: PACIFIC DRILLING
DRILL METHOD: TRIPOD DRILL RIG
SAMPLE METHOD: BULK AND RING
SHEET: 1 of 1
DRILLING DATE: 2/9/2006
ELEVATION: -

BORING: B-1

Depth (Feet)	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0				SC	Fill	Medium dense, very moist, medium to dark grayish brown clayey SAND (SC).	WA MAX
	7			CL	Qsw	Stiff, moist, medium grayish brown sandy CLAY (CL).	WA, MD AL
5							
	20			SC	Qsw BP_1	Dense, moist, medium to dark brown, fine to medium-grained clayey SAND (SC).	WA
10							
					BP_2	? ? ? ? ? Based on cross-section correlations.	
15							
	26				BP_3	Dense, saturated, medium gray and brown, fine to medium-grained clayey SAND (SC).	WA
20						Total Depth 20' Groundwater Observed at 18'	
25							

Boring B-1

CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL | CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD SUITE 115 | ESCONDIDO CA 92026 | 760 746 4955

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD DRILL RIG	DRILLING DATE:	2/9/2006
LOGGED BY:	STEVE H.	SAMPLE METHOD:	BULK AND RING	ELEVATION:	~23

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC	Fill	Medium dense, moist, medium yellowish brown fine to medium-grained clayey SAND (SC).	
	X					CL	Qsw	SLOPEWASH (Qsw): Stiff, moist, medium brown sandy CLAY (CL).	
5	X	X	10						EI CHEM
									MD
10		X	12				Qsw BP_1	? — ? — ? — ? — ?	
						SC	BP_2	Medium dense, moist, medium to dark brown fine to medium-grained clayey SAND (SC).	
15		X	22						
		X	27				BP_2	Dense, saturated, medium grayish brown, fine to medium-grained clayey SAND (SC).	
20								Total Depth 19' Groundwater Not Observed	
25									

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1441 MONTIEL ROAD, SUITE 115 | ESCONDIDO, CA 92026 | 760.746.4955

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD, SOLID STEM	DRILLING DATE:	10/2/2006
LOGGED BY:	D. RIES	SAMPLE METHOD:	BULK AND CONTINUES SPT	ELEVATION:	17.5

BORING: B-3

Depth (Feet)	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						0-0.3' TURF:	Hand Augered to 1.5 feet
				CL		0.3'-1.5': Soft, very moist, (irrigation), grayish brown fine sandy CLAY (CL) with silt, fine roots.	
	3			SC		1.5'-2.5': Soft to loose, moist to very moist, grayish brown clayey fine SAND (SC) with thin rootlets, occasional fine gravel, (possible fill).	
					Fill	2.5'-3': Soft, moist, yellowish grayish brown, CLAY (CL), trace fine sand, no roots, pinholes, porous.	EI
	5					3'-3.3': Continues soft to loose, moist to very moist, clayey fine SAND (SC) with thin rootlets, occasional fine gravel, (possible fill).	
5	4			CL		3.3'-6': Soft, moist, yellowish gray brown, CLAY (CL), trace fine sand, no roots, pinholes porous.	
	7				Qsw	6'-7': medium stiff, moist, yellowish gray brown CLAY (CL), at 7' becomes dark brown, less porous.	GA AL
					Qsw		
	10				BP_1	8.5'-10': Stiff, moist, dark yellow, gray, brown, orange, mottling, silty CLAY (CL) with trace fine to medium grained sand, scattered coarse grains, and organics.	
10	14					10'-11.5': Stiff, moist, mottled dark gray, brown, with dark orange brown blotches, silty CLAY (CL), with fine sand, scattered medium to coarse sand, trace fine gravel.	
	8			CL	BP_2	11.5'-15': Increasing sand content, grading to fine sandy CLAY (CL), mottled.	
	10						
15	18					15'-16.5': Becomes very stiff.	
			▼			Groundwater at 17'	
	12					17'-18.5': Stiff, wet, mottled dark reddish brown and dark gray dark brown, fine sandy CLAY (CL).	
	17			CL-SC	BP_3	18.5'-20': Grades to very stiff to medium dense, wet, mottled gray brown, orange brown, sandy CLAY to clayey fine SAND (SC), with medium to coarse grains.	
20	24			CL-ML		20'-21.5': Very stiff, wet, mottled gray, gray orange brown sandy silty CLAY to clayey sandy SILT.	GA
	18			SM	BP_4	22'-24': Medium dense, wet, yellowish brown, silty fine SAND (SM) with CLAY.	
	24			SP		24'-24.5': Medium dense, wet, dark brownish gray, SAND (SP), silt to clay, fine to medium grained, at 24.2' a 1/2" thick clay trace layer.	
25							

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	TRIPOD, SOLID STEM	DRILLING DATE:	10/2/2006
LOGGED BY:	D. RIES	SAMPLE METHOD:	BULK AND CONTINUES SPT	ELEVATION:	17.5

BORING: B-3

Depth (Feet)	Sample Bulk	Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25			38			SP-SM		25'-26.5': Dense, wet, dark brown gray and black poorly graded, SAND with silt (SP-SM), fine to medium grained with occasional coarse sand grains, light and dark laminations.	GA
			16					26.5'-27.8': Becomes medium dense.	
						SM		27.8'-28': Medium dense, wet, brown silty SAND (SM).	
			9			SP-SM		28'-29': Medium dense, wet, dark brown, gray, black, poorly graded SAND with silt (SP-SM).	
								29'-29.5': Loose, wet, brown silty SAND (SM).	
30			46			SP		30.5': Dense, wet, grading from last sample to yellow gray clean medium grained SAND (SP).	
			40					32': Dense, wet, yellow, gray, SAND (SP).	
35								Total Depth 33.5' Groundwater at 17' Backfill with Bentonite	
40									
45									
50									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	17.5

BORING: B-4

Depth (Feet)	Bulk Sample	Driven Sample Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0								0-0.3' TURF:	
						CL		0.3'-1.5': Soft, very moist, gray brown fine sandy CLAY with silt and roots.	
			4				Fill	1.5'-2.5': Same as above.	
			3			CL	Qsw	3': Soft, moist, yellow, gray, brown, black silty CLAY (CL), lots of roots, weak laminations. Becomes mottled yellow, gray, brown silty CLAY with small roots, porous.	AL
5			4					5'-7.5': Soft, moist, mottled yellow, gray, brown silty CLAY with small roots, porous.	
			5			ML		7.5'-8': Medium stiff, moist, gray brown clayey SILT (ML) with rootlets, porous.	
			8			CL	Qsw BP$_1$	8'-9.5': Stiff, moist, mottled faint orange to orange tint, dark brown, gray silty CLAY, porous, with sand (increasing content with depth).	
10			7		▽			9.5'-11': Medium stiff, moist, dark gray with light gray brown patches silty CLAY with fine to medium grained sand, porous, noroots, small concretions of fine orange SAND.	
			12					11': No recovery	
			12				BP$_2$	13'-14': Stiff, moist, mottled orange, reddish brown, gray, dark gray with black abundant organics, silty CLAY. 14'-14.5': Hard clay seam with stiff, moist, orange gray silty CLAY.	
15			17			CL		15'-16.5': Very stiff, moist, mottled dark brown, dark red, dary gray red brown, black silty CLAY with trace sand, organics, roots, black root casts.	
			17			ML-CL		17'-18.5': Very stiff, moist, mottled dark brown dark red, dark gray red brown, gray, silty CLAY to clayey SILT with sand.	
			24			SM-ML		18.5'-20': Very stiff, slightly moist, mottled reddish, light brown, gray silty CLAY to sandy SILT and small red inclusions.	
20			16			SC	BP$_3$	20'-20.5': Very stiff to stiff to medium dense, moist, orange brown, brown gray sandy CLAY to clayey SAND with organic fragments. 20.5'-21.5': Pockets of gray sandy CLAY occasional fine gravel, root casts.	
			23		▼	SP-SM		21.9'-22.5: Dense, wet, black, gray, yellow SAND (SP) with silt.	
						SC	BP$_4$	22.5'-23': Dense, wet, yellow, gray, brown, black clayey SAND (SC).	
25								End of Boring at 23' Perched Groundwater at 11' Groundwater observed during drilling at 22'	

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	20.5

BORING: B-5

Depth (Feet)	Bulk Sample	Driven Sample Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0								Cored Cement	
			7			CL	Fill	1.5'-2.75': Medium stiff, moist, yellow gray brown, silty CLAY with trace sand, no roots, porous.	
			12				Qsw	3'-4.5': Medium stiff, moist, gray brown CLAY, non-porous, with carbonate.	
5			8			CL		5.5'-7.5': Stiff, moist, yellow brown silty CLAY with fine to medium grained sand, occasional coarse black grains, faint laminations.	HA
			11			ML	Qsw BP$_1$	7.5'-8': Stiff, moist, red brown clayey SILT with trace sand.	
10									
					▽			Groundwater at 13'	
			16			CL-SC	BP$_2$	13'-14.5': Very stiff, slightly moist, mottled orange gray brown sandy CLAY to clayey SAND with layers of red brown sandy SILT.	
15			18					15.5'-17': Very stiff, slightly moist, mottled orange brown gray with areas of red brown sandy CLAY to clayey SAND and coarse black grains organics.	
			34			CL		18.5'-20': Hard, slightly moist, mottled red, gray, brown, sandy CLAY lots of coarse black grains, roots near 20'.	
20								Total Depth 20' bgs Groundwater Observed 13' bgs	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	24.5

BORING: B-6

Depth (Feet)	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0				SM		0-0.33': Medium dense, slightly moist, yellow gray silty fine to medium SAND (SM).	
				ML		0.33'-0.5': Becomes red brown.	
				CL	Fill	0.5'-2.5': Slightly moist, brown SILT with clay (ML), occasional roots.	
						2.5': Moist, yellow brown CLAY with fine SAND.	
	4					3'-4.5': Stiff, moist, mottled yellow gray brown, fine to medium sandy CLAY, porous, visible bedding.	
5	5				Qsw	4.5'-6': Medium stiff, slightly moist, mottled yellow gray, CLAY, occasional rootlets.	
	11					6'-8': Becomes stiff.	
	11				Qsw	8'-9': Stiff, slightly moist, dark gray light gray brown, fine sandy CLAY with occasional pebbles and coarse grain size charcoal.	
10	14				BP_1	9'-10.5': Stiff, moist, dark gray brown, silty CLAY with trace sand.	
	16			ML		11'-12.5': Very stiff, moist, brown to black, abundant organics, sandy SILT to sandy CLAY.	
				ML/CL			
	17				BP_2	12.5'-17' Very stiff, moist, mottled dark brown, reddish orange brown, dark gray, orange gray, brown siltyCLAY to clayey SILT with trace sand and oxidized orange red coarse sand grains.	
15	21			CL-SC			
	17						
			▼	SC		18'-19.5': Very stiff, wet, mottled dark gray dark red orange gray, clayey SAND with organics.	
	21						
20	32					20'-21.5': Becomes hard.	
	25			CL	BP_3	22'-23': Hard, moist, mottled orange brown, gray, black with organics, sandy CLAY with red oxidized coarse pebbles.	
				SM	BP_4	23': Medium dense, wet, gray silty fine to coarse silty SAND with clay lense.	
25	26				BP_5	24.5'-25.5': Stiff, slightly moist, mottled orange gray brown, black organics, sandy CLAY with bright red coarse grains.	

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	24.5

BORING: B-6

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25									
			22			CL	BP_3	26'-27.5': Medium dense, moist, mottled orange brown, brown gray, sandy CLAY with black organics.	
			44			SC	BP_4	28'-28.75': Very dense, wet, mottled orange black brown, clayey SAND. 28.75'-29.5': Very dense, wet, black yellow clayey medium grained SAND with occasional pebbles.	
30			49			SP-SM		29.5'-31.5': Very dense, wet, black yellow clayey medium grained, poorly graded SAND (SP-SM) with SILT and occasional fine gravel.	GA
35			54					@ 35' Becomes very dense.	
								End of Boring at 36.5' Groundwater Observed during Drillat at 18' and 23'	
40									
45									
50									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO.	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	-23.5

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						CL		0-1.5': Excavates medium stiff, moist, yellow gray brown, fine to medium-grained sandy CLAY (CL).	
						SC	Fill	@ 1.5' Clayey SAND (SC).	
								@ 2' Sandy CLAY (CL).	
			6			CL		2.5'-4': Medium stiff, moist, yellow gray CLAY with roots, trace sand.	
								Medium stiff, moist, yellow gray CLAY with carbonate.	
5			5				Qsw	5'-6.5': Becoming brown with depth.	
								? ? ? ? ?	
10			7		▼	SC	Qsw BP$_1$	10'-11.5': Loose, wet, yellow gray brown, with black organics clayey fine to coarse SAND with pebbles, and red coarse grains.	
			7					11.5'-13': Loose, moist, yellow brown sandy SILT with organics.	
								? ? ? ? ?	
15							BP$_2$		
			21			CL		18'-19.5': Medium dense, moist, mottled dark red, brown, gray sandy CLAY with red coarse grains.	
20			18						
						ML-CL	BP$_3$	20.75'-21': Stiff, moist, mottled orange brown, gray, orange brown clayey sandy SILT to sandy CLAY.	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	-23.5

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25			18		▼	CL-SC		Medium dense, moist to wet, mottled yellow gray brown with black organics.	
								Dug to 30', caved in up to 24'	
30								End of Boring at 30' Peached Groundwater at 10' Groundwater Observed during drilling at 25'	
35									
40									
45									
50									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C	SAMPLE METHOD:	SPT	ELEVATION:	21 8

BORING: B-8

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0								UNDOCUMENTED FILL:	
						SC		0.5': Loose, dry, light brown clayey medium grained SAND.	
						ML	Fill	0.5'-1': Soft, slightly moist, brown, SILT.	
			8			CL		1'-2.5': Stiff, slightly moist, brown silty CLAY with occasional fine gravel.	
			5				Qsw	2.5'-3': Medium stiff, slightly moist, mottled yellow gray, brown silty CLAY with roots, occasional black organics, carbonate stringers.	
5									
			5						
			8				Qsw	7.5'-8': Stiff, moist, yellow brown, CLAY, occasional organics. 8'-9': Stiff, moist, brown CLAY with silt.	
			8				BP_1	9'-10.5': Stiff, moist, yellow gray CLAY with sand and organics.	
10			18			CL		10.5'-11.75': Very stiff, moist, brown, sandy fine to medium CLAY.	
						CL	BP_2	11.75-17': Very stiff, moist, mottled orange, gray, brown with black organics sandy CLAY.	
15									
			17					17-17.75': Medium dense, moist, mottled orange, gray, brown, black organics clayey SAND.	
			12			CL		17.75'-18.5': Very stiff, slightly moist, mottled dark gray, dark reddish brown sandy CLAY. 18.5': Becomes stiff.	GA
20									
					▼	SC	BP_3		
			16					23'-24.5': Hard medium dense, moist to wet, mottled orange, gray, brown clayey fine to medium-grained silty SAND.	
25			16				BP_4	24.5.5-26': Medium dense, wet, mottled orange, gray, brown, black clayey sandy SILT to fine to coarse-grained silty SAND with silt layers/patches.	
								End of Boring at 26' Observed Groundwater at time of Drilling 22.4'	

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	22

BORING: B-9

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0									
			7			CL	Fill	1'-2.5': Medium stiff, moist, yellow brown sandy CLAY with fine gravel.	
			4					2.5'-4': Becomes soft.	
			12					4'-5.5': Stiff, slightly moist, yellow gray, fine sandy CLAY.	
5			7			CL	Qsw	5.5'-7': 0.75' Becomes medium stiff.	
10			10			CL	BP_1	10'-13': Stiff, slightly moist, orange to dark brown, with black organics, sandy CLAY.	
			12						
								— ? — ? — ? — ? — ? —	
15							BP_2	Upper BP_2 contact based on cross-section intrpretation.	
			27					18'-19.5': Very stiff, moist, mottled dark red brown with, black organics fine sandy CLAY.	
20			28			CL-SC		19.5'-21: Very stiff, moist, dark red brown, with black organics fine sandy CLAY to clayey SAND.	
						CL		21'-21.5': Very stiff, moist, mottled orange, dark red brown, with black organics fine sandy CLAY.	
			30			SC		21.5'-22.5': Dense, wet, mottled, orange gray brown, clayey SAND, with red coarse grain-fine gravel size inclusions.	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	2	of	2
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:			9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:			22

BORING: B-9

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
25								21.5'-22.5': Dense, wet, mottled, orange gray brown, clayey SAND, with red coarse grain-fine gravel size inclusions.	
		X	25			SC		27.5'-29': Very stiff, wet, light brown, gray, with black organics sandy CLAY with silt. Approaching silty SAND with clay. ~ 30' Cave in	
30								Total Depth 30' Groundwater Observed during Drilling at 22'	
35									
40									
45									
50									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	23.5

BORING: B-10

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0									
			7			CL	Fill	1'-2.5': Medium stiff, moist, brown sandy SILT to silty SAND, with . roots with coarse oxidized red grains	
			11				Qsw	3': Stiff, moist, yellow brown sandy SILT with CLAY.	
5									
			7			SC		6.5'-6.75': Medium stiff, moist, yellow brown gray, clayey fine to medium grainded SAND, with trace fine gravel.	
			9			CL		6.75'-7': Stiff, moist, gray brown fine sandy CLAY to sandy SILT. 7.5'-9': Becomes yellow brown.	
10			12			CL		9'-10.5': Stiff, moist, mottled yellow gray brown, fine sandy CLAY occasional black organics.	
			18				BP_1	10.5'-12': Very stiff, moist, slightly mottled dark brown to brown with distinctive orange fine gravel and black organics, sandy CLAY.	
								? — ? — ? — ? — ?	
15							BP_2 BP_4		
			14			CL		18-19.5': Stiff, slightly moist, mottled dark brown dark red brown gray with black organics, sandy CLAY.	GS AL
20			19					19.5'-21': Becomes increasing organic precentage very stiff.	
			16					21'-22.5': Less organics.	
					▼	CL	BP_3	Medium dense, wet, mottled, orange, dark red brown fine sandy CLAY.	
			15			SC	BP_4	23'-24.5': Medium dense, wet, orange, gray black clayey medium grained SAND.	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	~14.5

BORING: B-11

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0								SLOPEWASH:	
						SC	Fill	1'-2.5': Wet, brown clayey fine SAND with gravel.	
			2						
			2					2.5'-4': No recovery.	
			6				BP$_1$	4'-5.5': Medium stiff, moist, brown to mottled orange brown black, organics, fine sandy CLAY, last two inches are medium stiff, moist, dark brown CLAY.	
5			5			CL		5.5'-6.25': Medium stiff, moist, mottled light to dark gray brown sandy CLAY with black organic fragments (charcoal).	
			9					7'-8': Medium stiff, moist, mottled dark gray, brown with black organics, sandy CLAY, trace coarse sand and pebbles.	
						SC-CL		8'-8.5': Stiff, moist, dark brown sandy CLAY, to clayey SAND with coarse orange grains	
			18			CL		8.5'-9.5': Stiff to very stiff, moist, mottled brown to orange brown sandy CLAY with coarse orange grains and with wood chips.	
10							BP$_2$	9.5'-10': Very stiff, moist, heavily mottled orange reddish brown sandy CLAY with fine gravel.	
			11					10'-13': Stiff, moist, mottled dark brown orange brown, dark gray sandy CLAY, with abundant black organics.	
			13						
			13					13'-14.5': Stiff, moist, mottled dark reddish brown, dark brown, gray sandy CLAY, with black organics	
15			17		▼	CL-SC		14.5'-16': Very stiff, moist to wet, mottled dark brown, dark red, orange gray brown with black organics, sandy CLAY, with coarse red grains.	
			16			SC	BP$_3$	16'-19.5': Grades to stiff to very stiff, mottled orange brown, brown, gray, clayey SAND.	
			11						
						SC	BP$_4$	Hole cave back to 10'. Clayey sands at bottom.	
20									
								End of Boring 20.5' Groundwater Observed during Drilling at 14.5'	
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S C	SAMPLE METHOD:	SPT	ELEVATION:	~17.5

BORING: B-12

Depth (Feet)	Bulk Sample	Driven Sample Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1.8': Loose, moist, orange brown clayey fine to medium SAND with small roots. @ 1.8': Loose, moist, gray brown clayey fine SAND. 2'-2.5': Soft, slightly moist, yellow brown clayey fine SAND with roots.	
			3					2.5'-3.5': Very soft, moist, yellow gray clayey fine to coarse SAND with gravel and roots (orange oxidation on gravel).	
5			5			CL	Qsw	4'-7': Medim stiff, slightly moist, yellow gray fine sandy CLAY, black root casts.	
			9			CL-SC		7'-7.5': Medium stiff, moist, brown to spotty yellow sandy CLAY to clayey SAND.	
			14			CL	Qsw / BP1	7.6'-9': Stiff, moist, mottled yellow orange, gray-brown fine sandy CLAY with occasional coarse sand grains and black organics, roots.	
10			9		▼	CL	BP1	9'-9.5': Stiff, moist to wet, dark brown with brick red grains silty CLAY with sand.	
			18			CL	BP2	10.5'-12.5': Very stiff, moist, mottled brown, orange gray sandy CLAY.	
			18				BP2	12.5': Very stiff, slightly moist, red brown clayey SAND to sandy CLAY.	
15			15						
			14			CL		15'-16.5': Very stiff to stiff, moist, mottled dark brown, dark gray to red sandy to silty CLAY with organics (charcoal) abundant organics at 15' interval.	
20								End of Boring at 16.5' Groundwater Observed at 9.5'	
25									

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GEOTECHNICAL | CONSTRUCTION ENGINEERING TESTING AND INSPECTION

PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	19

BORING: B-13

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1' @ 1' Loose, slightly moist, yellow light gray, clayey SAND with micas.	
			3					1'-1.5': Very loose, slightly moist, yellow gray clayey fine to medium SAND.	
								1.5'-2.5': Very soft, slightly moist, yellow gray sandy CLAY.	
			5					3'-6': Medium stiff, slightly moist, yellow gray fine sandy CLAY with rootlets.	
5			4			CL	Qsw	4.5'-6': With carbonate.	
			5					6'-8.25': Becomes soft.	
			3						
							Qsw BP$_1$	8.25'-10': Moist, dark gray orange brown dark green, gray fine to coarse sandy CLAY, with occassional pebbles.	
10			9						
			9			CL		10.5': Stiff, moist to wet, mottled dark orange brown, light brown to dark brown, gray, sandy SILT with clay to sandy CLAY, grading downward to clayey fine to coarse-grained SAND.	
			12		▼	SC			
			20			CL	BP$_2$	13.5': Vert stiff, moist, mottled dark brown dark red orange gray brown sandy CLAY.	
15								End of Boring at 15' Groundwater Observed during Drilling at 13.5'	
20									
25									

CONSTRUCTION TESTING & ENGINEERING, INC.
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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO:	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C	SAMPLE METHOD:	SPT	ELEVATION:	14.5

BORING: B-14

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1' TOPSOIL: @ 1' Loose, moist, yellow gray, clayey SAND with roots.	
			2			CL		1.5'-3': Very soft, moist, yellow gray fine sandy CLAY.	
			5				Qsw	3'-3.75': Becomes soft.	
5			5					3.75'-6': Medium stiff, moist, gray brown sandy CLAY.	
			11			CL	Qsw BP$_1$	6'-7.25': Stiff, moist, dark gray silty CLAY with sand.	
			11					7.25'-7.5': Stiff, slightly moist, orange brown sandy CLAY. 7.5'-8': Becomes mottled orange to gray brown. 8'-9': Becomes mottled orange to gray brown..	
10			17			SC-CL	BP$_2$	9'-10.5': Very stiff, slightly moist, mottled red gray brown, clayey SAND to sandy CLAYwith gravel size pieces of charoal.	
15								End of Boring at 10.5' Groundwater Not Observed	
20									
25									

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PROJECT:	LUSARDI RESIDENCE	DRILLER:	PACIFIC DRILLING	SHEET:	1 of 1
CTE JOB NO.	10-8264G	DRILL METHOD:	6" TRIPOD	DRILLING DATE:	9/3/2006
LOGGED BY:	S.C.	SAMPLE METHOD:	SPT	ELEVATION:	~23

BORING: B-15

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/Comments
0						SC	Fill	0-1.5': Loose, moist, brown, clayey SAND with roots.	
						CL	Qsw	2'-3.5': Soft, moist, yellow brown, fine sandy CLAY with roots.	
			3						
			9					3.5'-5': Medium stiff, moist, gray brown sandy CLAY with occasional charcoal.	
5			3					5'-6.5': Soft, moist, yellow gray sandy CLAY with occasional orange grains.	
			6					6.5'-8': Becomes medium stiff.	
			5						
10			9			CL-SC	Qsw	9.25'-9.5': Medium stiff, moist, dark brown, fine to coarse sandy CLAY to clayey SAND.	
						CL	BP_1	9.5'-10.25': Stiff, moist, dark brown sandy CLAY.	
						SC		10.25'-11': Stiff, moist, mottled orange ,gray, brown clayey SAND.	
								? ? ? ? ?	
15			15			CL	BP_2	15'-16.5': Very stiff, moist, mottled dark orange reddish orange dark gray, dark brown, sandy CLAY with some black charcoal fragments.	
								End of Boring at 16.5' Groundwater Not Observed during Drilling	
20									
25									

APPENDIX C

LABORATORY METHODS AND RESULTS

APPENDIX C
LABORATORY METHODS AND RESULTS

Laboratory tests were performed on representative soil samples to detect their relative engineering properties. Tests were performed following test methods of the American Society for Testing Materials or other accepted standards. The following presents a brief description of the various test methods used. Laboratory results are presented in the following section of this Appendix.

Classification

Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D2487.

Particle-Size Analysis

Particle-size analyses were performed on selected representative samples according to ASTM D422.

Expansion Index

Expansion testing was performed on selected samples of the matrix of the onsite soils according to Building Code Standard No. 29-2.

Atterberg Limits

The procedure of ASTM D4518-84 was used to measure the liquid limit, plastic limit and plasticity index of representative samples.

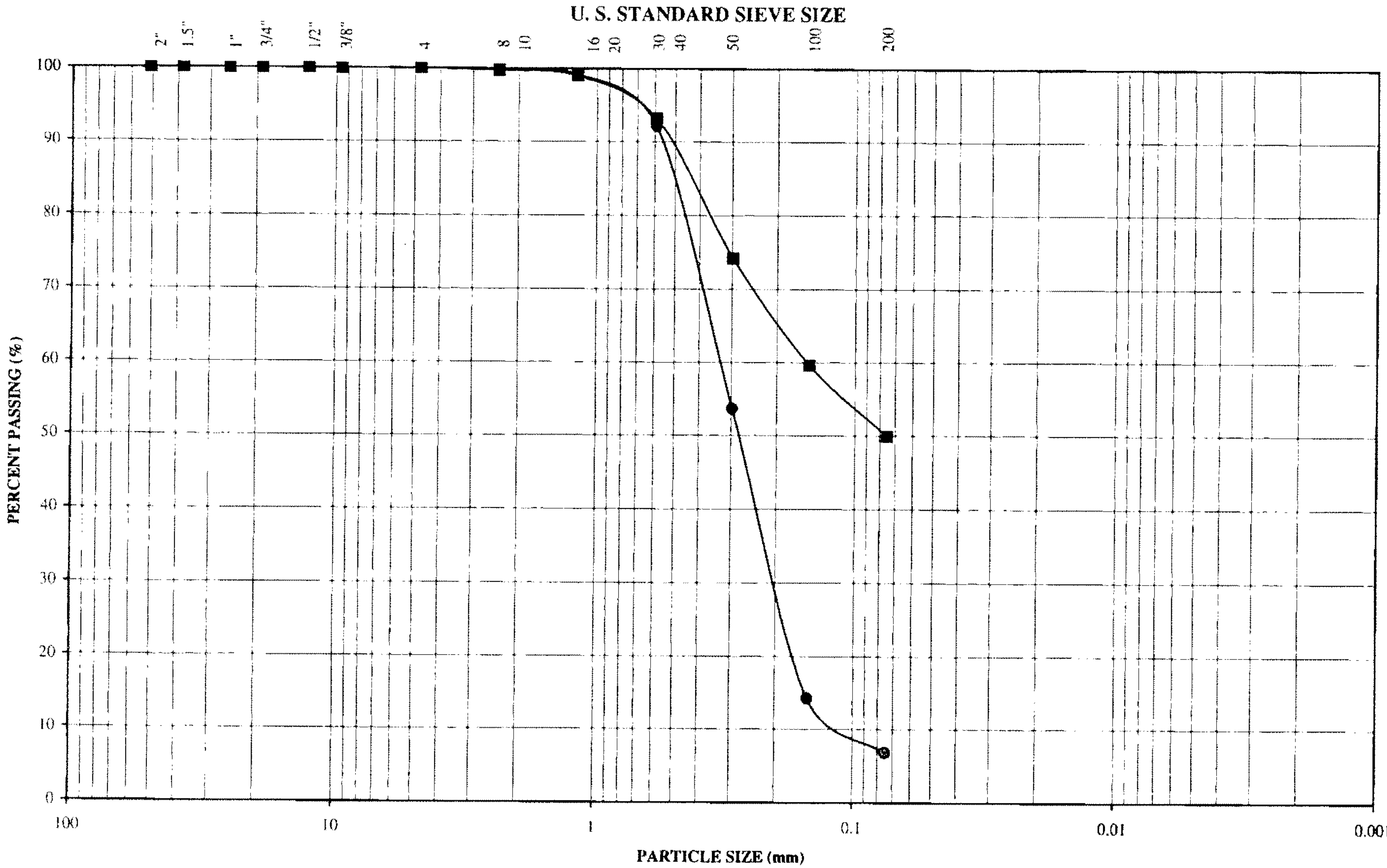
EXPANSION INDEX TEST

UBC 18-2

LOCATION	DEPTH (feet)	EXPANSION INDEX	EXPANSION POTENTIAL
B-3	2-7	41	LOW

ATTERBERG LIMITS

LOCATION	DEPTH	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
B-3	6-7.5	37	26	CL
B-4	3-4.5	41	29	CL
B-10	18-19.5	27	16	CL



PARTICLE SIZE ANALYSIS

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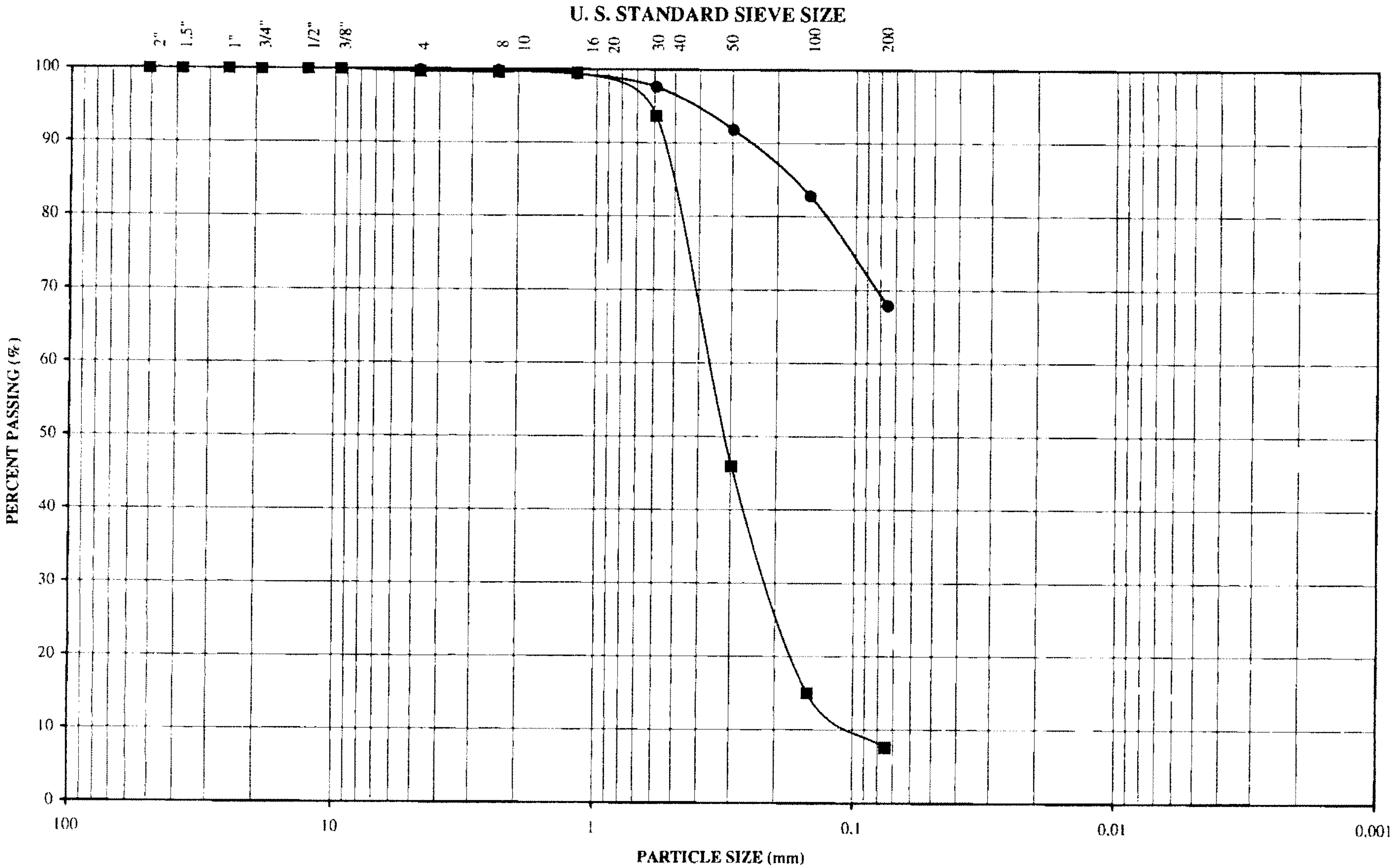
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
2414 VINEYARD AVENUE, SUITE G ESCONDIDO CA. 92029 (760) 746 4955

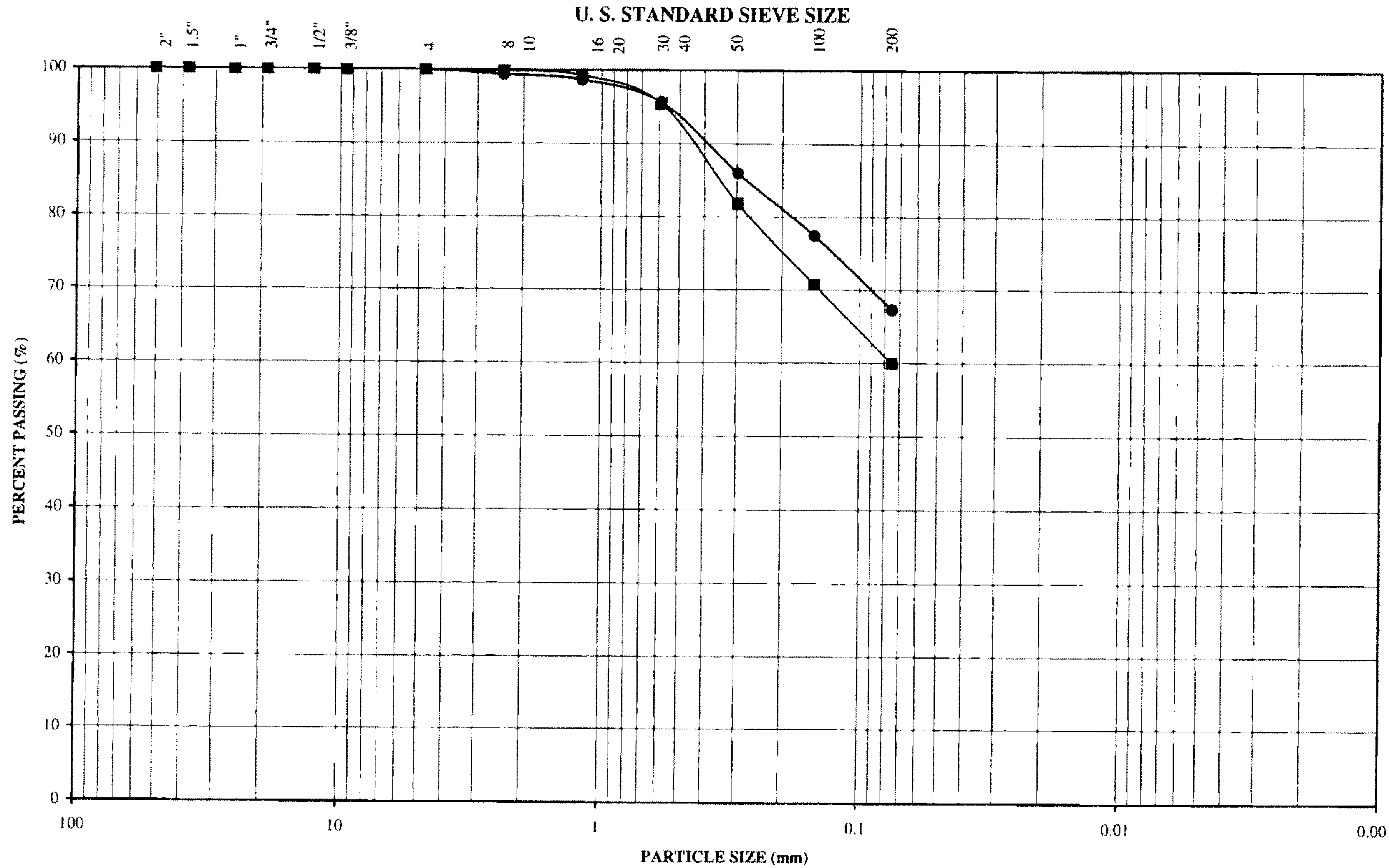
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-3	25-26.5	●	-	-	SP-SM
B-3	20-21.5	■	-	-	CL-SC
CTE JOB NUMBER:		10-8264G		FIGURE:	C-1



PARTICLE SIZE ANALYSIS

CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
2414 VINEYARD AVENUE, SUITE G ESCONDIDO CA 92029 (760) 746-4955

Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-3	6-7.5	●	-	-	CL
B-6	29.5-31.5	■	-	-	SP-SM
CTE JOB NUMBER:		10-8264G		FIGURE:	C-2



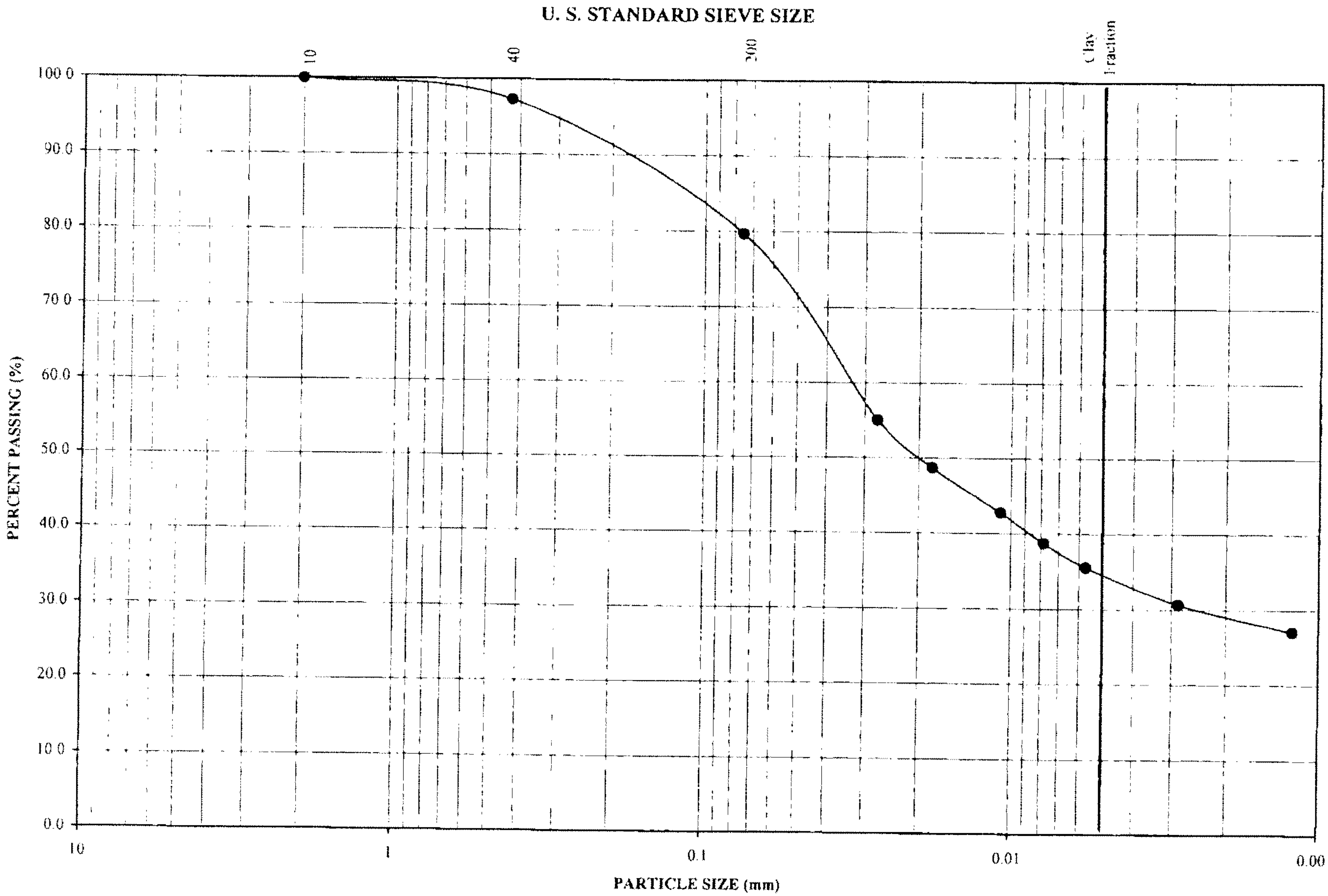
PARTICLE SIZE ANALYSIS

CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
2414 VINEYARD AVENUE, SUITE G ESCONDIDO CA 92029 (760) 746-4955

Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-8	17-18.5	●	-	-	CL
B-10	18-19.5	■	-	-	Cl

CTE JOB NUMBER:	10-8264G	FIGURE:	C-3

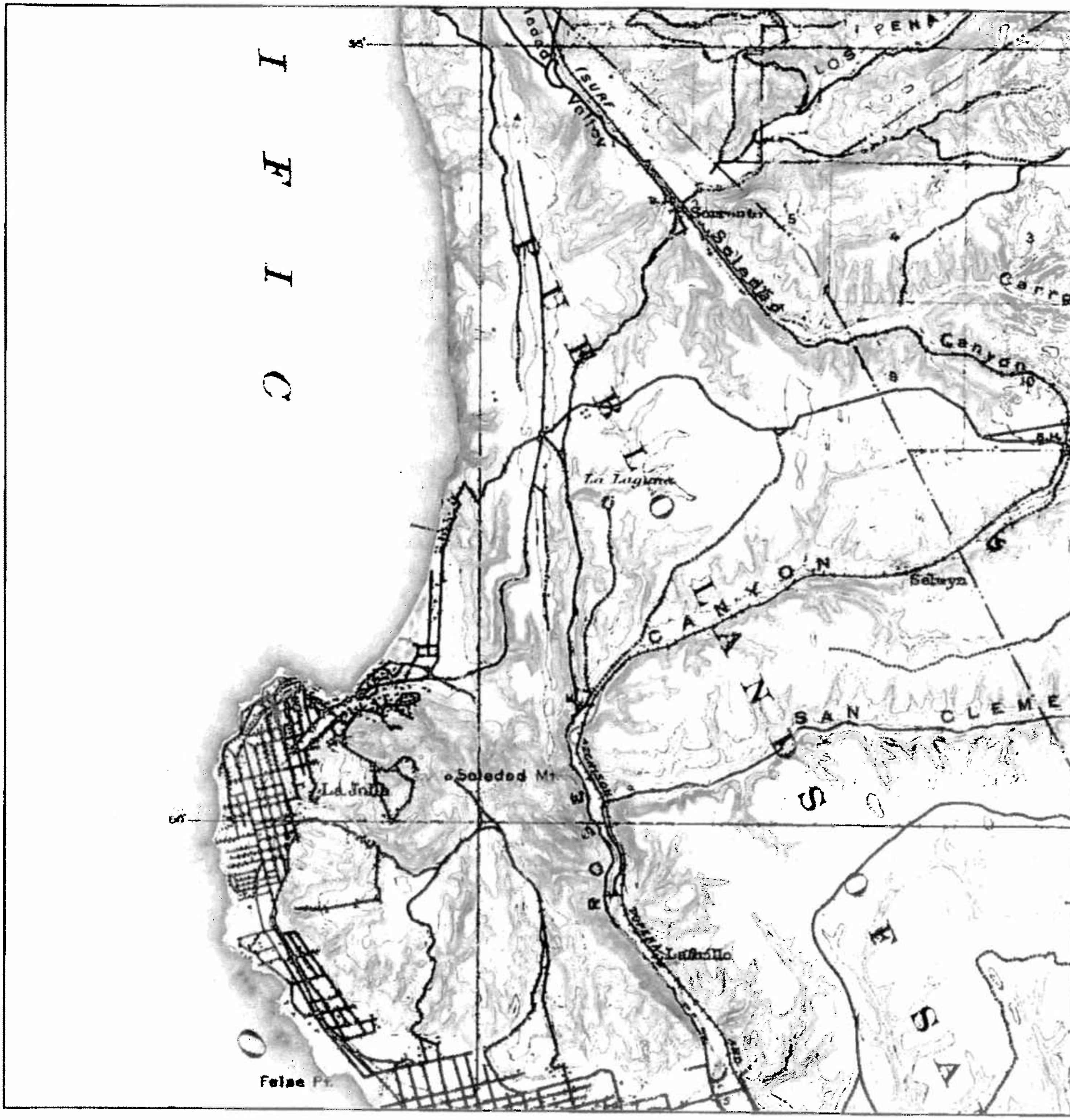
Lusardi Residence
10-8264G
Lab#16769 B5@5.5-7.0'



APPENDIX D

HISTORIC TOPOGRAPHIC MAPS

Historical Topographic Map

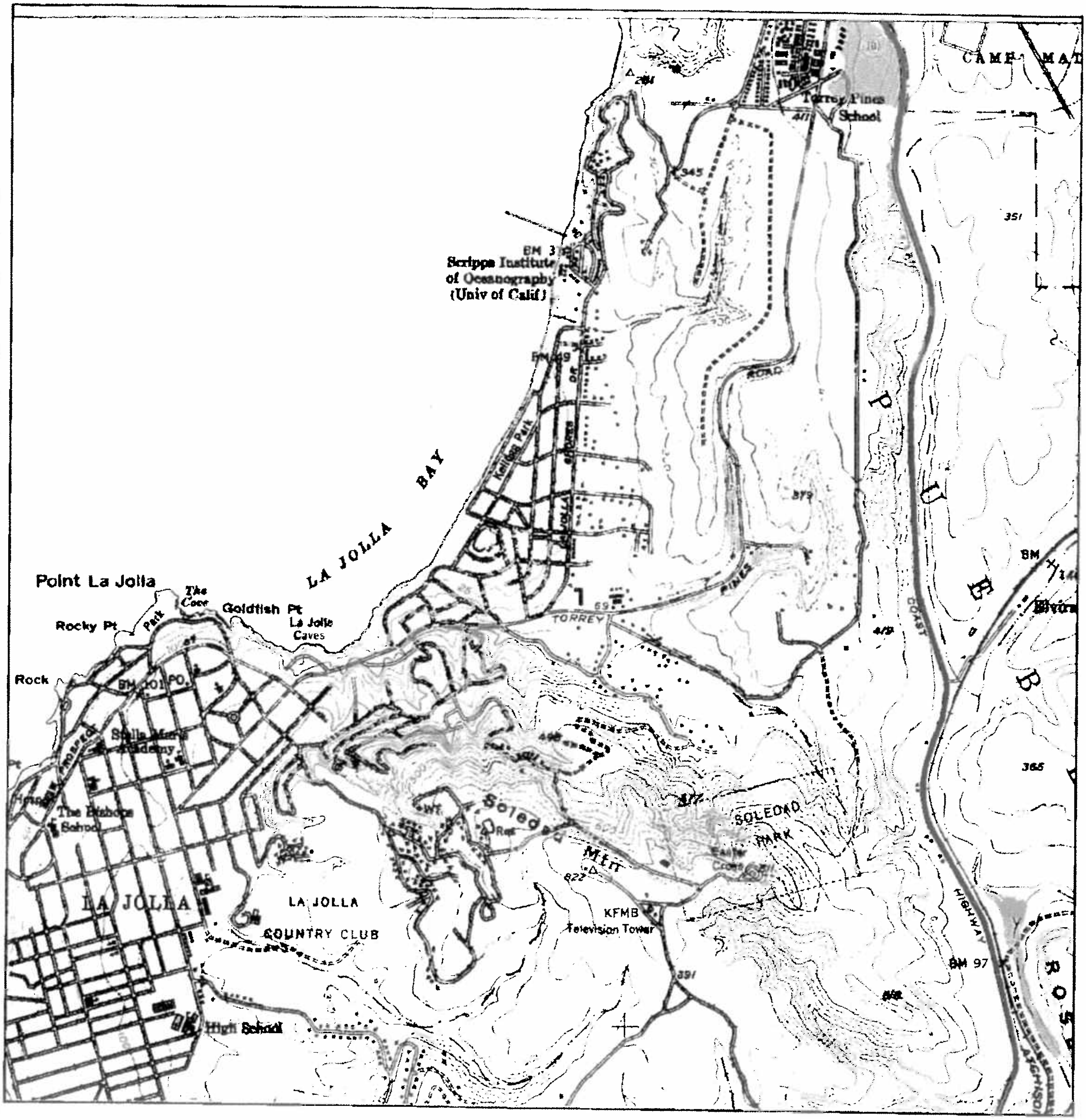


CONSTRUCTION TESTING & ENGINEERING, INC.
GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
1441 MONTIEL ROAD, STE 115 ESCONDIDO CA 92026 (760) 746-4955

LA JOLLA 15' QUAD. 1930
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO.	10-8264G
SCALE	1:62500
DATE 12/06	FIGURE D-1

Historical Topographic Map



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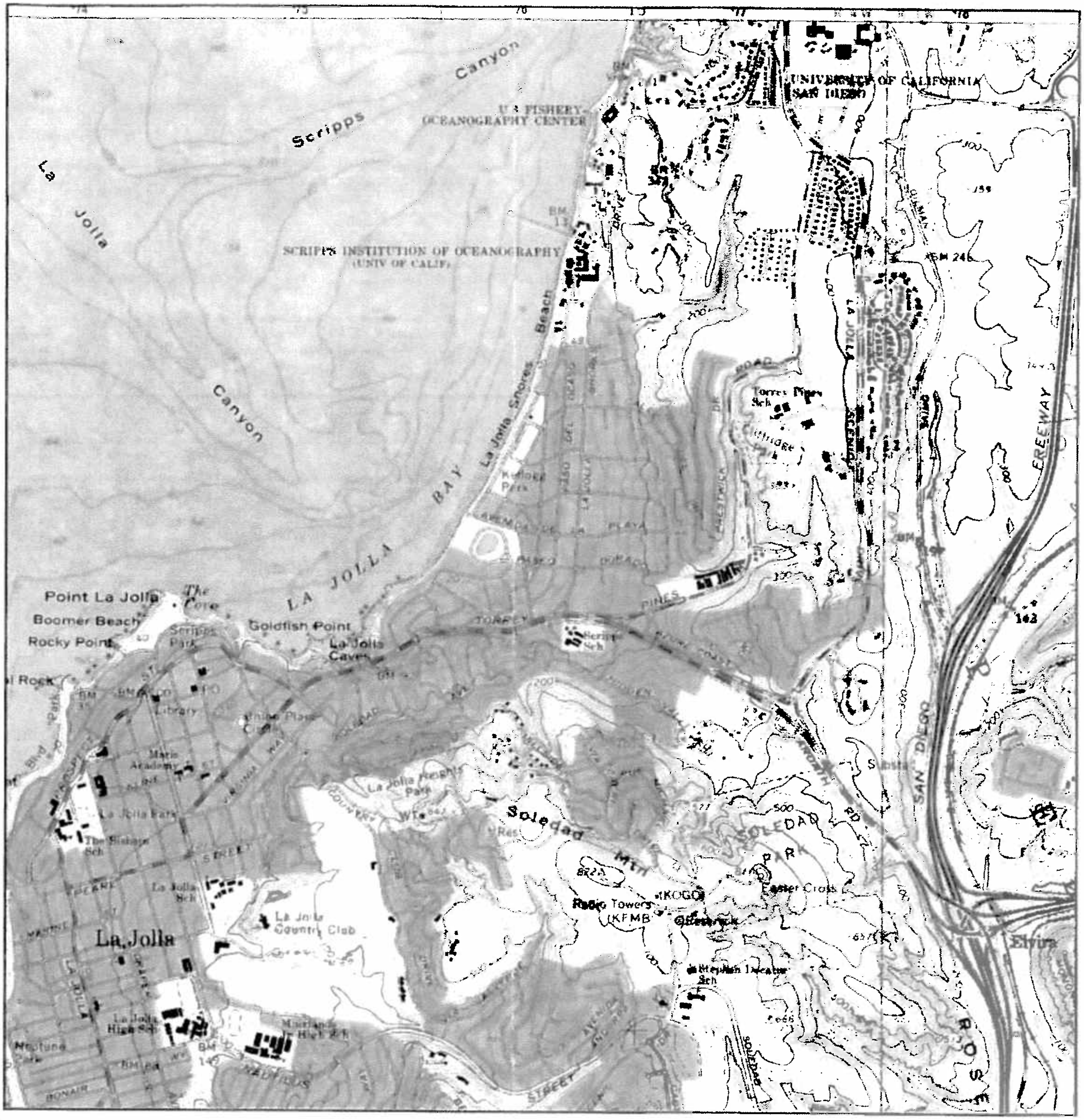
1441 MONTIEL ROAD, STE 115 ESCONDIDO CA 92026 (760) 746-4955

LA JOLLA 7.5' QUAD. 1953	CTE JOB NO 10-8264G
LUSARDI RESIDENCE	SCALE 1:24000
LA JOLLA, CALIFORNIA	DATE 12/06 FIGURE D-2

Historical Topographic Map



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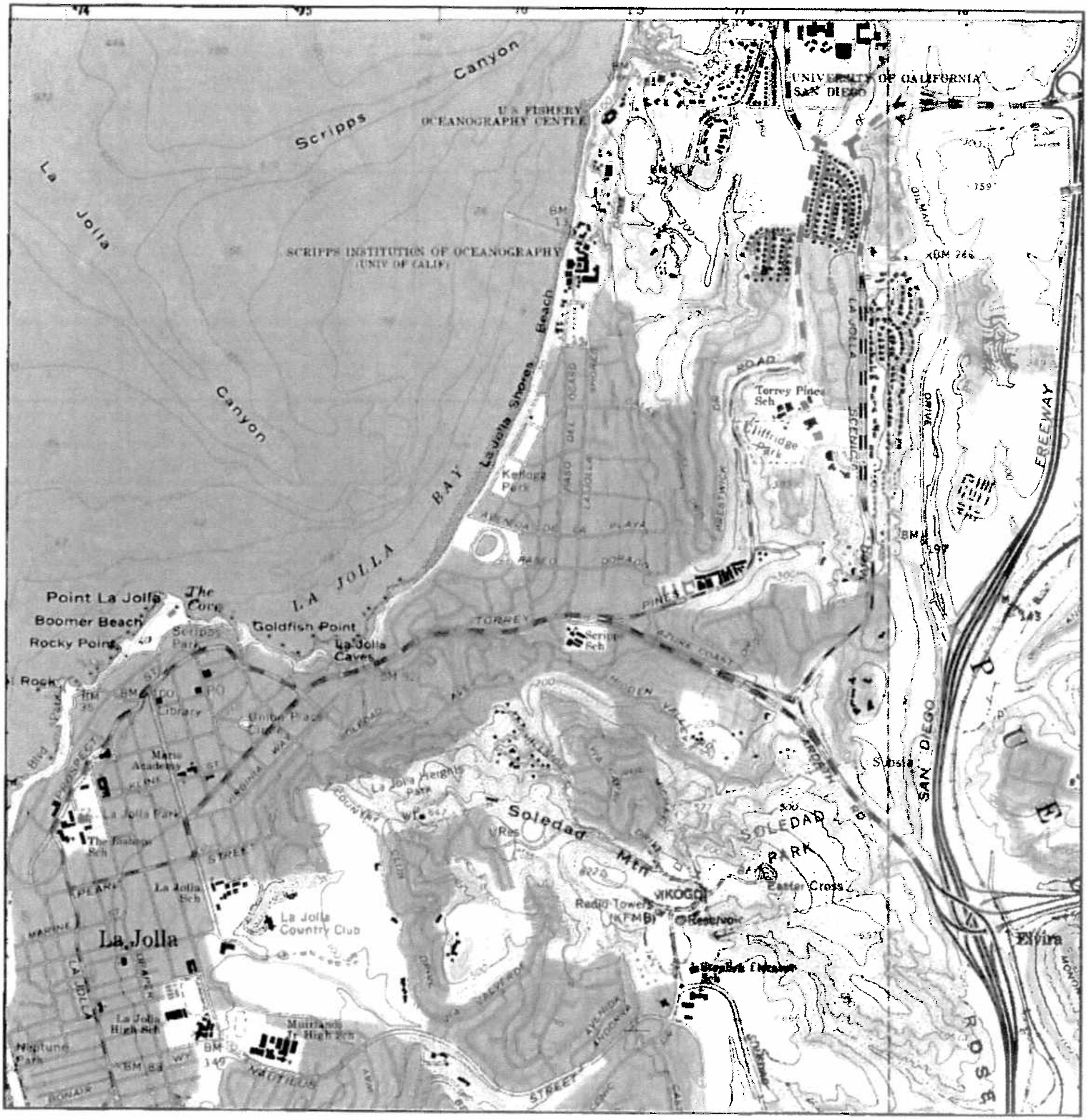
1441 MONTIEL ROAD, STE 115 ESCONDIDO CA 92026 (760) 746-4955

LA JOLLA 7.5' QUAD. 1967 LUSARDI RESIDENCE LA JOLLA, CALIFORNIA	CTE JOB NO 10-8264G	
	SCALE 1:24000	
	DATE 12/06	FIGURE D-3

Historical Topographic Map



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N

LA JOLLA 7.5' QUAD. 1975
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO. 10-8264G	
SCALE 1:24000	
DATE 12/06	FIGURE D-4

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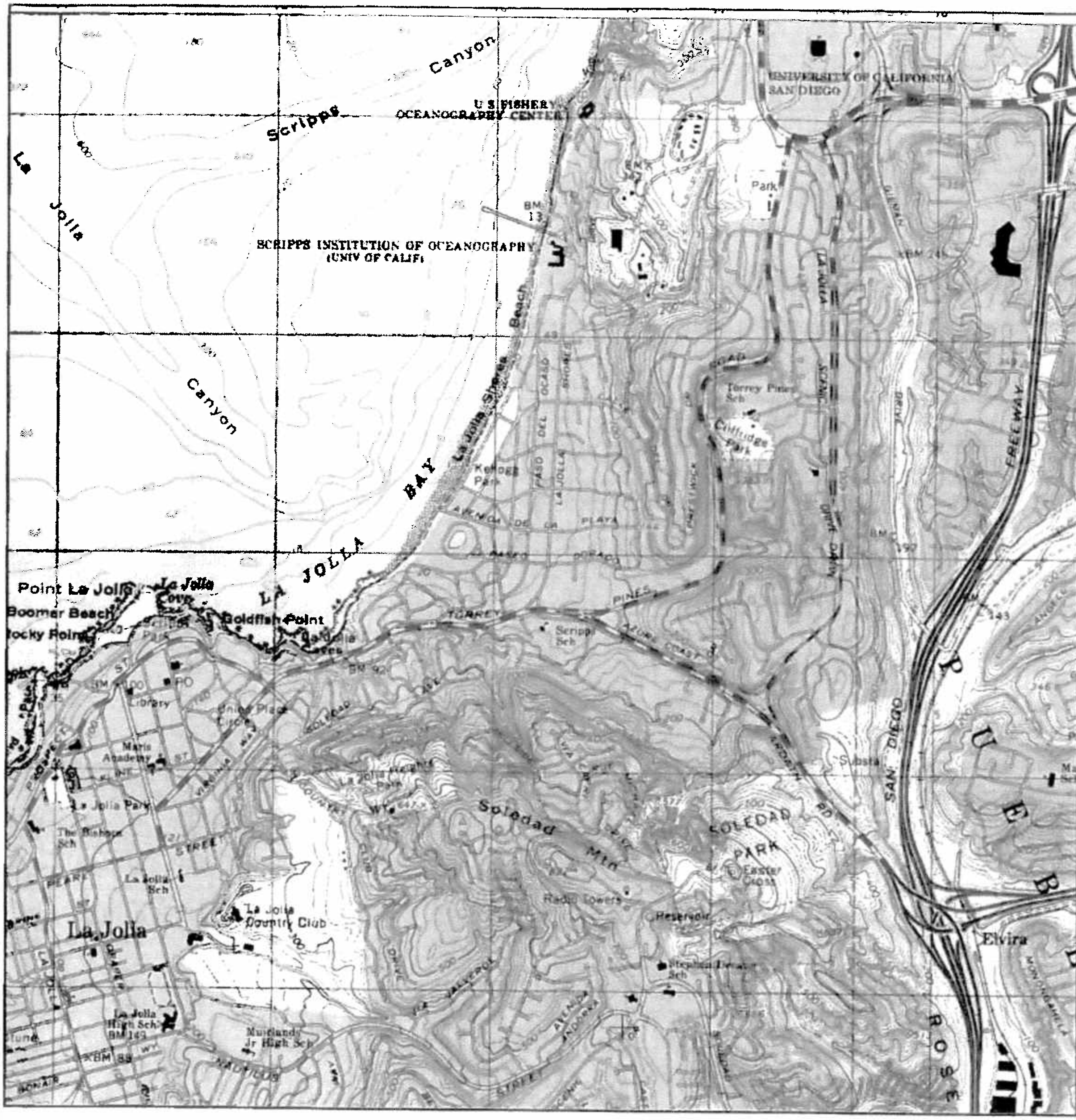
LA JOLLA QUAD. 1977

LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO	10-8264G
SCALE	1:2400
DATE 12/06	FIGURE D-5

Historical Topographic Map



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LA JOLLA 7.5' QUAD. 1996
LUSARDI RESIDENCE
LA JOLLA, CALIFORNIA

CTE JOB NO	10-8264G
SCALE	1:24000
DATE 12/06	FIGURE D-6

APPENDIX E

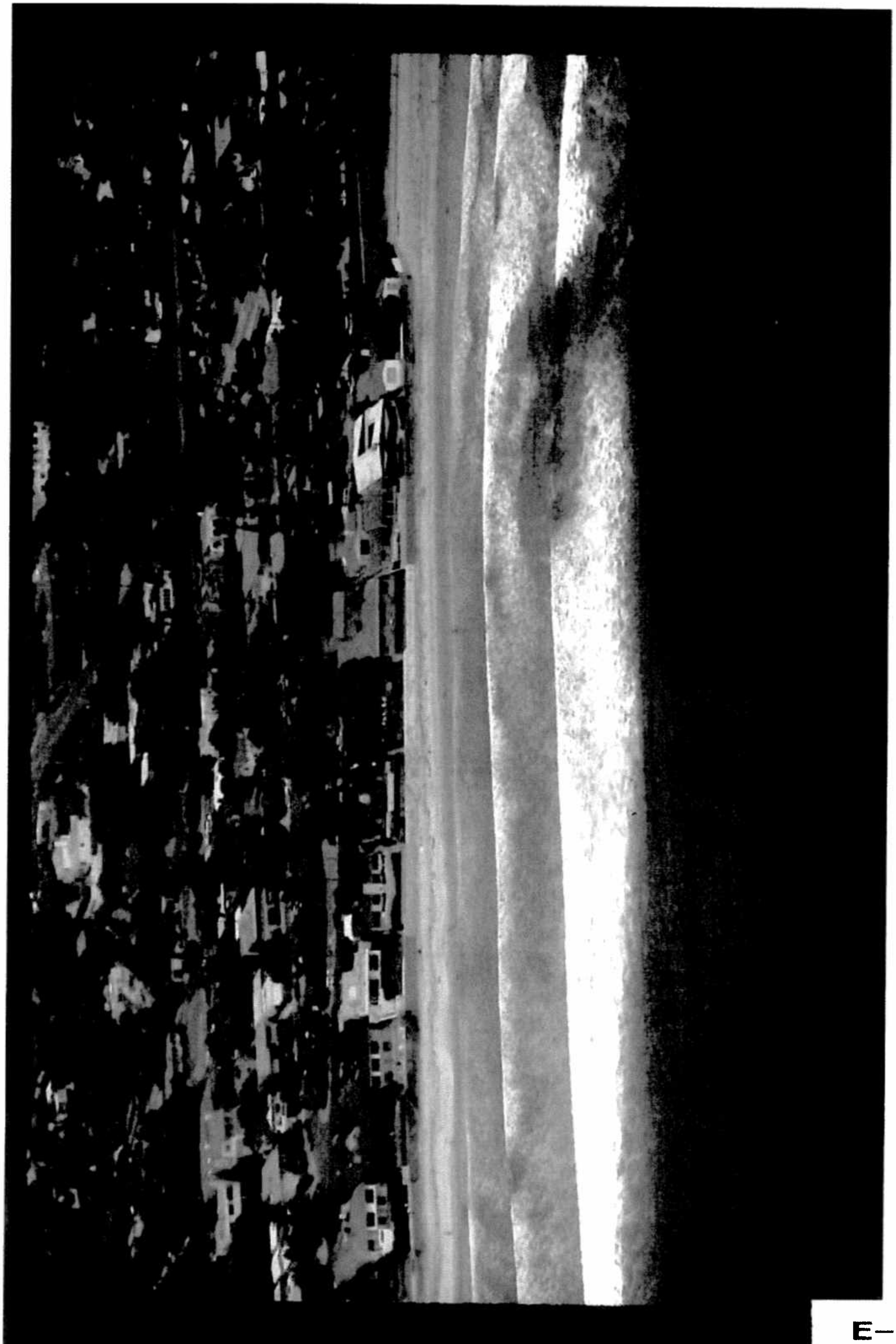
CALIFORNIA COASTAL RECORDS PROJECT PHOTOGRAPHS

1972

1979

1979

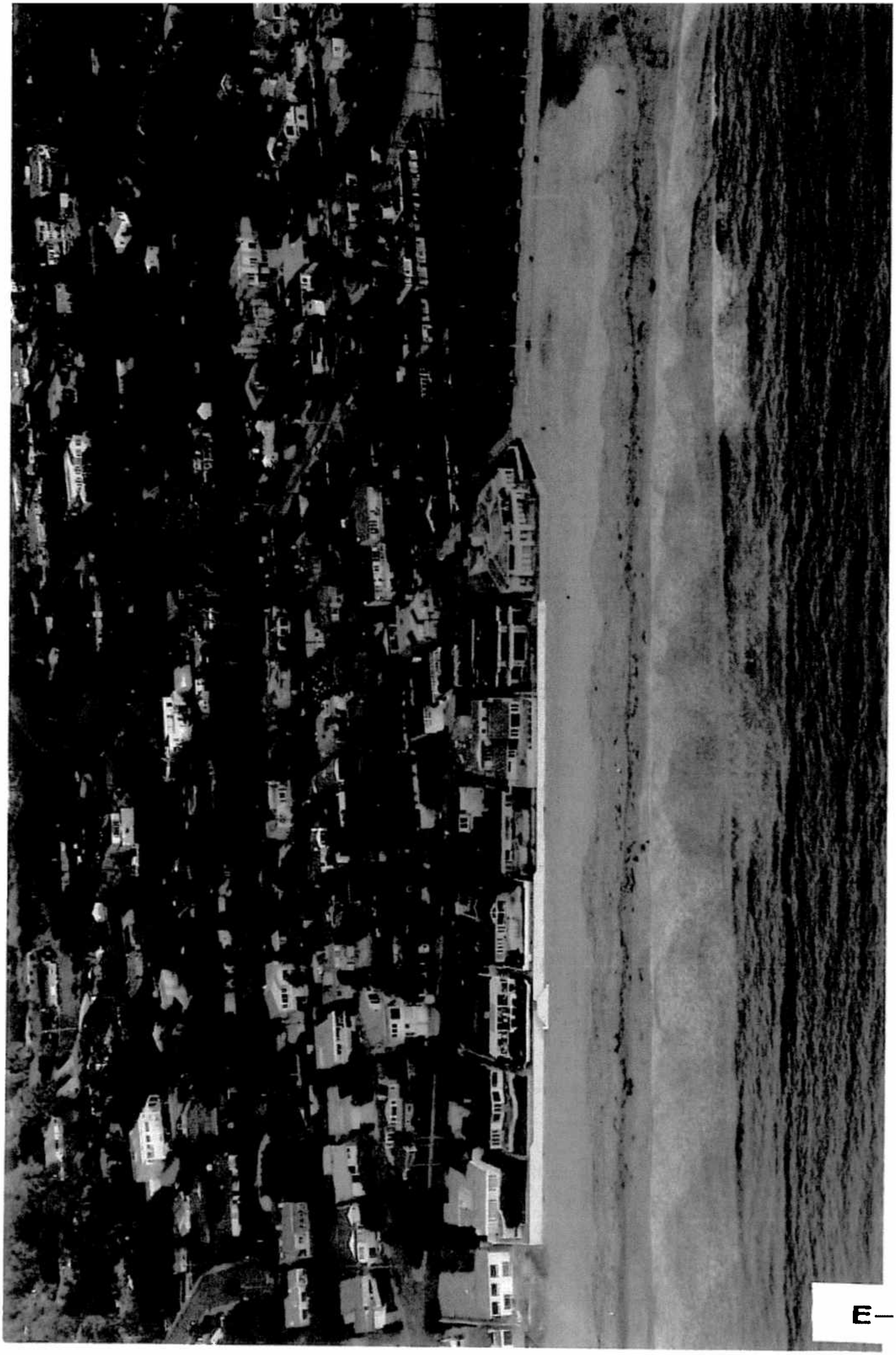
E-3



1987

1989

1995



2004

APPENDIX F

EDR HISTORICAL AERIAL PHOTOGRAPHS

Date EDR Searched Historical Sources:
Aerial Photography August 28, 2006

Target Property:
8466 El Paseo Grande
La Jolla, CA 92037

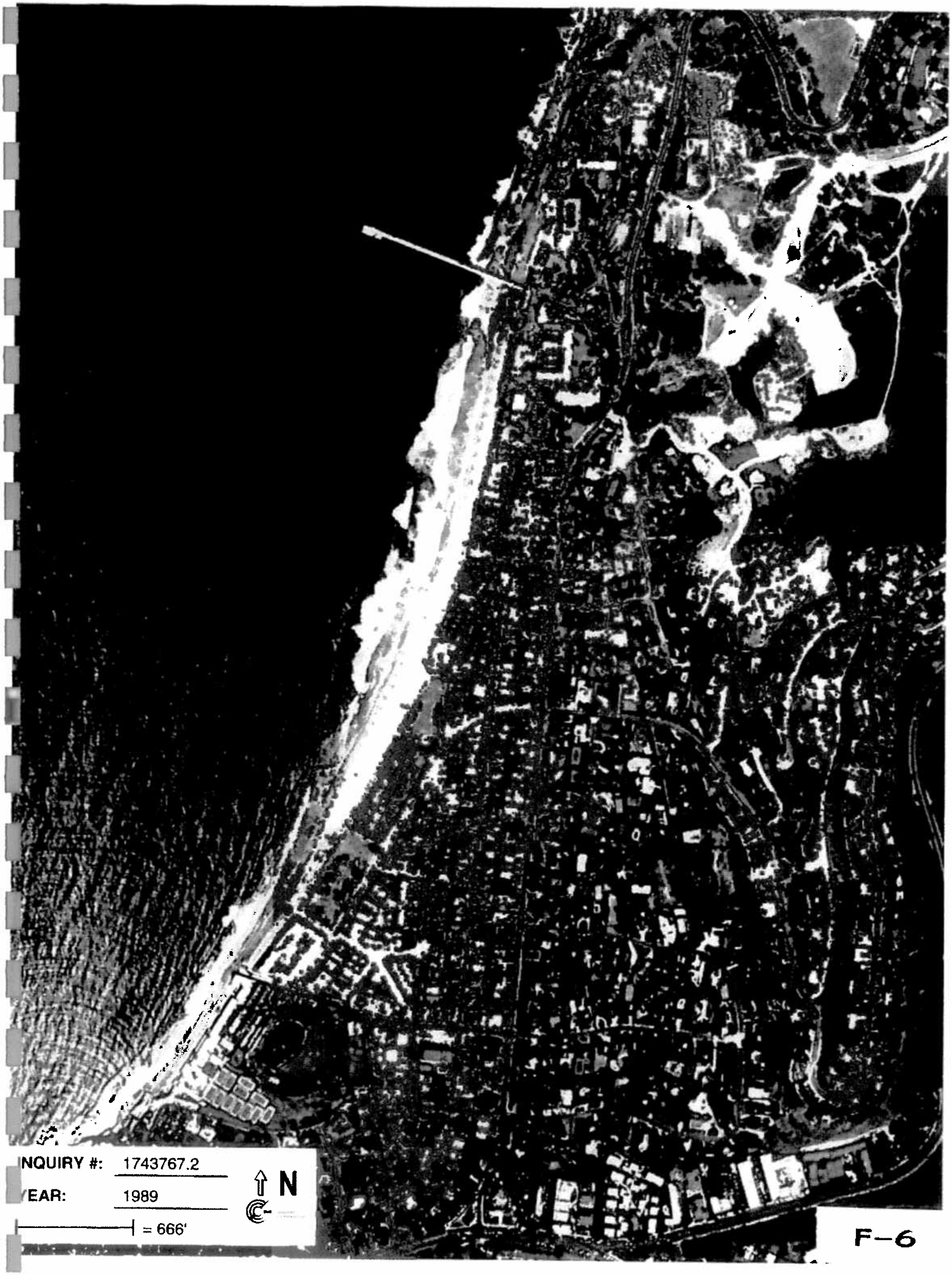
Year	***Scale***	***Details***	***Source***
1948	Aerial Photograph. Scale: 1"=666'	Flight Year: 1948	Pacific Air
1953	Aerial Photograph. Scale: 1"=555'	Flight Year: 1953	Park
1963	Aerial Photograph. Scale: 1"=555'	Flight Year: 1963	Cartwright
1974	Aerial Photograph. Scale: 1"=600'	Flight Year: 1974	AMI
1989	Aerial Photograph. Scale: 1"=666'	Flight Year: 1989	USGS
1994	Aerial Photograph. Scale: 1"=666'	Flight Year: 1994	USGS
2002	Aerial Photograph. Scale: 1"=666'	Flight Year: 2002	USGS

F-2

F-3


INQUIRY #: 1743767.2
YEAR: 1963
= 555'
N
F-4


INQUIRY #: 1743767.2
YEAR: 1974
N
= 600'
F-5



F-6


INQUIRY #: 1743767.2
YEAR: 1994
N
= 666'
F-7


INQUIRY #: 1743767.2
YEAR: 2002
= 666'
N
F-8

APPENDIX G

PUBLISHED HISTORICAL PHOTOGRAPHS

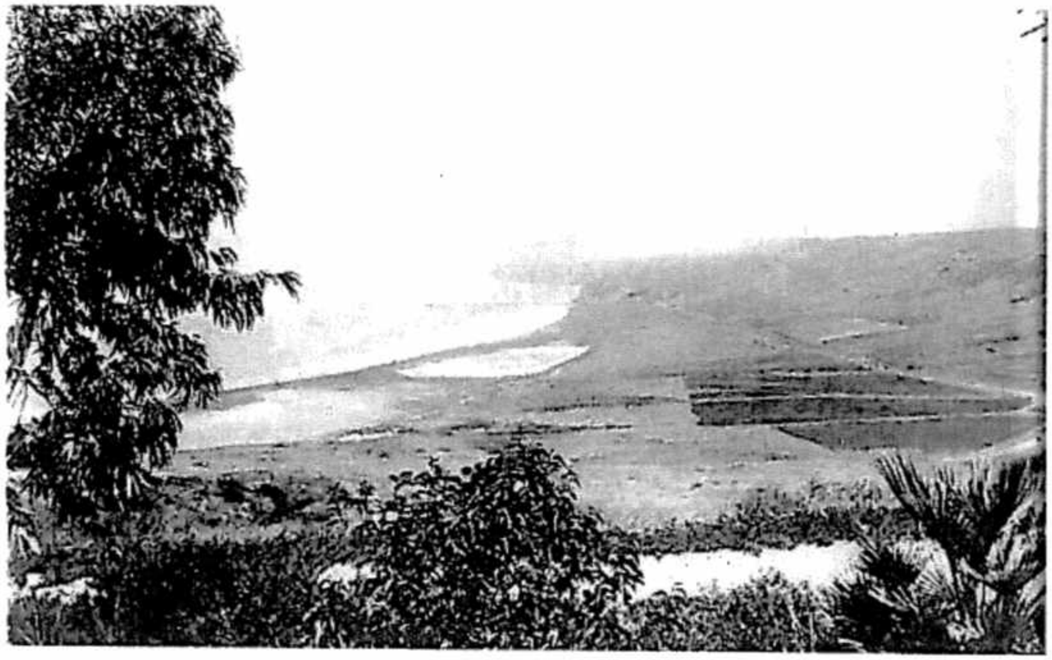


Photo #1: La Jolla Shores 1930 (T. Shepard Collection; in Kuhn, 1984)

Photo #2: View of low-lying alluvial cliffs 1936 (approximate location at 8516 El Paseo Grande
Cliff erosion rate at that time estimated at one foot per year (photo from U.S. Grant View Kuhu, 1984)

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APPENDIX G **LUSDARI RESIDENCE** **LA JOLLA, CALIFORNIA**	CTE JOB NO 10-8264G	
	SCALE NO SCALE	
	DATE 1/07	PAGE G-1

Photo #3: View at same location as Photo #2 during heavy storms of 1978 (Kuhn, 1984)

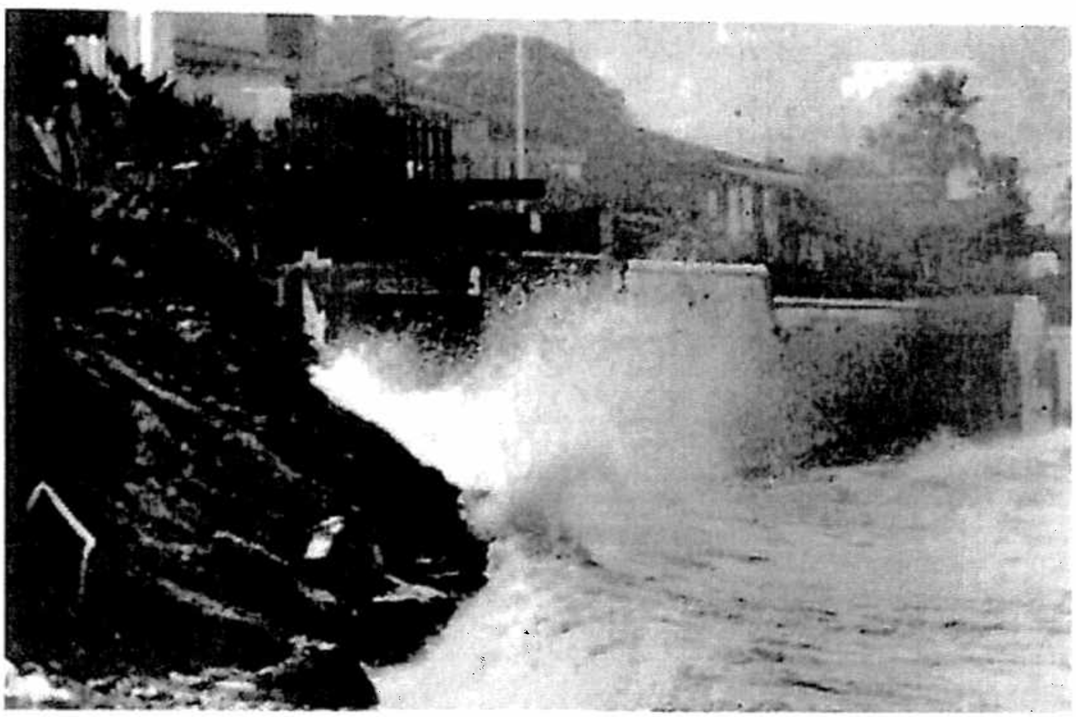

Photo #4: Same Location as Photo #3 1978 (Kuhn, 1984)

Photo #5: Same location as Photo #2-#5, showing partial collapse of seawall in 1978 (Kuhn, 1984)

Photo #6: Up to 15 feet local retreat in general area as Photo #5 (Kuhn, 1984)

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APPENDIX G **LUSDARI RESIDENCE** **LA JOLLA, CALIFORNIA**	CTE JOB NO 10-8264G SCALE NO SCALE DATE 1/07 PAGE G-3

Photo #7: 1979 view at 8516 El Paseo Grande with new seawall constructed (Kuhn, 1984)

CULTURAL RESOURCE SURVEY AND TESTING RESULTS
AT 8470 EL PASEO GRANDE
CITY OF SAN DIEGO, CALIFORNIA
(APN 346-050-01)

Prepared for:

Mr. David Lessnick
EPG3, LLC
1900 Western Avenue
Las Vegas, NV 89102

Prepared by:

Laguna Mountain Environmental, Inc.
7969 Engineer Road, Suite 208
San Diego, CA 92111

Andrew R. Pigniolo
Andrew R. Pigniolo, RPA
Carol Serr

May 2017

Laguna Mountain Environmental, Inc.

CULTURAL RESOURCE SURVEY AND TESTING RESULTS AT 8470 EL PASEO GRANDE CITY OF SAN DIEGO, CALIFORNIA
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May 2017

National Archaeological Data Base Information
Type of Study: Cultural Resource Survey
Sites: none
USGS Quadrangle: La Jolla 7.5'
Area: 0.27 acres
Key Words: City of San Diego, La Jolla Shores, 8470 El Paseo Grande, Negative Survey and Test

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ABSTRACT

Laguna Mountain Environmental, Inc. (Laguna Mountain) conducted an archaeological survey and testing program at 8470 El Paseo Grande, in the La Jolla Shores area of the City of San Diego. The proposed project includes an addition and expansion of an existing residence. The archaeological investigation included a records search, literature review, examination of historic maps, field inventory of the property, and subsequent testing.

The goal of the effort was to determine if significant portions of prehistoric site CA-SDI-20129/SDM-W-199 extend within the project area and would be impacted by the project. Cultural resource work was conducted in accordance with the California Environmental Quality Act (CEQA) and the City of San Diego Land Development Code and Historical Resources Guidelines. The City of San Diego will serve as lead agency for the project and CEQA compliance.

The records search was conducted at the South Coastal Information Center at San Diego State University. The record search concluded that the project area had not been previously surveyed, but that at least 40 cultural resource investigations have been conducted within one-quarter mile of the project area. Eleven cultural resources have been identified through previous research within the one-quarter mile radius of the project, seven prehistoric and two historic. The project area is near the previously recorded southern boundary of site CA-SDI-20129/SDM-W-199. The temporary camp site boundary encompasses a large area and is based on sparse early data in the area showing the presence of buried prehistoric shell lenses and associated artifacts.

The survey was conducted by Andrew R. Pigniolo, MA, on July 29, 2016. Mr. Dennis Linton, of Red Tail Monitoring and Research, served as Native American monitor. The entire project area was surveyed in less than 5-meter transect intervals. Approximately 85 percent of the lot was covered by the existing residence and hardscape. Within the lawn area and landscape areas of the parcel, surface visibility was good, averaging approximately 75 percent. Grading associated with the construction of the existing residence appears to have been limited, but may include some fill on the western portion of the lot and in other landscape areas.

The results of this survey indicated that no cultural resources were present on the surface of the property. A small amount of recent beach shell was observed on the side of a walkway near the beach side of the parcel. The shell appeared water-worn and recent. The absence of cultural material suggests that the project area is not within the boundaries of site CA-SDI-20129/SDM-W-199.

Because survey visibility was limited and the project is located within the La Jolla Shores Archaeological Study Area, subsurface testing was required. Three hand-excavated shovel test pits (STPs) were excavated within the parcel in order to determine if remains of site CA-SDI-20129/SDM-W-199 extend into the project area. Testing was conducted on July 29, 2016. Mr. Andrew Pigniolo served as Principal Investigator and Mr. Dennis Linton of Red Tail Monitoring & Research served the project as the Native American monitor.

Testing indicated that the western side of the lot was partially raised with fill during house construction in the 1950s. The area on the eastern side of the existing residence also shows evidence of disturbance related to landscaping and previous construction. Soils are relatively shallow (approximately 20 cm), over compact clayey silt subsoil. No identifiable prehistoric cultural material was identified during testing. No artifacts or other cultural material were recovered or observed other than modern intrusive materials.

While the NAHC has no records of known cultural resources in the project area, because the project is within the La Jolla Shores Archaeological Study Area, monitoring by an archaeological and a Native American monitor is recommended during both geotechnical testing as well as construction excavation and grading to ensure sensitive resources are not present or impacted by the project.

In accordance with CEQA criteria as defined in Section 15064.5 and City of San Diego Historical Resources Guidelines the project has the potential to impact cultural resources. A cultural resource mitigation, monitoring, and reporting program will serve as mitigation for potential impacts.

I. INTRODUCTION

A. Project Description

The proposed project includes the demolition of an existing residence and construction of a new residential structure. Prior to the project demolition, geotechnical testing is required in order to assess soils stability and faulting in the area. During house construction grading and excavation for foundations and utilities will occur. The project area is located in the southwestern portion San Diego County within the La Jolla Shores area in the City of San Diego (Figure 1). It is located west of Interstate 5, west of La Jolla Shores Drive, and south of the Scripps Institute of Oceanography. The project is situated on a residential lot at 8470 El Paseo Grande (APN 346-050-01-00). The project is located in an unsectioned portion of Pueblo Lands in Township 15 South, Range 3 West. The project area is shown on the La Jolla USGS 7.5' Quadrangle (Figure 2) and on the City of San Diego 1:800 scale maps (Figure 3).

The 8470 El Paseo Grande project includes the demolition and addition to an existing 2,805 square foot one-story single family residence (Figure 4). Excavation will include geotechnical trenching and testing, partial demolition, new foundation work, and disturbance to remove existing landscaping and hardscape. The property is within a sensitive zone for cultural resources that triggered the requirement for archaeological mitigation monitoring during earth-disturbing activities.

Cultural resource work was conducted in accordance with the California Environmental Quality Act (CEQA), and the City of San Diego Land Development Code and Historical Resources Guidelines. The City of San Diego will serve as lead agency for the project and CEQA compliance. The survey and testing program was conducted to determine whether there were cultural resources present within the project area, and to evaluate whether resources eligible for nomination to the California Register are present.

B. Project Personnel

The cultural resource survey was conducted by Laguna Mountain Environmental, Inc. (Laguna Mountain), whose cultural resources personnel meet state and local requirements. Mr. Andrew Pigniolo served as Principal Investigator for the project in addition to field surveyor and report author. Mr. Pigniolo is a member of the Register of Professional Archaeologists (RPA; previously called SOPA), and meets the Secretary of the Interior's standards for qualified archaeologists. He is also a qualified archaeologist within the City of San Diego. Mr. Pigniolo has a MA degree in Anthropology from San Diego State University, along with 35 years experience in southern California archaeology. His resume is included in Appendix A.

Ms. Carol Serr prepared the report graphics, catalogued the recovered material, and formatted the report. She has a B.A. in Anthropology from San Diego State University and more than 36 years of experience in San Diego archaeology. Mr. Dennis Linton, a representative of Red Tail Monitoring and Research (Red Tail), served the project as Native American Monitor.

Figure 1
Regional Location Map

0 5 10
MILES

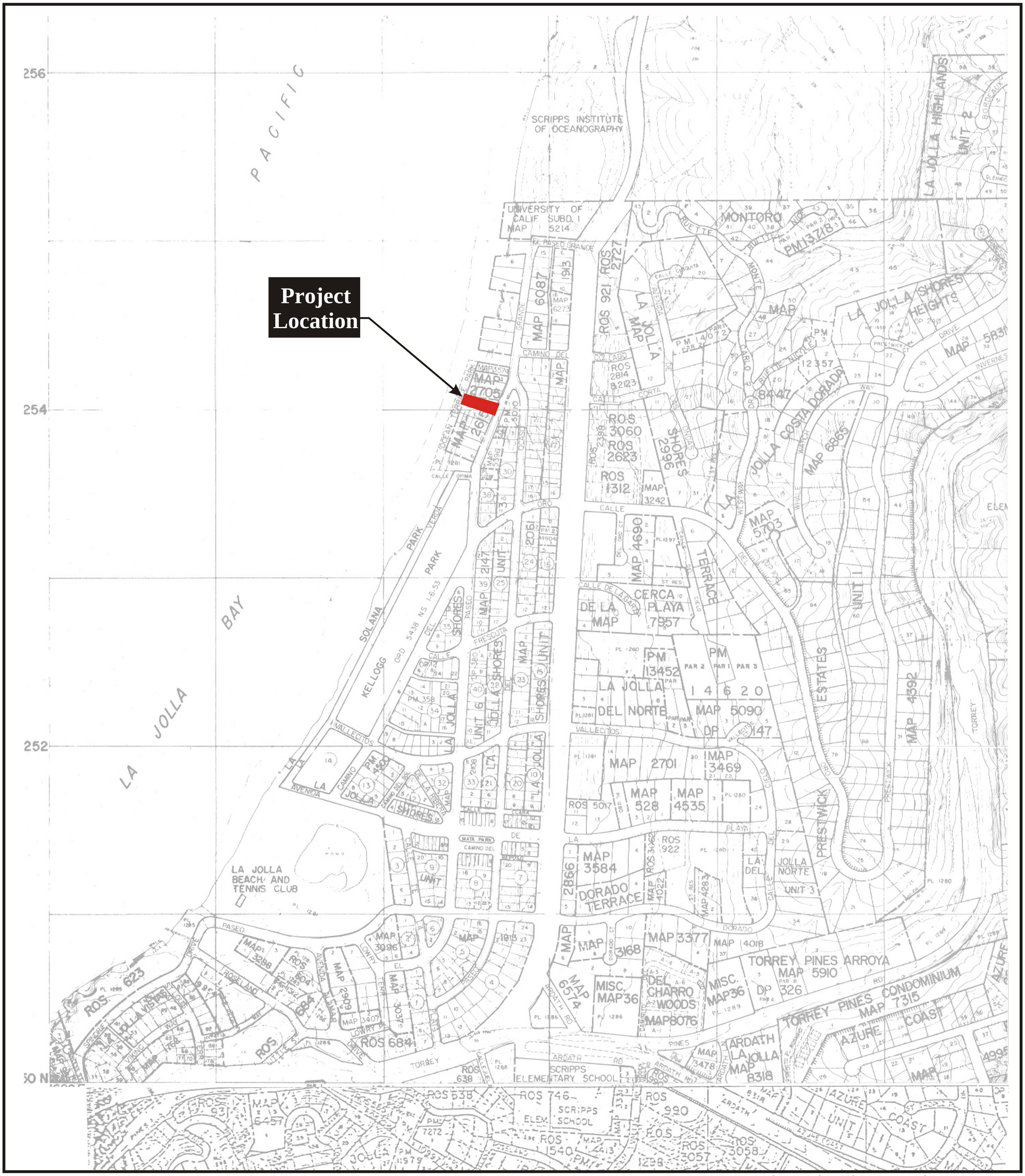
Laguna Mountain Environmental, Inc.

Source: USGS 7.5' La Jolla Quadrangle

0 1,000 2,000 Feet

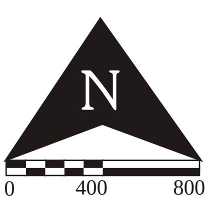
Figure 2
Project Location

Laguna Mountain Environmental, Inc.



Source: City Engineering Map, Sheet 250-1689

Figure 3
Project Location as Shown on City of San Diego 1:800 Scale Map



Laguna Mountain Environmental, Inc.

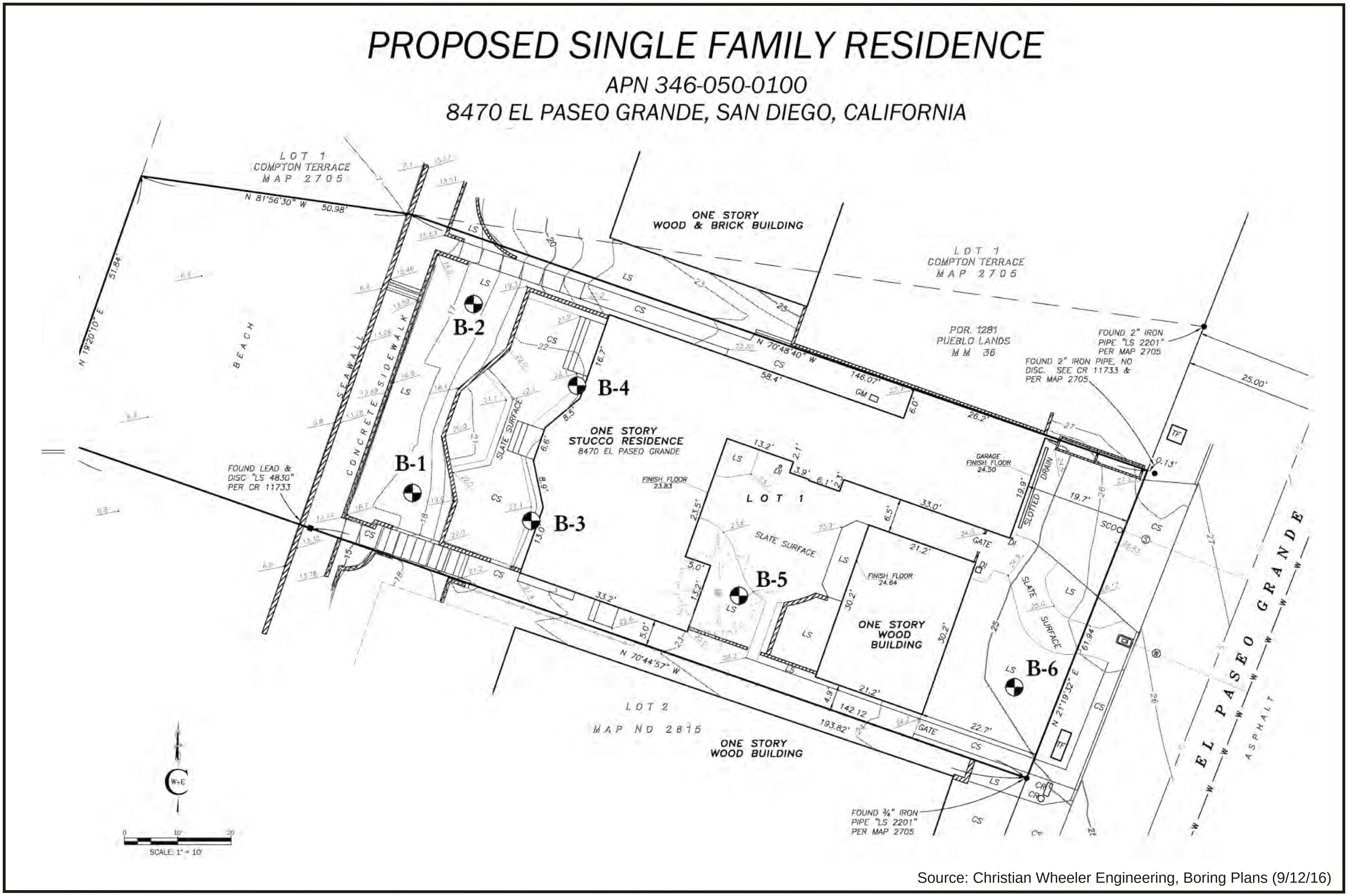


Figure 4
Geotechnical Test Plan

Laguna Mountain Environmental, Inc.

C. Structure of the Report

This report follows the State Historic Preservation Office's guidelines for Archaeological Resource Management Reports (ARMR). The report introduction provides a description of the project and associated personnel. Section II provides background on the project area and previous research. Section III describes the research design and field methods, while Section IV describes the results of the archaeological survey and testing program. Section V provides an evaluation summary and recommendations and Section VI includes the references cited.

II. NATURAL AND CULTURAL SETTING

The following environmental and cultural background provides a context for the cultural resource inventory.

A. Natural Setting

The project area is adjacent to the eastern edge of La Jolla Bay, and elevation is approximately 24 feet above mean sea level. The area is currently located within a developed urban landscape with paved streets and developed residential lots, and has been transformed from its original condition by grading and filling. The project itself is a developed lot containing a single family residence and associated landscaping. The open sand beach of La Jolla Shores is on the western side of the lot.

The geomorphology of the project area is largely a product of the region's geologic history. During the Jurassic and late Cretaceous (>100 million years ago) a series of volcanic islands paralleled the current coastline in the San Diego region. The remnants of these islands stand as Mount Helix, Black Mountain, and the Jamul Mountains among others. This island arc of volcanoes spewed out vast layers of tuff (volcanic ash) and breccia that have since been metamorphosed into hard rock of the Santiago Peak Volcanic formation. These fine-grained rocks provided a regionally important resource for Native American flaked stone tools.

At about the same time, a granitic and gabbroic batholith was being formed under and east of these volcanoes. This batholith was uplifted and forms the granitic rocks and outcrops of the Peninsular Range and the foothills to the west. In San Diego County the large and varied crystals of these granitic rocks provided particularly good abrasive surfaces for Native American seed processing. These outcrops were frequently used for bedrock milling of seeds. The batholith contains numerous pegmatite dikes. This was a good source of quartz, a material used by Native Americans for flaked stone tools and ceremonial purposes.

During the Eocene, a series of marine transgressions and regressions, along with sediment and rock deposition from major river systems to the east, left behind a series of sandstone, shale, and conglomerate formations. These sedimentary rocks were later flattened by marine erosion to form the current coastal plain and mesas in the San Diego region. Mount Soledad and Torrey Pines Mesa to the south and north of the project represent uplifts of these Eocene sediments. Some of these sedimentary formations contain porphyritic volcanic and quartzite cobbles that were used for producing both flaked lithic and groundstone tools.

The property itself is underlain by Quaternary alluvium and slopewash (Kennedy 1975). This material is largely derived from nearby Eocene-age formations and may contain buried soils. Just east of the property, however, the urbanized area is underlain by the Bay Point Formation, which is composed mainly of marine and non-marine, poorly consolidated, fine to medium grained, pale brown fossiliferous sandstone. The fossils located within this formation indicate a brackish water estuarine depositional environment and a Late Pleistocene age (Kennedy 1975). The Bay Point Formation dates back to the third interglacial, or Sangamon Period, of the Pleistocene epoch in North America (1.25 m.y.a. to 75,000 y.a.); it is widespread and well exposed in the western portion of San Diego County, particularly in areas adjacent to the coastline (Abbott 1999).

The soil on the property is mapped as the Corralitos Loamy Sand Series (Bowman 1973). This series consists of excessively drained, very deep loamy sands that formed in alluvium derived form marine sandstone. These soils are found in narrow valleys and on small alluvial fans. In the project area these soils occur as Corralitos loam sands on slopes ranging from 5 to 9 percent. In a representative profile, the surface layer is a grayish-brown, slightly acidic loamy sand about 9 inches thick. The next layers are brown, neutral sand that extends to a depth of more than 60 inches (Bowman 1973).

The climate of the region can generally be described as Mediterranean, with cool wet winters and hot dry summers. Rainfall limits vegetation growth. Two vegetation communities adapted to the dry conditions of the area occur in the project area. These include salt-water marsh and coastal sage scrub vegetation. Components of these communities provided important resources to Native Americans in the region. Sage seed, yucca, buckwheat, acorns, and native grasses formed important food resources to Late Prehistoric Native Americans. Torrey pines are also present in the project vicinity and would have provided an additional food resource.

Animal resources in the region included deer, fox, raccoon, skunk, bobcats, coyotes, rabbits, and various rodent, reptile, and bird species. Small game, dominated by rabbits, was relatively abundant. The rocky coastline to the southwest estuary to the southwest and sandy beach to the west of the project area would have provided a variety shellfish, bird, and marine resources.

B. Cultural Setting

Paleoindian Period

The earliest well documented prehistoric sites in southern California are identified as belonging to the Paleoindian period, which has locally been termed the San Dieguito complex/tradition. The Paleoindian period is thought to have occurred between 9,000 years ago, or earlier, and 8,000 years ago in this region. Although varying from the well-defined fluted point complexes such as Clovis, the San Dieguito complex is still seen as a hunting-focused economy with limited use of seed grinding technology. The economy is generally seen to focus on highly ranked resources such as large mammals and relatively high mobility, which may be related to following large game. Archaeological evidence associated with this period has been found around inland dry lakes, on old terrace deposits of the California desert, and also near the coast where it was first documented at the Harris Site.

Early Archaic Period

Native Americans during the Archaic period had a generalized economy that focused on hunting and gathering. In many parts of North America, Native Americans chose to replace this economy with types based on horticulture and agriculture. Coastal southern California economies remained largely based on wild resource use until European contact (Willey and Phillips 1958). Changes in hunting technology and other important elements of material culture have created two distinct subdivisions within the Archaic period in southern California.

The Early Archaic period is differentiated from the earlier Paleoindian period by a shift to a more generalized economy and an increased focus on the use of grinding and seed processing technology. At sites dated between approximately 8,000 and 1,500 years before present (B.P.), the increased use of groundstone artifacts and atlatl dart points, along with a mixed core-based tool assemblage, identify a range of adaptations to a more diversified set of plant and animal resources. Variations of the Pinto and Elko series projectile points, large bifaces, manos and portable metates, core tools, and heavy use of marine invertebrates in coastal areas are characteristic of this period, but many coastal sites show limited use of diagnostic atlatl points. Major changes in technology within this relatively long chronological unit appear limited. Several scientists have considered changes in projectile point styles and artifact frequencies within the Early Archaic period to be indicative of population movements or units of cultural change (Moratto 1984), but these units are poorly defined locally due to poor site preservation.

Late Archaic or Late Prehistoric Period

Around 2,000 B.P., Yuman-speaking people from the eastern Colorado River region began migrating into southern California, representing what is called the Late Prehistoric Period. The Late Prehistoric Period in San Diego County is recognized archaeologically by smaller projectile points, the replacement of flexed inhumations with cremation, the introduction of ceramics, and an emphasis on inland plant food collection and processing, especially acorns (True 1966). Inland semi-sedentary villages were established along major watercourses, and montane areas were seasonally occupied to exploit acorns and piñon nuts, resulting in permanent milling features on bedrock outcrops. Mortars for acorn processing increased in frequency relative to seed grinding basins. This period is known archaeologically in southern San Diego County as the Yuman (Rogers 1945) or the Cuyamaca Complex (True 1970).

The Kumeyaay (formerly referred to as Diegueño) who inhabited the southern region of San Diego County, western and central Imperial County, and northern Baja California (Almstedt 1982; Gifford 1931; Hedges 1975; Luomala 1976; Shipek 1982; Spier 1923) are the direct descendants of the early Yuman hunter-gatherers. Kumeyaay territory encompassed a large and diverse environment, which included marine, foothill, mountain, and desert resource zones. Their language is a dialect of the Yuman language, which is related to the large Hokan super family.

There seems to have been considerable variability in the level of social organization and settlement variance. The Kumeyaay were organized by patrilineal, patrilocal lineages that claimed prescribed territories, but did not own the resources except for some minor plants and eagle aeries (Luomala 1976; Spier 1923). Some lineages occupied procurement ranges that required considerable residential mobility, such as those in the deserts (Hicks 1963). In the mountains, some of the larger groups occupied a few large residential bases that would be occupied biannually, such as those occupied in Cuyamaca in the summer and fall, and in Guatay or Descanso during the rest of the year (Almstedt 1982; Rensch 1975). According to Spier (1923), many Eastern Kumeyaay spent the period of time from spring through autumn in larger residential bases in the upland procurement ranges, and wintered in mixed groups in residential bases along the eastern foothills on the edge of the desert (i.e., Jacumba and Mountain Springs). This variability in settlement mobility and organization reflects the great range of environments in the territory.

Acorns were the single most important food source used by the Kumeyaay. Their villages were usually located near water, which was necessary for leaching acorn meal. Other storable resources such as mesquite or agave were equally valuable to groups inhabiting desert areas, at least during certain seasons (Hicks 1963; Shackley 1984). Seeds from grasses, manzanita, sage, sunflowers, lemonade berry, chia, and other plants were also used along with various wild greens and fruits. Deer, small game, and birds were hunted and fish and marine foods were eaten. Houses were arranged in the village without apparent pattern. The houses in primary villages were conical structures covered with tule bundles, having excavated floors and central hearths. Houses constructed at the mountain camps generally lacked any excavation, probably due to the summer occupation. Other structures included sweathouses, ceremonial enclosures, armadas, and acorn granaries. The material culture included ceramic cooking and storage vessels, baskets, flaked lithic and ground stone tools, arrow shaft straighteners, stone, bone, and shell ornaments.

Hunting implements included the bow and arrow, curved throwing sticks, nets and snares. Shell and bone fishhooks, as well as nets, were used for fishing. Lithic materials including quartz and metavolcanics were commonly available throughout much of the Kumeyaay territory. Other lithic resources, such as obsidian, chert, chalcedony, and steatite, occur in more localized areas and were acquired through direct procurement or exchange. Projectile points including the Cottonwood Series points and Desert Side-notched points were commonly produced.

Kumeyaay culture and society remained stable until the advent of missionization and displacement by Hispanic populations during the eighteenth century. The effects of missionization, along with the introduction of European diseases, greatly reduced the native population of southern California. By the early 1820s, California was under Mexico's rule. The establishment of ranchos under the Mexican land grant program further disrupted the way of life of the native inhabitants.

Ethnohistoric Period

The Ethnohistoric period refers to a brief period when Native American culture was initially being affected by Euroamerican culture and historical records on Native American activities were limited. When the Spanish colonists began to settle California, the project area was within the territory of a loosely integrated cultural group historically known as the Kumeyaay or Northern and Southern Diegueño because of their association with the San Diego Mission. The Kumeyaay as a whole speak a Yuman language, which differentiates them from the Luiseño, who speak a Takic language to the north (Kroeber 1976). Both of these groups were hunter-gatherers with highly developed social systems. European contact introduced diseases that dramatically reduced the Native American population and helped to break down cultural institutions. The transition to a largely Euroamerican lifestyle occurred relatively rapidly in the nineteenth century.

Historic Period

Cultural activities within San Diego County between the late 1700s and the present provide a record of Native American, Spanish, Mexican, and American control, occupation, and land use. An abbreviated history of San Diego County is presented for the purpose of providing a background on the presence, chronological significance, and historical relationship of cultural resources within the county.

Native American control of the southern California region ended in the political views of western nations with Spanish colonization of the area beginning in 1769. De facto Native American control of the majority of the population of California did not end until several decades later. In southern California, Euroamerican control was firmly established by the end of the Garra uprising in the early 1850s (Phillips 1975).

The Spanish Period (1769-1821) represents a period of Euroamerican exploration and settlement. Dual military and religious contingents established the San Diego Presidio and the San Diego and San Luis Rey Missions. The Mission system used Native Americans to build a footing for greater European settlement. The Mission system also introduced horses, cattle, other agricultural goods and implements; and provided construction methods and new architectural styles. The cultural and institutional systems established by the Spanish continued beyond the year 1821, when California came under Mexican rule.

The Mexican Period (1821-1848) includes the retention of many Spanish institutions and laws. The mission system was secularized in 1834, which dispossessed many Native Americans and increased Mexican settlement. After secularization, large tracts of land were granted to individuals and families and the rancho system was established. Cattle ranching dominated other agricultural activities and the development of the hide and tallow trade with the United States increased during the early part of this period. The Pueblo of San Diego was established during this period and Native American influence and control greatly declined. The Mexican Period ended when Mexico ceded California to the United States after the Mexican-American War of 1846-48.

Soon after American control was established (1848-present), gold was discovered in California. The tremendous influx of American and Europeans that resulted quickly drowned out much of the Spanish and Mexican cultural influences and eliminated the last vestiges of de facto Native American control. Few Mexican ranchos remained intact because of land claim disputes and the homestead system increased American settlement beyond the coastal plain.

C. Prior Research

The investigation included archival research and review of other background studies prior to completing the field survey of the project area. The archival research consisted of conducting a literature and record search at the local archaeological repository, in addition to examining historic maps, and historic site inventories. This information was used to identify previously recorded resources and determine the types of resources that might occur in the survey area.

The records and literature search for the project was conducted at the South Coastal Information Center (SCIC) at San Diego State University (Appendix B). In-house data of the San Diego Museum of Man records were examined as well. The records search included a one-quarter mile radius of the project area to provide background on the types of sites that would be expected in the region. Access to historic maps and a historic address database was also provided by the SCIC.

At least 40 archaeological investigations have been documented in the vicinity of the project (Table 1). These consist of surveys or monitoring projects for residences, but also some utility implementation and infrastructures associated with the growth and development of this area over the last 40 years.

The 11 cultural resources identified by the previous investigations within the one-quarter mile radius include minor prehistoric shell and lithic scatters, a temporary camp, and a large habitation site area to the south along with isolate grinding tools as well as two historic residences, a historic flume, and a historic trash deposit (Table 2). Only CA-SDI-20129/SDM-W-199 is near the current project area.

The site boundary for temporary camp CA-SDI-20129/SDM-W-199 is recorded just north of the current project area on a small alluvial fan on the marine terrace. This site was originally recorded by Malcolm Rogers as exposed in an eroded drainage cut just south of the Scripps Institution of Oceanography (SIO) property (Rogers n.d.). Rogers named the site "La Jolla Shores Extension" and described it as a "sea-margin intermittent camping" site (Rogers n.d.). He described the site as:

> ...a very intricate piece of geology and stratigraphy to interpret. Lit. I [later La Jolla I] material consisting of flakes, cores, and a little shell and charcoal occur in a secondary position having been washed into the formations whose diversity would indicate a long history for Lit. I. Most of it indicates a long dry period with a wet period setting in at its close. The Lit. II midden which covers a broad horizon is thinly bedded and low in charcoal, shell and spalls and tools, and involves only the upper quarter of the beds exposed in the sea cliff (Rogers n.d.).

Rogers (n.d.) also noted the presence of some scattered hearth features. In terms of location, Rogers noted that the site was exposed in the sea cliff from SIO south to La Jolla Shores at elevations ranging from 8 to 30 feet above mean sea level. Site size was described as 1,000 feet (305 m) north/south with the east/west dimensions listed as "unknown" (Rogers n.d.).

Carter (1950:84) noted that the upper part of the fan contains evidence of shellfish, charcoal in hearths, stone tools, and a mano. He also noted that "hearths, flakes, and shells are found throughout the 20-foot exposed depth." He therefore implied that the site was 20 feet deep and continued to note "in the top of the north wall of a gully cut through the fan there was formerly a concentration of shell sufficient to warrant the term 'midden'." Carter excavated the remaining three cubic yards of this midden material in 1947 in order to salvage it before it was destroyed by sea cliff erosion (Carter 1950). Carter (1950:84-85) noted that:

> The midden was associated with a developed soil profile. The A horizon contained a quantity of rock-oyster shell. The midden proper lay in the B horizon and extended into the upper few inches of the C horizon. It contained principally mussel and abalone shell. None of these shells can be found in this area today, though they can be obtained in small quantities from a few rocks a quarter of a mile north and in larger quantities from the rocks about La Jolla beginning one mile to the south.

Table 1. Archaeological Investigations within One-quarter Mile of the Project Area

Author(s)	Report Title	Year
Aguilar, Pigniolo, and Serr	Archaeological Monitoring and Testing Report for the Kellogg Park Green Lot Infiltration Project, La Jolla Shores, San Diego, California	2012
Alter	Results of the Historic Building Assessment for 8368 La Jolla Shores Drive, La Jolla. California	2000
Alter	Results of Archaeological Monitoring Conducted at 8351 Paseo Del Ocaso, La Jolla, California	1999
Bradbury	Historical Assessment of the Residence Located at 8351 Paseo Del Ocaso, La Jolla, California 92037	1998
City of San Diego	Proposed Mitigated Negative Declaration of the La Jolla Shores Pipeline No. 2. San Diego County, California	1993
City of San Diego	Draft Negative Declaration for 8480 Paseo Del Ocaso, La Jolla Shores Planned District	1998
City of San Diego	Public Notice of A Proposed Mitigated Negative Declaration Coble Residence	2002
City of San Diego	Gaxiola Residence	2013
Clowery-Moreno and Smith	A Cultural Resources Study for the Walkush Residence Project	2009
Gallegos et al.	A Cultural and Paleontological Inventory Update for the University of California at San Diego and Scripps Institution of Oceanography	1989
Gardner	Archaeological Monitoring for the SDG&E Cable Replacement Project in La Jolla, San Diego County, California (ETS 8601)	2009
Gilleti	Archaeological Monitoring Report: Barth Residence. La Jolla, San Diego, California	2011
Gilleti and Robbins-Wade	Archaeological Monitoring Report: Morrow Residence, La Jolla, San Diego, California	2013
Goodwin	Archaeological Monitoring Program, La Jolla Shores Drive Water Main Replacement, City of San Diego, California	2012
Gross and Robbins-Wade	Archaeological Resources Inventory 8480 Paseo Del Ocaso, La Jolla, San Diego, California (LDR No. 96-7879)	1998
Hanna	A Cultural Resource Inventory of the University of California at San Diego	1980
Kyle	Cultural Resource Constraint Study for the La Jolla Water Main Replacement Project, City of San Diego, California	2001
Kyle	Cultural Resource Inventory Update and Recommendations for the University of California at San Diego Long Range Development Plan	2004
Loughlin	An Environmental Impact Report (Archaeology) for Science Applications Incorporated for a Parcel Consisting of One Thousand Acres in La Jolla, California	1974
Mattingly	Archaeological and Geospatial Investigations of Fire-altered Rock Features at Torrey Pines State Reserve, San Diego, California	2007
McLean	Results of Archaeological and Paleontological Monitoring at 8356 Paseo Del Ocaso, La Jolla, San Diego County, California	2000
Moomjian	Historical Assessment of the Residence Located at 8356 Paseo Del Ocaso, La Jolla, California 92037	1998
Moomjian	Historical Assessment of the 8368 Paseo Del Ocaso Residence, La Jolla, California 92037	2009
Pierson	Archaeological Resource Report For: Archaeological Survey of the Kusman Residence	2007
Pierson	Archaeological Resource Report Form: Mitigation Monitoring of the Walkush Residence, San Diego, California	2011
Pigniolo	Cultural Resource Monitoring Results for the Whitworth Residence at 8462 El Paseo Grande, La Jolla Shores, City of San Diego, California	2013

Table 1. Archaeological Investigations within One-quarter Mile of the Project Area
(Continued)

Author(s)	Report Title	Year
Pigniolo	Cultural Resource Survey, Testing, and Geotechnical and Construction Monitoring Results for the Postlethwaite Residence at 8315 Paseo Del Ocaso, La Jolla Shores, City of San Diego, California	2013
Pigniolo and Baksh	Cultural Resource Inventory of the Coastal Low Flow Storm Drain Diversion System, City of San Diego, California	1999
Pigniolo and Murray	Cultural Resource Inventory for Phases II and IIB of the Coastal Low Flow Storm Drain Diversion System, City of San Diego, California LDR#99-0232	2002
Pigniolo et al.	Research and Testing a the La Jolla Shores Site (CA-SDI-20130/SDM-W-2) and the La Jolla Shores Extension Site (CA-SDI-20129/SDM-W-199) for the Residential Block 1J West Underground Utility District Project, La Jolla, California.	2012
Price and Underwood	Results of Historical Resources Survey of the Levi Residence, La Jolla, California	2008
Smith	An Archaeological Investigation of the Odeh Project, La Jolla, California	1997
Stropes	A Cultural Resources Study for the Gatto Residence Project	2009
Stropes	Cultural Resource Monitoring Report for the Gatto Residence Project	2011
Stropes	Archaeological Survey of the Liske Residence 8323 Paseo Del Ocaso, La Jolla, California 92037	2013
Stropes and Hoff	A Phase I Cultural Resource Study for the La Fond Residence Project, La Jolla. California	2011
Stropes and Smith	Archaeological Survey of the Rohmiller Residence for a Bulletin 560 Permit Application 2350 Calle De La Garza, La Jolla, California 92037	2013
Underwood and Price	Historical Resources Survey of the Lusardi Property	2007
Underwood and Price	Historical Resources Survey of the Levi Property	2008
Zepeda-Herman	Background Research and Test Excavation for the Sewer and Water Group 809, San Diego, California	2011

Table 2. Recorded Cultural Resources within One-quarter Mile of the Project Area

Resource Number	Resource Type	Recorder (Year)
CA-SDI-19235	Shell and lithic scatter (disturbed)	Clowery-Moreno (2008)
CA-SDI-20129 (SDM-W-199)	Temporary camp	Rogers (1934)
CA-SDI-20130 (SDM-W-2)	Habitation site with burials	Rogers (1926)
CA-SDI-20151	Lithic scatter and hearth	Rochester & Stout (2010)
CA-SDI-20455	Historic refuse deposit	Yerka (2011)
CA-SDI-20456	Historic refuse deposit	Yerka (2011)
P-37-018406	Historic house (1949)	Alter (2000)
P-37-018620	Historic house (1946)	Moomjian (1998); McHenry (1999)
P-37-018621	Isolate mano	McHenry (1999)
P-37-032639	Isolate metate	Goodwin (2012)
P-37-032641	Historic flume	Goodwin (2012)

Carter (1950:85) also noted that debitage was "moderately common" but formal tools were lacking. No ceramics or projectile points were recovered from the site and a mano was the only shaped tool from the site. Carter provides examples of the flaked lithics from the site (1957:238, Figure 15). As indicated in his Figure 15, these are dominated by debitage and a unifacially flaked cobble tool typical of an Archaic Period assemblage.

Carter (1950) noted that the mano from the site was found 400 feet south of the midden area and that it was granitic and pecked. The mano and another stone were embedded in the base of a dense clay layer of a buried soil horizon. Carter (1957:237) also notes that during very detailed mapping of the cliff face in 1947 he recovered 12 flakes (8 quartzite and 4 porphyritic volcanic) and one mano.

Site bioturbation by ground squirrels was noted along with a complex history of repeated fan erosion and deposition. A series of what were interpreted as burnt soil lenses or hearths were observed. Those near the surface were associated with shell and debitage, while deep in the stratigraphy they had no associated cultural material.

Another description of cultural material at the site is provided by Carter (1957:223-224):

> Evidence for the presence of man is to be found throughout the fan. There is a thin occupation over the whole surface and a concentration of occupation at the north side of the present gully mouth. Deeper strata contain flakes. One mano has been found in place and one on a recently fallen talus. Burned earth areas with food shell are present in the upper part of the fan. In the lower part of the fan, similar burned areas lacking shell are numerous.

Shellfish at the site appear to have been largely in discrete lenses in areas outside the main midden. Carter (1957) notes a dense mussel (*Mytilus*) stratum with some abalone (*Haliotis*). Rock oyster (*Pseudochama*) was noted in other areas and he described several lenses of bean clam (*Donax*) and Pismo clam (*Tivela*). Carter (1957) noted that the *Tivela* was about three inches in width, which was larger than those found on the beach at the time.

Historic research included an examination of a variety of resources. The current listings of the National Register of Historic Places were checked through the National Register of Historic Places website. The California Inventory of Historic Resources (State of California 1976) and the California Historical Landmarks (State of California 1992) were also checked for historic resources. The historic resources mapped in the area were determined as not significant.

III. RESEARCH DESIGN AND METHODS

A. Survey Research Design

The goal of this study was to identify any cultural resources located within the project area so that the effects of the project on these resources can be assessed and minimized. To accomplish this goal, background information was examined and assessed, and a field survey was conducted to identify cultural remains. Additionally, a Sacred Lands record search was requested from the Native American Heritage Commission (NAHC) (Appendix C).

Based on the records search and historic map check, most of the cultural resources that might occur within the project were likely to be prehistoric resources. Historic structures appear within one mile of the project area on early maps of the area, but are unlikely to occur within the project itself based on early maps. Prehistoric cultural resources such as CA-SDI-20129/SDM-W-199 could include midden soils, shell and lithic scatters, and hearth features associated with marine and estuary utilization in the area. Special attention was given to naturally exposed soil deposits. Because the project area is developed and located in the La Jolla Shores Archaeological Study Area, testing was required to establish whether archaeological deposits extend into the project area. Both phases of investigation are described in more detail below.

B. Survey Methods

The survey was conducted by Andrew R. Pigniolo, MA, on July 29, 2016. Mr. Dennis Linton, of Red Tail, served as Native American monitor. The entire project area was surveyed in less than 5-meter transect intervals. Approximately 85 percent of the lot was covered by the existing residence and hardscape. Within the lawn area and landscape areas of the parcel, surface visibility was good, averaging approximately 75 percent. Grading associated with the construction of the existing residence appears to have been limited, but may include some fill on the western portion of the lot and in other landscape areas.

Photographs taken and project records for this inventory will be temporarily curated at Laguna Mountain until final curation arrangements can be made at the San Diego Archaeological Center or another appropriate regional repository.

C. Test Methods

Subsurface testing was conducted in the project area in order to determine if portions of site CA-SDI-20129/SDM-W-199, or any other previously unrecorded site, were present within the project area. The subsurface testing included the excavation of three 30 m by 50 cm shovel test pits (STPs) in order to assess the presence of any subsurface deposits.

STPs are normally placed in the cardinal directions along a Cartesian grid pattern, but due to the amount of developed area on the property and the limited landscaped areas where soil was exposed, STPs were intuitively placed in open areas distributed across the proposed area of direct impacts. The long axis of each STP was oriented north/south.

STPs were excavated in 10-cm arbitrary levels. All excavated soil was passed through 1/8-inch mesh hardware cloth and dry-screened in the field. Any cultural material was removed from the screens and bagged by level. STP forms noting the recovery and observations were completed following the excavation of each 10-cm level. The information gathered included the type of cultural material recovered, soil types and conditions, and any noted disturbance. Recovered material was taken to the laboratory for processing. The recovered material was entered into an Excel spreadsheet that serves as the recovery catalog (Appendix D).

A photographic record was kept to document the testing program (Appendix E). Digital photographs were taken during STP excavation. A photographic log was kept to document orientation and subject matter.

IV. RESULTS

The project area is currently a developed residence with a large amount of hardscape and landscape. Figure 5 provides views of the site conditions. Figure 6 shows the STP locations.

A. Survey Results

The cultural resource survey resulted in no indications of prehistoric or historic material on the surface of the parcel and proposed impact area. No surface cultural material was observed on the survey of the property. A small amount of recent beach shell was observed on the side of a walkway near the beach side of the parcel. The shell appeared water-worn and recent. The absence of cultural material suggests that the project area is not within the boundaries of site CA-SDI-20129/SDM-W-199. The surface of the property was highly obscured by development and the area contains colluvial deposits that could be covering or obscuring buried cultural features however.

The project area is approximately 85 percent covered by development and hardscape. Because the project area is highly developed the survey did not adequately serve to determine if cultural resources were present, therefore a testing program was subsequently implemented to identify whether there are any subsurface cultural deposits within the project area.

B. Testing Results

Because survey visibility was limited, the project is located within the La Jolla Shores Archaeological Study Area, and site CA-SDI-20129/SDM-W-199 exists in the vicinity, three hand-excavated STPs were excavated within the project area in order to determine if CA-SDI-20129/SDM-W-199 deposits extend into the project area. The number of STPs was limited to three due to the small amount of undeveloped area on the property.

Testing indicated a relatively consistent pattern of disturbance and fill. What appeared to be native soils were limited to medium brown sandy loam soil over light brown silty clay subsoil. All STPs were excavated in existing lawn or landscape areas. Small amounts of intrusive material were recovered from STPs 1 and 2 while STP 3 contained large amounts of contract and other debris. Imported topsoil related to lawn placement was also noted in STP 3 and imported soils related to landscaping were found in STP 1. Recovery included only intrusive material dominated by construction material (concrete and brick). No prehistoric cultural material or historic material was recovered.

Soils and Stratigraphy

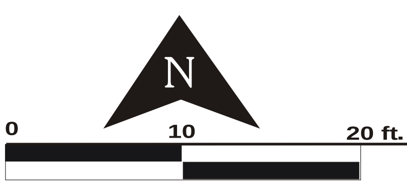
Soils in all three STPs were generally consistent, but the stratigraphy generally was not. STP 1 had surface cover of landscape bark. This was underlain by an upper stratum of dark reddish brown silty clay (Munsell 5YR 3/2). Rodent activity was also observed in this level. This material appears to represent redeposited subsoil moved during landscaping. At 30 cm, a sharp contact with very dark brown silty loam (10YR 2/2) occurred. This may represent native topsoil or an earlier landscaping zone. This material was underlain by the Stratum 1 material at approximately 36 cm.

a. House and yard overview, looking west (PR-05519-051)

b. West side of house and yard overview, looking southeast (PR-05519-033)

Figure 5
Project Overviews

Figure 6
Archaeological Test Locations



Laguna Mountain Environmental, Inc.

STP 2 showed what may be closer to the natural soil stratigraphy. Stratum 1 was composed of a dark brown silty loam (7.5YR 3/2). This was underlain at approximately 5 cm by the same dark reddish brown silty clay (5YR 3/2) as seen in STP 1. STP 3, with the exception of fill associated with the sod, was made up entirely of the same dark reddish brown silty clay (5YR 3/2) subsoil associated with large amounts of concrete, concrete block, and brick indicating that this area was made up of fill. This intrusive building material suggests that the upper portions of the soil were fill placed at the time of house construction or remodeling. Figure 7 shows a typical STP profile.

The overall stratigraphic pattern suggests that native soils from the lot were very shallow and the area was highly disturbed during house construction on the parcel. They also indicate that the western edge of the parcel was partially elevated with fill.

STP Recovery

The excavation of three STPs resulted in the recovery of 152.7 g of modern intrusive material and no prehistoric or historic cultural material. By weight, STP 3 produced the most intrusive material but the concrete block and brick were not recovered for cataloging.

Most of the intrusive material was recovered from the 20-30 cm levels suggesting that most of the soils excavated were previously disturbed. Most of the recovered intrusive material represents building waste including concrete, concrete block, and brick fragments. Small amounts of domestic refuse were present including plastic and glass.

Summary

The survey and testing program indicates that the project area has been heavily disturbed by previous construction of the existing residence and landscaping. The lack of a subsurface deposit indicates the parcel is situated outside the original boundaries of site CA-SDI-20129/SDM-W-199.

Additionally, the NAHC indicated that their records failed to indicate the presence of Native American cultural resources in the immediate project area. However, the absence of information in the sacred lands file does not mean there would not be any cultural resources present in the project area.

a. STP 1, 30 cm floor, showing covered topsoil (PR-05519-008)

b. STP 3, 20 cm floor, showing brick (PR-05519-038)

Figure 7
STP 1 and STP 3 Showing Soils

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V. SUMMARY AND RECOMMENDATIONS

The goal of the project was to identify resources that may be impacted by the project. The lack of surface and subsurface prehistoric cultural material suggest that the project area is not within the boundaries of site CA-SDI-20129/SDM-W-199.

The surface of the property was highly obscured by development and the area contains colluvial deposits that could be covering or obscuring cultural features. While the NAHC has no records of known cultural resources in the project area, because the project is within the La Jolla Shores Archaeological Study Area, monitoring by an archaeological and a Native American monitor is recommended during geotechnical testing, demolition, and construction excavation and grading to ensure sensitive resources are not present or impacted by the project.

In accordance with CEQA criteria as defined in Section 15064.5 and City of San Diego Historical Resources Guidelines the project has the potential to impact cultural resources. A cultural resource mitigation, monitoring, and reporting program will serve as mitigation for potential impacts.

VI. REFERENCES

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APPENDICES

A. Resume of Principal Investigator
B. Records Search Confirmation
C. Native American Correspondence
D. Catalogue
E. Photos and Photo Logs

APPENDIX A

RESUME OF PRINCIPAL INVESTIGATOR

ANDREW R. PIGNIOLO, M.A., RPA
Principal Archaeologist
Laguna Mountain Environmental, Inc.

Education

San Diego State University, Master of Arts, Anthropology, 1992
San Diego State University, Bachelor of Arts, Anthropology, 1985

Professional Experience

2002-Present	Principal Archaeologist/President, Laguna Mountain Environmental, Inc., San Diego
1997-2002	Senior Archaeologist, Tierra Environmental Services, San Diego
1994-1997	Senior Archaeologist, KEA Environmental, Inc., San Diego
1985-1994	Project Archaeologist/Senior Archaeologist, Ogden Environmental and Energy Services, San Diego
1982-1985	Reports Archivist, Cultural Resource Management Center (now the South Coastal Information Center), San Diego State University
1980-1985	Archaeological Consultant, San Diego, California

Professional Affiliations

Register of Professional Archaeologists (RPA; formerly called SOPA), 1992-present
Qualified Archaeology Consultant, San Diego County
Qualified Archaeology Consultant, City of San Diego
Qualified Archaeology Consultant, City of Chula Vista
Qualified Archaeology Consultant, Riverside County
Society for American Archaeology
Society for California Archaeology

Qualifications

Mr. Andrew Pigniolo is a certified archaeology consultant for the County and City of San Diego. He has received 40 hour HAZWOPPER training and holds an active card for hazardous material work. Mr. Pigniolo has more than 30 years of experience as an archaeologist, and has conducted more than 700 projects throughout southern California and western Arizona. His archaeological investigations have been conducted for a wide variety of development and resource management projects including military installations, geothermal power projects, water resource facilities, transportation projects, commercial and residential developments, and projects involving Indian Reservation lands. Mr. Pigniolo has conducted the complete range of technical studies including archaeological overviews and management plans, ethnographic studies, archaeological surveys, test excavations, historical research, evaluations of significance for National Register eligibility, data recovery programs, and monitoring projects.

REPRESENTATIVE PROJECTS

Centinela Solar Project, Imperial County, California *(KP Environmental, Inc.)* Mr. Pigniolo served as the Principal Investigator for a cultural resource survey of more than 240 acres of agricultural land near Mt. Signal, California. The survey was conducted in multiple phases based on crop conditions and surface visibility within various parcels. The project included surveys of highly impacted agricultural lands. Historic-age agricultural features were identified within several parcels. Cultural resources within the proposed project area were recorded during the survey and recommendations for impact avoidance were made. This project was conducted under both Federal and State environmental requirements.

Princess Street Monitoring and Data Recovery Project at the Spindrift Site *(City of San Diego).* Mr. Pigniolo served as a Principal Investigator of an archaeological monitoring and data recovery program at the Spindrift Site in the community of La Jolla in the City of San Diego. The effort was initially to provide archaeological monitoring of a utility undergrounding project. The presence of the major prehistoric village site within the project alignment quickly became evident prior to construction monitoring and a data recovery plan was prepared prior to the start of work. Monitoring was conducted until the site was encountered. The data recovery plan was immediately implemented, so that data recovery could progress while construction excavation continued on other portions of the project. Data recovery included the excavation of 25 controlled units and the water screening of 100 percent of the archaeological site material impacted during trenching. More than 40 fragmented human burials were encountered. Working with Native American monitors and representatives, the remains were repatriated.

Hill Street Undergrounding Project, Point Loma, California *(City of San Diego).* Mr. Pigniolo served as Principal Investigator of an archaeological monitoring project of utility undergrounding in the community of Point Loma. The project was located in an urban environment under city streets. Archaeological monitoring identified two prehistoric sites with high levels of integrity. Testing included the excavation of four units to evaluate the significance of these resources and mitigate project effects. A hearth feature, shell and a variety of prehistoric artifacts were recovered and additional impacts to the sites were avoided by reducing trench depth.

Center City Development Corporation Area 1 Utility Undergrounding Project, San Diego, California (*City of San Diego*). Mr. Pigniolo served as Principal Investigator of an archaeological monitoring project including the undergrounding of residential and commercial utilities in the community of Logan Heights in San Diego. The project was conducted under CEQA and City of San Diego guidelines. Historic streetcar lines were encountered along with sparse historic trash deposit, but adverse impacts did not occur and no further work was recommended.

Mission Hills Sever Group 664 Project *(Lamprides Environmental Organization)* Mr. Pigniolo was the Principal Investigator for an archaeological monitoring project for a sewer line replacement in the community of Mission Hills in the City of San Diego. The project included archaeological construction monitoring in an urban environment. The project was located near the Old Town area of San Diego, but steep slopes and previous pipelines in the area resulted in an absence of cultural materials encountered.

City of San Diego Sever Group 783 Project, San Diego, California *(Orion Construction Company)* Mr. Pigniolo was the Principal Investigator for an archaeological monitoring project for a sewer line replacement in the eastern portion of the City of San Diego. The project included archaeological construction monitoring in an urban environment. Shallow soils and previous pipeline disturbance in the area resulted in an absence of cultural materials encountered (2006-2007)

All American 105 Race Project, West Mesa, Imperial County, California *(Legacy 106, Inc.)* Mr. Pigniolo served as Principal Investigator, report author, and crew chief for an archaeological survey for a proposed off-road vehicle race course in the West Mesa area of Imperial County. The survey covered Bureau of Land Management (BLM) lands and included close coordination with BLM staff. The survey included a proposed 7.5 mile course with a very short time-frame. The goal was project alignment adjustment and realignment to avoid resource impacts where possible. A variety of prehistoric cultural resources including 10 sites and 7 isolates were encountered. Human remains were identified and avoided. The race route was realigned to avoid significant resource impacts allowing the race to proceed on schedule.

Victoria Loop Road Survey, Alpine, San Diego County, California (*Alpine Fire Safe Council*) Mr. Pigniolo served as Principal Investigator of an 85-acre cultural resource survey in the Alpine area of San Diego County. The survey identified six cultural resources within the project area including prehistoric lithic scatters, an historic well, and historic artifact scatters. All resources were flagged and marked for avoidance during the vegetation treatment program. The Bureau of Land Management served as Federal Lead Agency for the project.

Spirit of Joy Church Project Testing Program, Ramona, San Diego County, California (*Spirit of Joy Lutheran Church*) Mr. Pigniolo served as Principal Investigator and Project Manager a cultural resource testing program at site CA-SDI-17299. The site was a sparse temporary camp. The project included surface collection and subsurface testing. Subsurface deposits were not identified within the project area and the site material was recovered during testing. Construction monitoring was recommended to address alluvial soils within other portions of the project area.

Alpine Fire Safe Council Brush Management Monitoring Project, Alpine Region, San Diego County, California (*Alpine Fire Safe Council*) Mr. Pigniolo served as Principal Investigator for a cultural resources monitoring and protection program on four project areas surrounding Alpine, California. Cultural resources identified during previous surveys within the vegetation treatment areas were flagged for avoidance. The project included hand clearing and chaparral mastication near residential structures to create a fire buffer zone. Vegetation removal was monitored to ensure cultural resources obscured by heavy vegetation were not impacted by the project and that all recorded cultural resources were avoided. The Bureau of Land Management served as Lead Agency for the project.

APPENDIX B

RECORDS SEARCH CONFIRMATION

South Coastal Information Center
4283 El Cajon Blvd., Suite 250
San Diego, CA 92105
Office: (619) 594-5682
Fax: (619) 594-4483
scic@mail.sdsu.edu
scic_gis@mail.sdsu.edu

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM
CLIENT IN-HOUSE RECORDS SEARCH

Company: LAGUNA MOUNTAIN ENVIRONMENTAL

Company Representative: CAROL SERR

Date: 11/15/16

Project Identification: 8470 EL PASEO GRANDE GEOTECH STUDY (#1621)

Search Radius: 1/4 mile

Historical Resources: SELF

Trinomial and Primary site maps have been reviewed. All sites within the project boundaries and the specified radius of the project area have been plotted. Copies of the site record forms have been included for all recorded sites.

Previous Survey Report Boundaries: SELF

Project boundary maps have been reviewed. National Archaeological Database (NADB) citations for reports within the project boundaries and within the specified radius of the project area have been included.

Historic Addresses: SELF

A map and database of historic properties (formerly Geofinder) has been included.

Historic Maps: SELF

The historic maps on file at the South Coastal Information Center have been reviewed, and copies have been included.

Copies: 0

Hours: 1

This is not an invoice. Please pay from the monthly billing statement

APPENDIX C

NATIVE AMERICAN CORRESPONDENCE

Laguna Mountain Environmental, Inc.

October 18, 2016

Native American Heritage Commission
c/o Kathy Sanchez
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691

Via e-mail: nahc@nahc.ca.gov

Subject: 8470 El Paseo Grande Monitoring Project (San Diego), California (#1621)

Dear Ms. Sanchez,

Laguna Mountain Environmental is conducting an archaeological investigation in the La Jolla area of the City of San Diego for geotechnical trench monitoring at 8470 El Paseo Grande. The project involves the demolition and addition to an existing 2,805 square-foot one-story single family residence.

The project area is approximately 0.27 acres located west of Interstate 5, west of La Jolla Shores Drive, and south of the Scripps Institute of Oceanography. The project area is shown on the La Jolla 7.5' USGS quadrangle, in Township 15 South, Range 2 West, within an unsectioned portion of Pueblo Lands (see attached figure).

We respectfully request any information and input that you may have regarding Native American concerns either directly or indirectly associated with this project area. We would also appreciate a current list of appropriate Native American contacts for the area in order to elicit local concerns. If you or your files have any information about cultural resources or traditional cultural properties located on or near the project site, please contact me. If I can provide any additional information, please contact me immediately at (858) 505-8164. Thank you for your assistance.

Sincerely,

Andrew R. Pigniolo

Andrew Pigniolo, M.A., RPA
Principal Archaeologist

Attachments:
Project Location map
Sacred Lands File & Native American Contacts List Request Form

7969 Engineer Road, Suite 208 ✦ San Diego, CA 92111
Phone: (858) 505-8164 ✦ Fax: (858) 505-9658
E-Mail: Laguna@LagunaEnv.com

Source: USGS 7.5' La Jolla Quadrangle

Project Location

0 1,000 2,000 Feet

Laguna Mountain Environmental, Inc.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95501
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: 8470 El Paseo Grande Monitoring

County: San Diego

USGS Quadrangle
Name: La Jolla

Township: 15 S Range: 2 W Section(s): unsectioned

Company/Firm/Agency:
Laguna Mountain Environmental

Contact Person: Andrew Pigniolo

Street Address: 7969 Engineer Road, Suite 208

City: San Diego Zip: 92111

Phone: (858) 505-8164 Extension: 109

Fax: (858) 505-9658

Email: Andrew@LagunaEnv.com

Project Description:
The demolition and addition to an existing 2,805 square-foot one-story single family residence.

☑ Project Location Map is attached

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

October 19, 2016

Andrew Pigniolo
Laguna Mountain Environmental

Sent by E-mail: Andrew@lagunaenv.com

RE: Proposed 8470 El Paseo Grande Monitoring Project, Community of La Jolla; La Jolla USGS Quadrangle, San Diego County, California

Dear Mr. Pigniolo:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contact List
San Diego County
10/19/2016

Barona Group of the Capitan Grande
Clifford LaChappa, Chairperson
1095 Barona Road — Kumeyaay
Lakeside, CA, 92040
Phone: (619)443-6612
Fax: (619)443-0681
cloyd@barona-nsn.gov

Campo Band of Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 — Kumeyaay
Campo, CA, 91906
Phone: (619)478-9046
Fax: (619)478-5818
rgoff@campo-nsn.gov

Ewiiaapaayp Tribal Office
Robert Pinto, Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619)445-6315
Fax: (619)445-9126

Ewiiaapaayp Tribal Office
Michael Garcia, Vice Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
michaelg@leaningrock.net

Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760)765-0845
Fax: (760)765-0320

Iipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760) 803 - 5694
cjlinton73@aol.com

Inaja Band of Mission Indians
Rebecca Osuna, Chairperson
2005 S. Escondido Blvd. — Kumeyaay
Escondido, CA, 92025
Phone: (760)737-7628
Fax: (760)747-8568

Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612 — Kumeyaay
Jamul, CA, 91935
Phone: (619)669-4785
Fax: (619)669-4817

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas,
P.O. Box 775 — Kumeyaay
Pine Valley, CA, 91962
Phone: (619)709-4207

La Posta Band of Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619)478-2113
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LP13boots@aol.com

La Posta Band of Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
jmiller@LPtribe.net

Manzanita Band of Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302 — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 8470 El Paseo Grande Monitoring Project, San Diego County.

Native American Heritage Commission
Native American Contact List
San Diego County
10/19/2016

Manzanita Band of Kumeyaay Nation
Nick Elliott, Cultural Resources Coordinator
P. O. Box 1302 — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957
nickmepa@yahoo.com

Mesa Grande Band of Mission Indians
Virgil Oyos, Chairperson
P.O Box 270 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760)782-3818
Fax: (760)782-9092
mesagrandeband@msn.com

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760)749-3200
Fax: (760)749-3876
allenl@sanpasqualtribe.org

San Pasqual Band of Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
johnf@sanpasqualtribe.org

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619)445-2613
Fax: (619)445-1927
ssilva@sycuan-nsn.gov

Sycuan Band of the Kumeyaay Nation
Lisa Haws, Cultural Resources Manager
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619) 312 - 1935

Viejas Band of Kumeyaay Indians
Robert J. Welch, Chairperson
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619)445-3810
Fax: (619)445-5337
jhagen@viejas-nsn.gov

Viejas Band of Kumeyaay Indians
Julie Hagen,
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337
jhagen@viejas-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 8470 El Paseo Grande Monitoring Project, San Diego County.

APPENDIX D

CATALOGUE

8470 El Paseo Grande STP Recovery (2016)

Cat#	Prov.	Level (cm)	Class	Item	Type	Material	Count	Wt (g)	Comments
1	STP-1	20-30	Instrusive	Modern	Nesting Material	Plastic	-	0.1	chewed, red & white styrofoam bottle wrapper (probably Coke)
2	STP-1	30-40	Instrusive	Modern	Glass	Glass	-	12.3	faint aqua window glass
2	STP-1	30-40	Instrusive	Modern	Concrete	Other	-	14.7	
3	STP-2	20-30	Instrusive	Modern	Concrete	Other	-	101.9	
3	STP-2	20-30	Instrusive	Modern	Tile?	TerraCotta	-	23.7	1/2" thk; paver? (or very large flower pot with no curve)
4	STP-1	Stratum 1	Soil Sample	-	-	-	-	-	5YR 3/2 dark reddish brown, silty loam
5	STP-1	Stratum 2	Soil Sample	-	-	-	-	-	10YR 2/2 very dark brown, silty loam
6	STP-2	Stratum 1	Soil Sample	-	-	-	-	-	7.5YR 3/2 dark brown, silty loam

APPENDIX E

PHOTOS AND PHOTO LOGS

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Project Name (No.): 8470 El Paseo Grande Geotech (1621) **Year 2016**

Camera Format: FujiChrome
Film Type and Speed: Digital
Images Kept at: Laguna Mountain Environmental, Inc.

Mo.	Day	Time	Exp.	Subject/Description	View Toward	Accession #
7	29	7:00	01	STP 1 Surface Without Bark	N	PR-05519-001
7	29	7:00	02	STP 1 Surface Without Bark Overview	N	PR-05519-002
7	29	7:30	03	STP 1 10 cm Floor	N	PR-05519-003
7	29	7:30	04	STP 1 10 cm Floor	N	PR-05519-004
7	29	8:00	05	STP 1 20 cm Floor	N	PR-05519-005
7	29	8:00	06	STP 1 20 cm Floor	N	PR-05519-006
7	29	8:00	07	STP 1 30 cm Floor	N	PR-05519-007
7	29	8:00	08	STP 1 30 cm Floor	N	PR-05519-008
7	29	8:00	09	STP 1 30 cm Floor	N	PR-05519-009
7	29	8:30	10	STP 1 40 cm Floor	N	PR-05519-010
7	29	8:30	11	STP 1 40 cm Floor and Sidewall	N	PR-05519-011
7	29	8:30	12	STP 1 40 cm Floor and Sidewall	W	PR-05519-012
7	29	8:30	13	STP 1 40 cm Floor and Sidewall	W	PR-05519-013
7	29	8:30	14	STP 1 40 cm Floor and Sidewall	E	PR-05519-014
7	29	8:30	15	STP 1 40 cm Floor and Sidewall	S	PR-05519-015
7	29	8:30	16	STP 1 40 cm Floor and Sidewall	S	PR-05519-016
7	29	9:00	17	STP 2 Surface	N	PR-05519-017
7	29	9:00	18	STP 2 Surface	N	PR-05519-018
7	29	9:00	19	STP 2 Surface	N	PR-05519-019
7	29	9:00	20	STP 2 10 cm Floor	N	PR-05519-020
7	29	9:00	21	STP 2 10 cm Floor	N	PR-05519-021
7	29	9:00	22	STP 2 20 cm Floor	N	PR-05519-022
7	29	9:00	23	STP 2 30 cm Floor	N	PR-05519-023
7	29	9:30	24	STP 2 30 cm Floor	N	PR-05519-024
7	29	9:30	25	STP 2 30 cm Floor and Sidewall	W	PR-05519-025
7	29	9:30	26	STP 2 30 cm Floor and Sidewall	N	PR-05519-026
7	29	9:30	27	STP 2 30 cm Floor and Sidewall	E	PR-05519-027
7	29	9:30	28	STP 2 30 cm Floor and Sidewall	S	PR-05519-028
7	29	9:30	29	STP 2 30 cm Floor Overview	NW	PR-05519-029
7	29	10:00	30	STP 3 Surface	N	PR-05519-030
7	29	10:00	31	Western Yard and STP Overview	N	PR-05519-031
7	29	10:00	32	Western Yard Overview	NE	PR-05519-032
7	29	10:00	33	Western Yard Overview	SE	PR-05519-033
7	29	10:00	34	Western Yard Overview	SE	PR-05519-034
7	29	10:00	35	STP 3 10 cm Floor	N	PR-05519-035
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7	29	10:30	47	STP 3 Overview	SE	PR-05519-047

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Page 2 **of** 2 **Project Name (No.):** 8470 El Paseo Grande Geotech (1621) **Year 2016**

Camera Format: FujiChrome
Film Type and Speed: Digital Images Kept at: Laguna Mountain Environmental, Inc.

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7	29	10:30	49	Front Yard landscaping Overview	SW	PR-05519-049
7	29	10:30	50	South Side Yard Overview	W	PR-05519-050
7	29	10:30	51	House and Yard Overview	W	PR-05519-051
7	29	10:30	52	House and Yard Overview	W	PR-05519-052
7	29	10:30	53	Front Yard landscaping Overview	W	PR-05519-053


PR-05519-001

PR-05519-002

PR-05519-003

PR-05519-004

PR-05519-005

PR-05519-006

PR-05519-007

PR-05519-008

PR-05519-009

PR-05519-010

PR-05519-011

PR-05519-012

PR-05519-013

PR-05519-014

PR-05519-015

PR-05519-016

PR-05519-017

PR-05519-018

PR-05519-019

PR-05519-020

PR-05519-021

PR-05519-022

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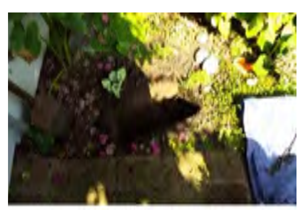
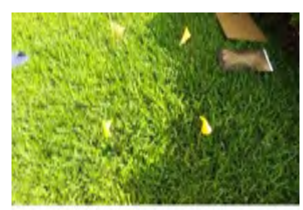
PR-05519-024

PR-05519-025

PR-05519-026

PR-05519-027

PR-05519-028

PR-05519-029

PR-05519-030

PR-05519-031

PR-05519-032

PR-05519-033

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PR-05519-035


PR-05519-036


PR-05519-037


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PR-05519-053

WAVE RUNUP / SEA LEVEL RISE STUDY
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

Prepared for
BLUE HERON DESIGN BUILD
Las Vegas, Nevada

Prepared by
TERRACOSTA CONSULTING GROUP, INC.
3890 Murphy Canyon Road, Suite 200
San Diego, California 92123
(858) 573-6900

Project No. 2966
March 21, 2017

TerraCosta
Consulting Group

TerraCosta Consulting Group

Geotechnical Engineering
Coastal Engineering
Maritime Engineering

Project No. 2966
March 21, 2017

Mr. David Lessnick
BLUE HERON DESIGN BUILD
4675 W. Teco Avenue, Suite 250
Las Vegas, Nevada 89118

WAVE RUNUP / SEA LEVEL RISE STUDY
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

Gentlemen:

In accordance with your request, TerraCosta Consulting Group, Inc. (TerraCosta) is pleased to present the results of our evaluation of the coastal processes in the site vicinity, along with an assessment of wave runup and its effect on the proposed beachfront property located at 8470 El Paseo Grande in La Jolla, California.

We have also addressed the impact of sea level rise on future inundation levels within this general segment of La Jolla, along with its effect on coastal processes, including the design wave height, wave forces, and anticipated scour extending out to the year 2100. The accompanying report describes our findings pertinent to the general coastal processes in the area, including the potential for marine erosion and its effect on the proposed improvements.

We appreciate the opportunity to be of service and trust this information meets your needs. If you have any questions or require additional information, please give us a call.

Very truly yours,

TERRACOSTA CONSULTING GROUP, INC.

Walter F. Crampton, Principal Engineer
R.C.E. 23792, R.G.E. 245

WFC/jg
Attachments

TABLE OF CONTENTS

WAVE RUNUP / SEA LEVEL RISE STUDY
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

1 INTRODUCTION AND PROJECT DESCRIPTION

As we understand, the proposed project consists of demolishing the existing residential structure at 8470 El Paseo Grande, and constructing a new three-story single-family residence designed by Marengo Morton Architects. A review of the architectural drawings dated March 10, 2017, indicates that the basement level of the residence is at elevation 13.5 feet, NGVD 29, while the elevation along El Paseo Grande is approximately 26 feet, NGVD 29.

An existing seawall fronts the subject property and extends from Kellogg Park to Scripps Institution of Oceanography (SIO), with the elevation of the wall in front of the subject property at 15.1 feet, NGVD 29.

Although we do not know the actual specifics, it would appear that the subject seawall is one of several seawalls that protect a total of 22 properties extending south of SIO along El Paseo Grande. The subject seawall appears to have been constructed fronting six properties, with a shared 8-foot-wide boardwalk landward of the seawall and a public access stairway located near the middle of this seawall. Low-height private walls then exist on the landward side of the boardwalk, delineating the private properties to the east, with the public access boardwalk fronting these six properties providing access to the beach.

2 SETTING

The approximately 1-mile-long beach at La Jolla Shores is located between Scripps Submarine Canyon on the north, and La Jolla Submarine Canyon and Point La Jolla on the south, which marks the southern boundary of the Oceanside Littoral Cell (Figure 1). The canyon and inter-canyon bathymetry greatly influence the local wave distribution, generally producing lower wave heights than at adjacent areas to the north and south. The Rose Canyon fault intersects the coast at the southern end of the reach and controls the local geomorphology. Beach access is excellent, especially at SIO (although parking is restricted) and at Kellogg Park with its large public parking lot. Along with Pacific Beach and Mission Beach to the south, La Jolla Shores provides a major portion of the available recreational beach area in the City of San Diego.

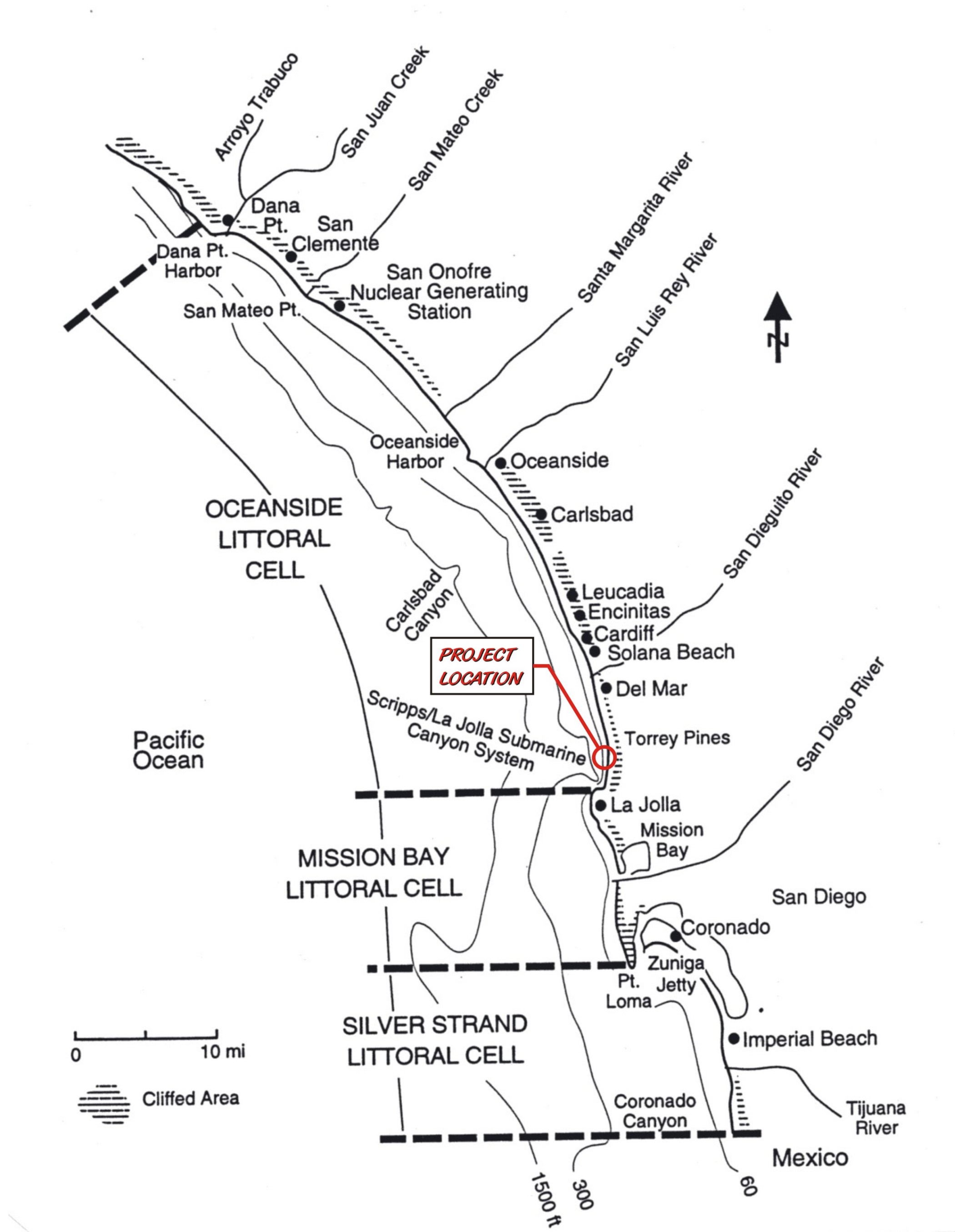


Figure 1. Littoral cells in the San Diego region. The Oceanside cell extends from Dana Point to Point La Jolla (Mt. Soledad).

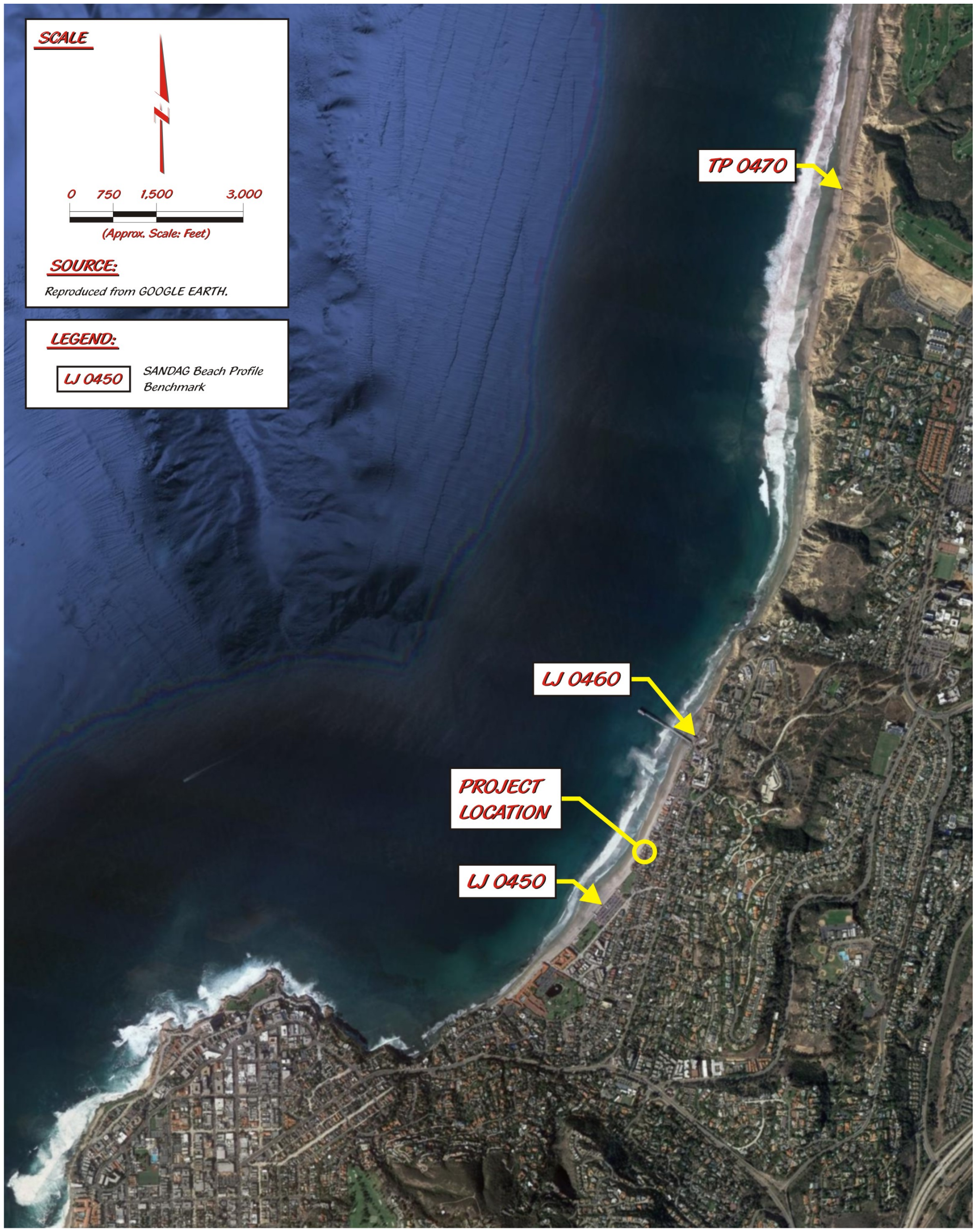


Figure 2. Torrey Pines (South) and La Jolla Shores indicating project site and beach profile benchmark locations.

Figure 2 is a Google Earth image of the southern Torrey Pines and La Jolla Shores beach sections. Also indicated are the project site at 8470 El Paseo Grande and benchmark locations TP-0470, LJ-0460, and LJ-0450, used as the starting points for cross-shore beach profile measurements used to derive beach width history surveyed by Coastal Frontiers (2015) under contract to SANDAG.

The sandy beach at La Jolla Shores is moderately wide in the northern and central reaches, but tapers to the south where La Jolla Submarine Canyon intercepts sand and funnels it offshore (Inman and Frautschy, 1966). SIO and residential development back the northern half, while the low-lying Kellogg Park, a filled coastal lagoon, sits in the south-center and a hotel-resort and restaurant, and several additional residential properties, occupy the southern end.

The developed northern and southern sections are completely armored with various types of concrete seawalls of varying heights. Several armored sections are still vulnerable to wave overtopping, which will become gradually more acute as mean sea level rises. The Marine Room restaurant has a history of being occasionally damaged by wave flooding, such as occurred in 1941 and 1983. The restaurant has turned this hazard into an asset by featuring “High Tide” breakfasts and dinners from (respectively) October-March and April-September, when the daily extreme high tide “brings the waves up to our picture windows,” most recently during the 2015-16 El Niño winter.

A narrow bedrock and cobble beach forms a transition between the sandy beach at Torrey Pines State Beach and the one at La Jolla Shores to the south. Dike Rock, an outcrop of volcanic rock, acts as a natural breakwater protecting a small headland that dominates this area. The only shore protection is a short section of riprap high on the back beach protecting the “Mushroom House,” a novel, private guesthouse near Dike Rock. Proceeding south, seawall protection commences in front of the SIO marine biology research building (Hubbs Hall), and continues unbroken to Kellogg Park.

Beach conditions at the northern and central sections of La Jolla Shores are closely tied to the conditions at Torrey Pines Beach, which supplies essentially all of the available sand to the area. Gullying of the terrace and the cliff face and landslides are the dominant mechanisms of erosion at Torrey Pines (Flick, 1993; Flick and Elwany, 2006). USACE (1988) cites a 1982 landslide at Torrey Pines estimated to contain over 1.3 million cubic meters of sedimentary material, of which about 43 percent is sand-sized (Young and Ashford, 2006). Torrey Pines received 209,000 cubic yards of sand nourishment in April 2001 as part of the SANDAG regional beach nourishment project. Storm waves in November 2001 shifted some of this sand offshore and alongshore, with much of it moving south toward La Jolla Shores (Seymour, et al., 2005).

2.1 Beach Width and Stability

Figure 3 illustrates the time history of beach width at south Torrey Pines (Range TP-0470). Regular twice-yearly (spring and fall) measurements sponsored by SANDAG beginning in 1996 follow early surveys in autumn 1984 and 1989. The data suggest that beach width at Torrey Pines was between about 200 and 250 feet in 1984-1989. It ranged between about 60 and 270 feet, averaging about 200 feet between 2003 and late 2015. Beach widths were lower before the 2001 nourishment, presumably because of erosion between 1989 and 1996, during which time no measurements are available, and due to additional erosion in the 1997-98 El Niño winter. Natural beach width recovery is evident before the additional boost from the 2001 nourishments. The SANDAG data for 2016 is not available as of this writing. However, Ludka, et al. (2016), demonstrate a 90-foot decrease in beach width at Torrey Pines during the 2015-16 El Niño winter, which exceeded the typical seasonal decline of 50 to 70 feet.

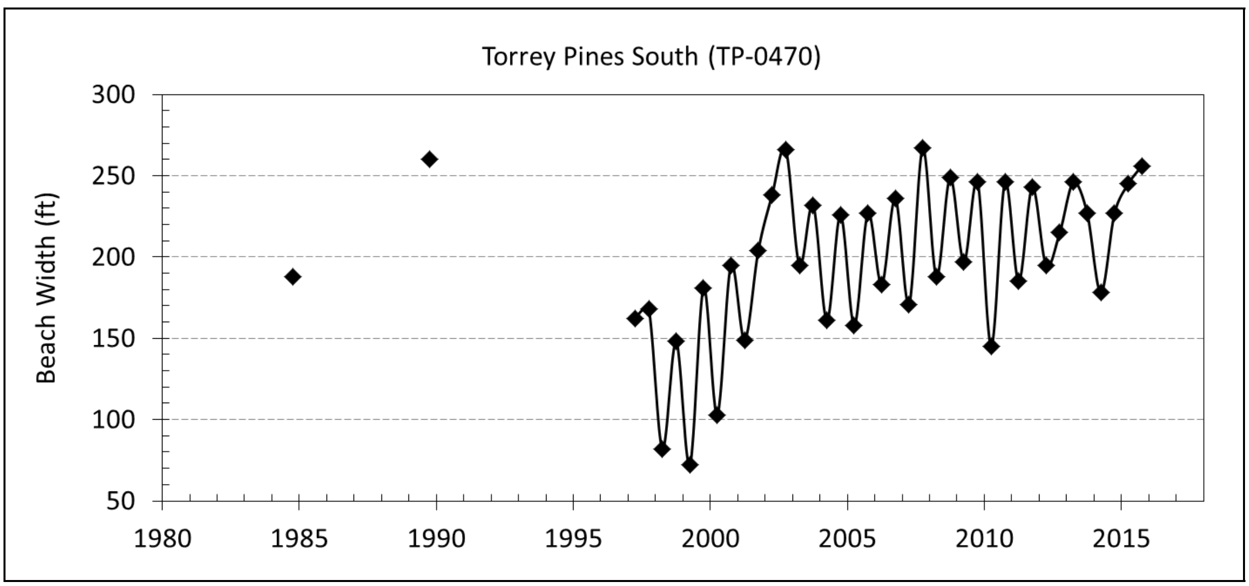


Figure 3. Beach width history at Torrey Pines (South), Range TP-0470.

Profile Range LJ-0460 is located at the foot of the concrete ramp between the Dive Locker and Center for Coastal Studies buildings at SIO. Figure 4 shows the time history of beach width at this range. The average width is about 150 feet, with a range of 60 to nearly 300 feet, similar to the width of south Torrey Pines beach. Fluctuations are slightly larger, ranging from about 70 to 100 feet. Unlike Torrey Pines, La Jolla Shores received no sand during the 2001 SANDAG nourishment project. However, a slight increase in width after 2001 suggests a direct benefit. The maximum beach width measured between 1984 and 2015 occurred in fall 2015. Forthcoming data will undoubtedly show a decrease during the winter of 2015-16, just as most other local beaches did (Ludka, et al., 2016). Sand availability in the region, both upcoast at Torrey Pines and offshore on the wide shelf between the two branches of the offshore submarine canyon system, ensures timely recovery and continued long-term stability of La Jolla Shores beach.

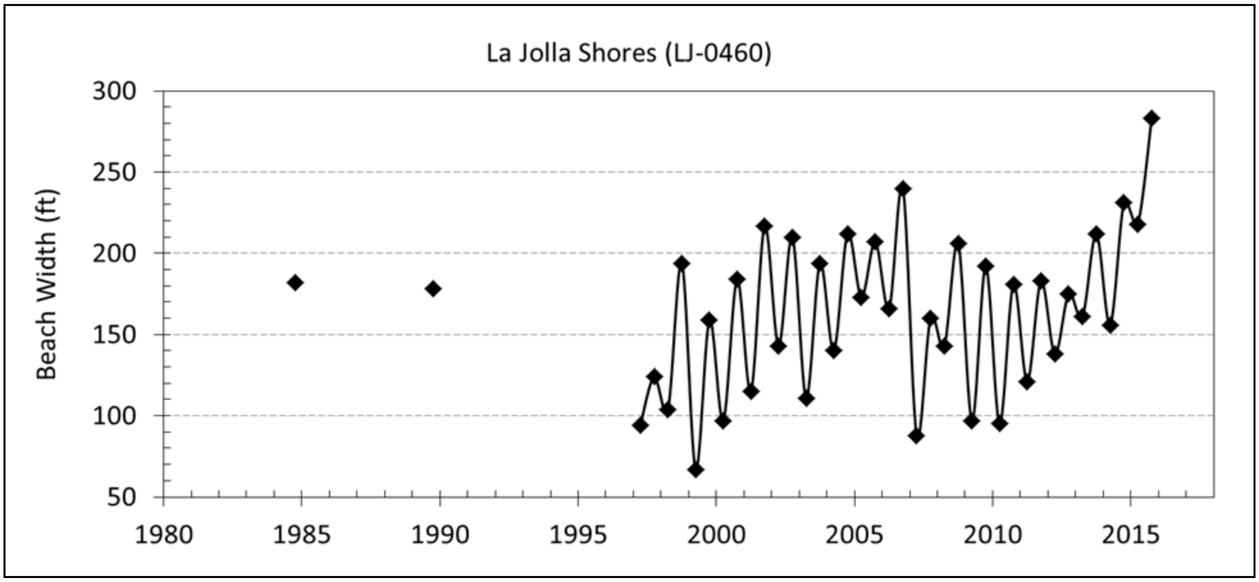


Figure 4. Beach width history at La Jolla Shores, Range LJ-0460.

Profile LJ-0450 is located approximately 1,200 feet south of the project site (Figure 2). Figure 5 shows the beach width history there, and strongly suggests long-term stability. The average beach width from 1996-2015 was about 250 feet, which is about the same as the widths measured in 1984 and 1989. Seasonal fluctuations are smaller than those at LJ-0460, ranging about 50 feet. The minimum observed beach width of about 150 feet occurred in spring 1998 after the aforementioned 1997-98 El Niño. Recovery was rapid, with beach width reaching 250 feet by fall 1998. The data also suggest some 25 to 50 feet of benefit following the 2001 Torrey Pines nourishment. Near-maximum beach widths were also recorded in late 2014 and 2015, but erosion can be anticipated in winter 2015-16, as at other locations.

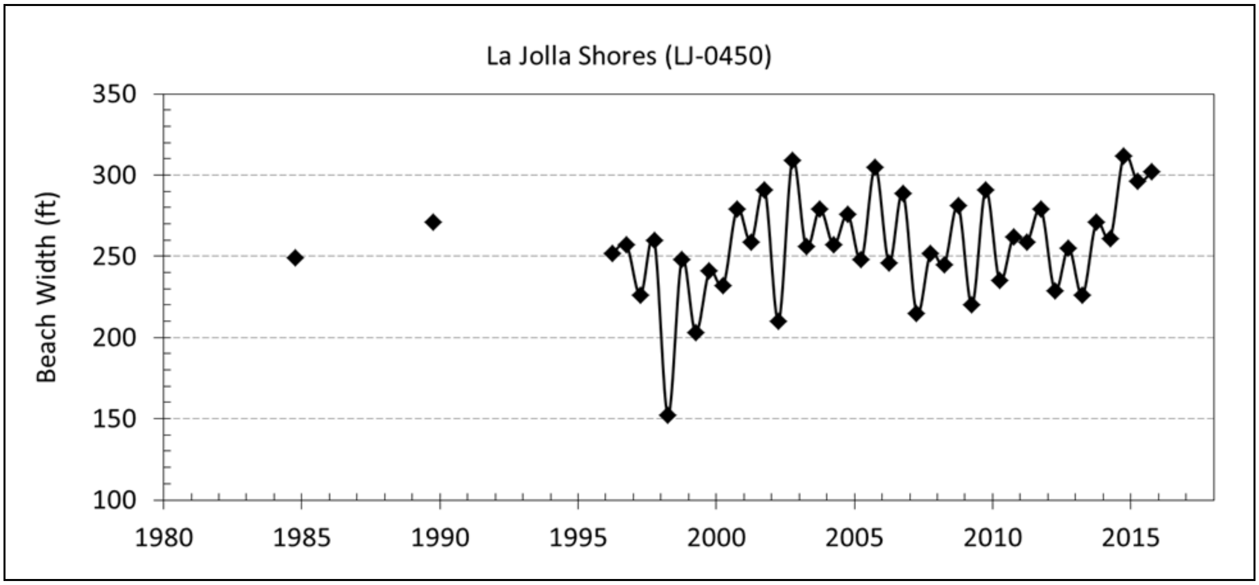


Figure 5. Beach width history at La Jolla Shores, Range LJ-0450.

3 FEMA MAPPING

We conducted a review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for the study area (Figures 6A and 6B). The proposed project falls within an X Zone (Outside the Special Flood Hazard Area), with a base flood elevation (BFE) of 12 feet, NAVD 88 (9.89 feet, NGVD 29). The X Zone designation results from a pad grade of above elevation 13.5 feet NGVD 29, or well above any typical coastal flooding.

4 COASTAL FLOOD AND EROSION HAZARD MAPPING

The Pacific Institute has developed coastal flood and erosion hazard zone maps addressing the impacts of sea level rise on the California coast by the year 2100 under funding by the California Energy Commission, the California Department of Transportation, and the Ocean Protection Counsel. The Impacts of Sea Level Rise on the California Coast report (Pacific Institute, 2009) concludes that sea level rise will inevitably change the character of the California coast and that adaptation strategies must be evaluated, tested, and implemented if the risks defined in the impacts of sea level rise on the California coast report are to be reduced or avoided. Populations and critical infrastructure at risk are shown on detailed maps prepared by the Pacific Institute. A close-up portion of the coastal flood hazard map for the La Jolla Quadrangle projected out to the year 2100 is shown on Figure 7, with the study area landward of the erosion high hazard zone in 2100. If the viewer is interested in examining the Pacific Institute's map in more detail, this map can be viewed and enlarged at: http://www2.pacinst.org/reports/sea_level_rise/hazmaps.html.

5 TSUNAMI MAPPING

The University of Southern California Tsunami Research Center, funded through the California Emergency Management Agency, has developed tsunami inundation maps for emergency planning for the entire state of California. The tsunami inundation map for the La Jolla quadrangle is shown on Figure 8A, with an enlargement showing the study area provided on Figure 8B, along with an enlargement of the map text provided on Figure 8C describing the methodology and data sources used in the model. Although the tsunami inundation map provides almost no detailed information on the inundation area along the shoreline, Figure 8B indicates a fairly extensive inundation area throughout the low-lying areas around Kellogg Park. While exact inundation elevations are not available through the University of Southern California Tsunami Research Center, tsunami inundation elevations can be approximated by comparing actual ground surface elevations along the tsunami inundation limits in the vicinity of Kellogg Park, with an estimated inundation elevation, using this admittedly somewhat crude approach, being on the order of 11 feet NGVD 29.

6 WAVE CLIMATE

Waves provide nearly all of the energy input that drives shoreline processes along the California coast. As illustrated in Figure 9, incoming waves along the southern California coast fall into three main categories: Longer period northern and southern hemisphere swell, and locally short-period generated seas. North hemisphere swell from the North Pacific Ocean dominate the winter wave conditions off California, while southern hemisphere swell is more important in the summer. Short-period seas are produced by storms sweeping through the area. The offshore islands, shallow banks, submarine canyons and generally complex bathymetry of southern California greatly complicate the wave climate at the coast.

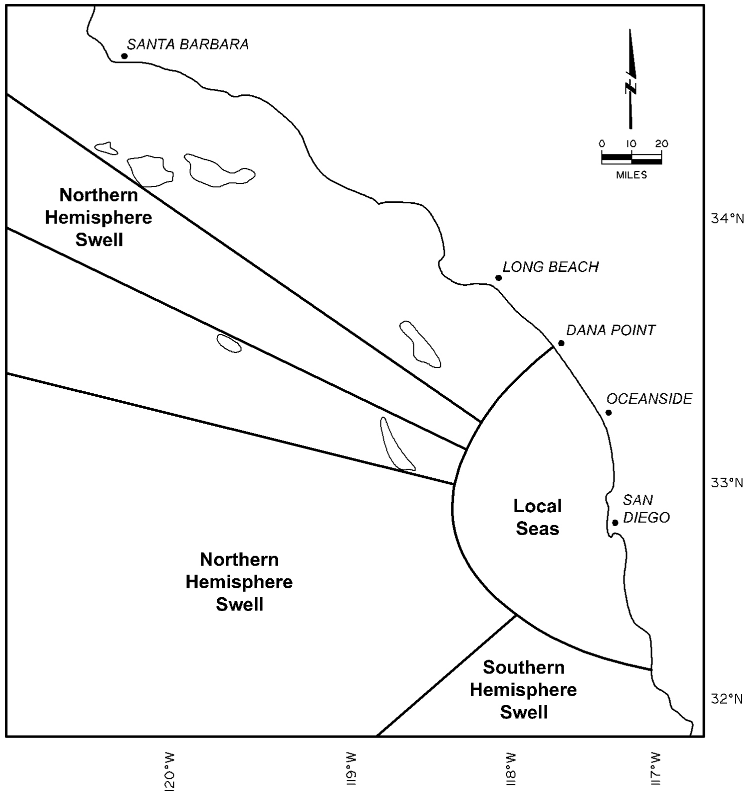


Figure 9. Map showing generalized wave exposure for southern California.

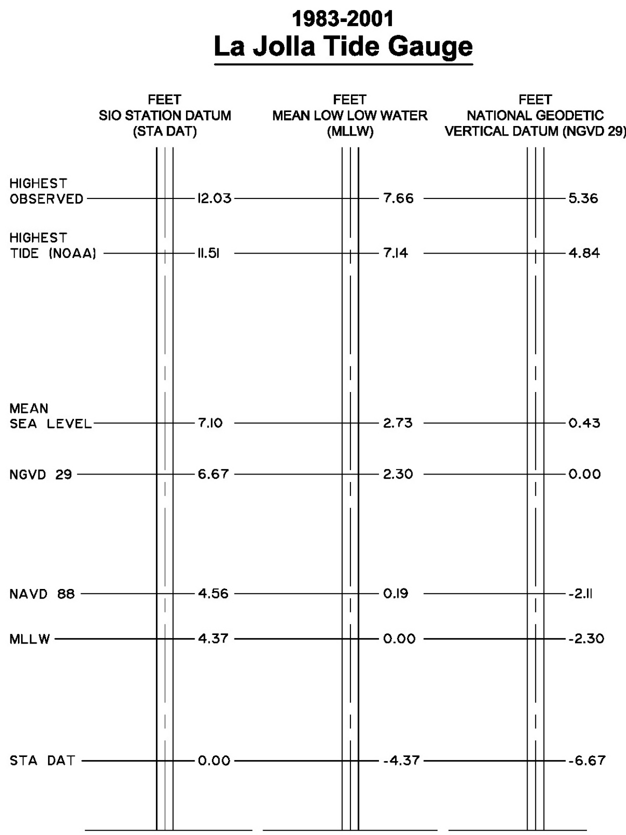
Coastal orientation, and the islands and banks greatly influence the swell propagating toward shore by partially sheltering southern California, especially from directions north of west. Because of the complicated effects of bathymetry and island shadowing, the wave height at the shoreline is sensitive to relatively small changes in the incoming direction of the deep ocean waves.

While waves along the San Diego County shoreline generally range in height from 2 to 5 feet, deep water waves off the coast have been recorded with deep water significant wave heights approaching 10 meters (33 feet).

7 WATER LEVELS

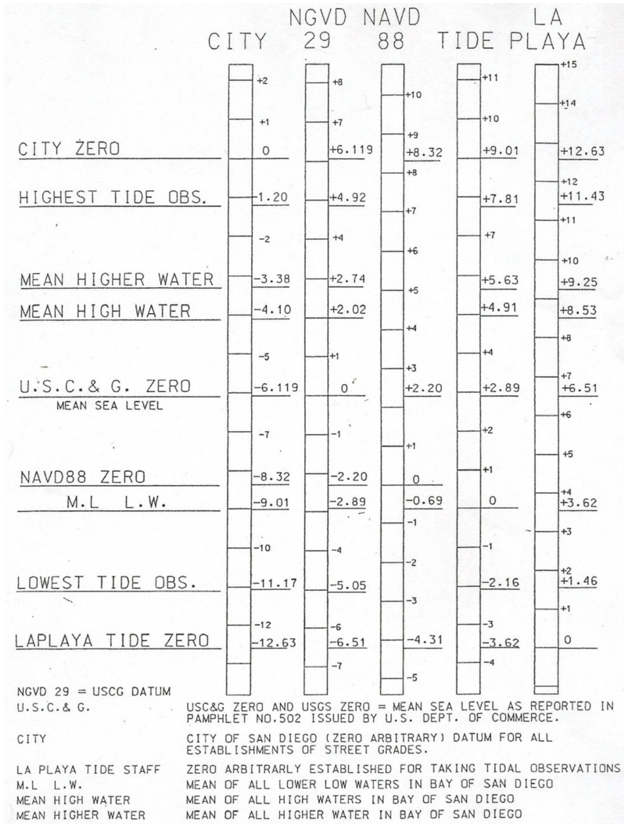
Past water elevations are based on the tide gauge data from La Jolla, which has been collected at SIO Pier since 1924. These data are applicable to the San Diego region open-ocean coastline. The tidal and geodetic reference relationships at La Jolla are illustrated in

Figure 10. Note that similar relationships derived for La Playa inside San Diego Bay (Figure 11) are often used. However, the tide range in San Diego Bay is about 10 percent larger than along the open coast, so that the La Jolla tidal datums are preferred for coastal locations.



Tidal and geodetic datum relationships for the latest (1983-2001) tidal epoch at La Jolla (Scripps Pier). These are applicable to the open-coast of the San Diego region.

Figure 10. Sea Level Datums



Tidal and geodetic datum relationships in the San Diego Bay based on La Playa (behind present-day Shelter Island) where a tide gauge was located from 1853-72. Note that the currently operating San Diego tide gauge has been located at or near Navy Pier off downtown San Diego since 1906.

Figure 11. Datum Relationships

Tide gauges measure total water level outside the breaker zone, which includes contributions from the tide, as well as storm surges and other factors that raise sea level over the short and long term, including the effects of El Niño. All non-tide sea level influences measured by the tide gauges are termed “non-tide residuals, or “NTR.” Importantly, tide gauges do <u>not</u> include the effects of waves, including wave setup and wave-driven runup. At the shoreline and on beaches, wave-driven runup is a crucial component of the design water elevation and must be determined by means other than tide gauge data.

The projected future total maximum water level elevations include the contributions from the predicted tides, and projected storm effects, El Niño influences, and wave runup. Projected NTR and wave runup were derived from a National Center for Atmospheric Research (NCAR) global circulation model (GCM) run using the IPCC (2007) A2 future greenhouse gas (GHG) emission scenario. The A2 scenario is a moderately aggressive one, with only limited reductions in the rate of future GHG emissions from current levels. This is, therefore, a conservative scenario. This information is available from a study recently completed by TerraCosta Consulting Group for SPAWAR Systems Center Pacific that seeks to determine the impacts of future MSLR on the beach training areas at Naval Base Coronado (Chadwick, et al., 2011). The results are directly applicable to the issues being addressed in this report.

Figure 12 illustrates projected MSLR scenarios equal to 0.5, 1.0, 1.5, and 2.0 m by 2100. These projections are the ones being considered by SPAWAR and span the currently accepted range of scientific consensus of possible future scenarios, although the higher ranges are deemed less likely than the central tendencies (Nichols, et al., 2011; Houston, 2012).

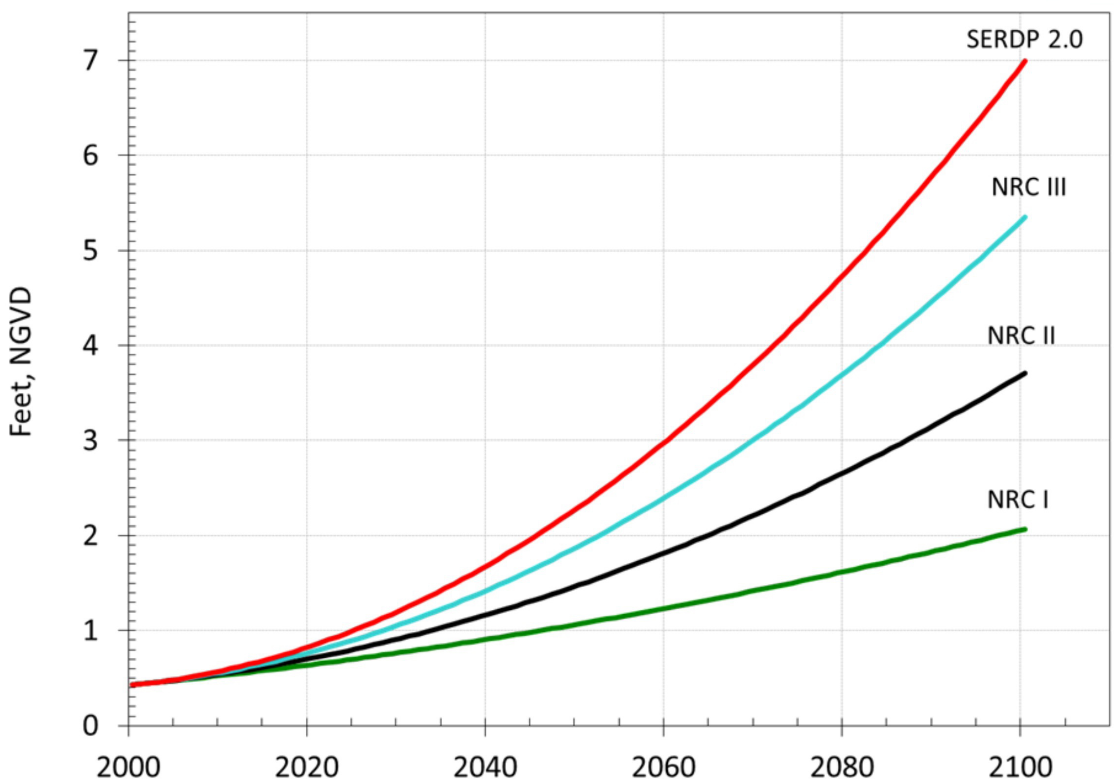


Figure 12. Four illustrative future MSLR scenarios spanning the equivalent of 0.5, 1.0, 1.5, and 2.0 meter increase from 2000-2100 (in feet relative to NGVD).

Figure 13 summarizes future MSLR scenarios developed in a new National Research Council (NRC 2012) study that the California Ocean Protection Council is currently seeking to adopt and provide as guidance for state and local agencies.

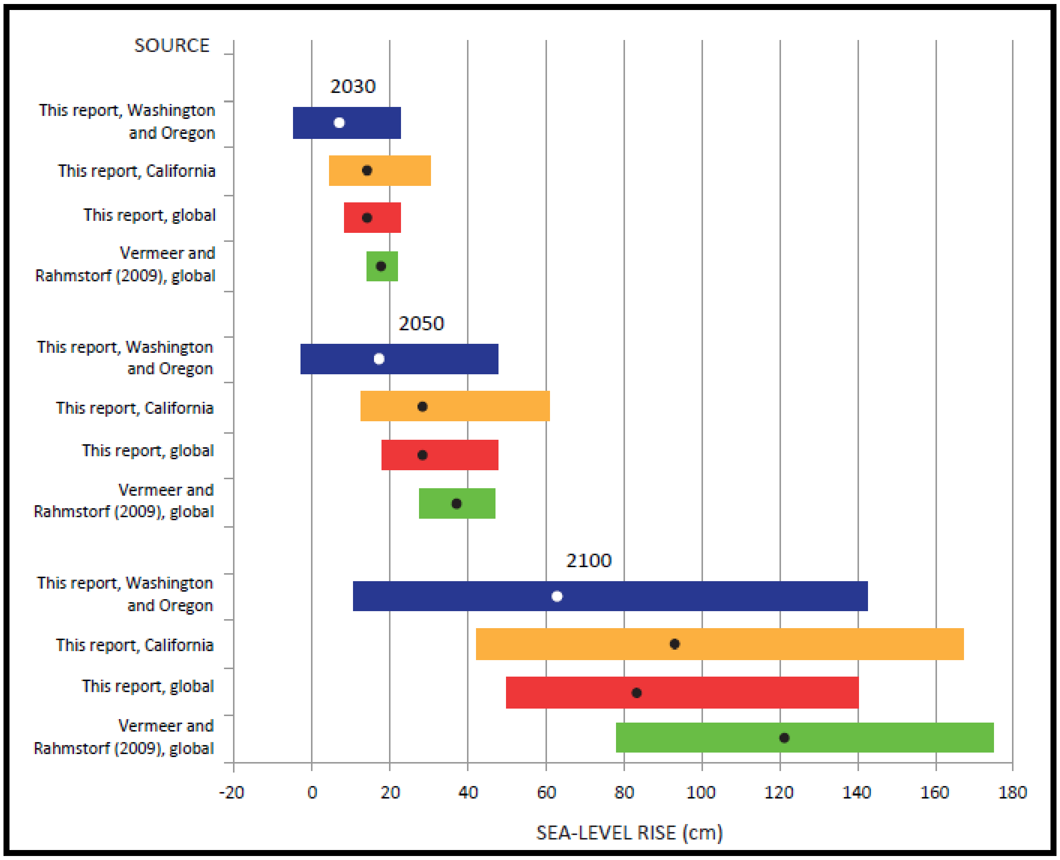


Figure 13. NAS (2012) summary of global, Washington, Oregon, and California (south of Cape Mendocino) MSLR projections for 2030, 2050, and 2100 relative to 2000.

7.1 Sea Level Rise

Past and possible future changes in mean sea level (MSL) are of interest in design and planning for all coastal cities, as well as for any engineering activities on the coast. Figure 14 shows the time history of maximum monthly sea level observed at the La Jolla tide gauge from 1924 to 2011. These data are routinely tabulated by the National Oceanic and Atmospheric Administration (NOAA) as part of their national tide gaging program (Flick *et* *al.*, 2003). Peak observed values (relative to NGVD) are 5.36 feet (January 2005) and 5.35 feet (November 1997).

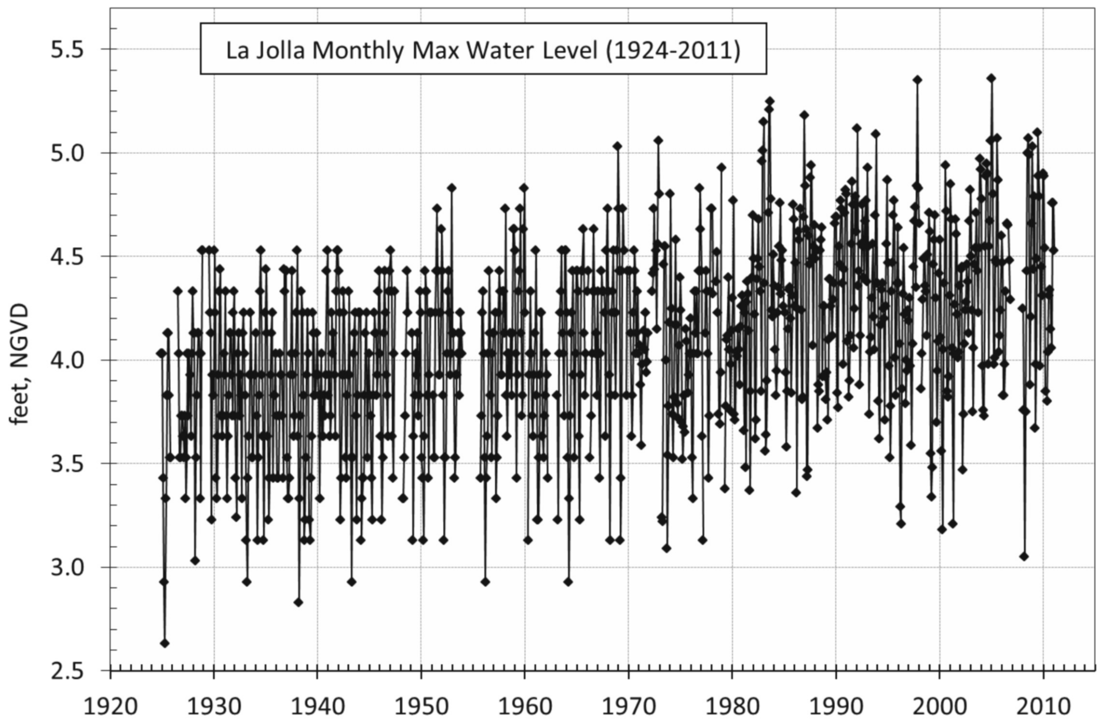


Figure 14. Time history of maximum monthly sea level observed at the La Jolla tide gauge 1924-2011.

Global mean sea level rose at least 300 feet, and perhaps as much as 400 feet, during the past 18,000 years or so (CLIMAP, 1976). Sea level, both globally and along California, rose approximately 0.7 foot over the past century, as shown in Figure 15. Furthermore, evidence suggests that the rate of global mean sea level rise has accelerated since the mid-1800s, or even earlier (Church and White, 2006; Jevrejeva, et al., 2008), and that it has now reached a rate of about 1 foot per century over the past decade or so (Nerem, et al., 2006).

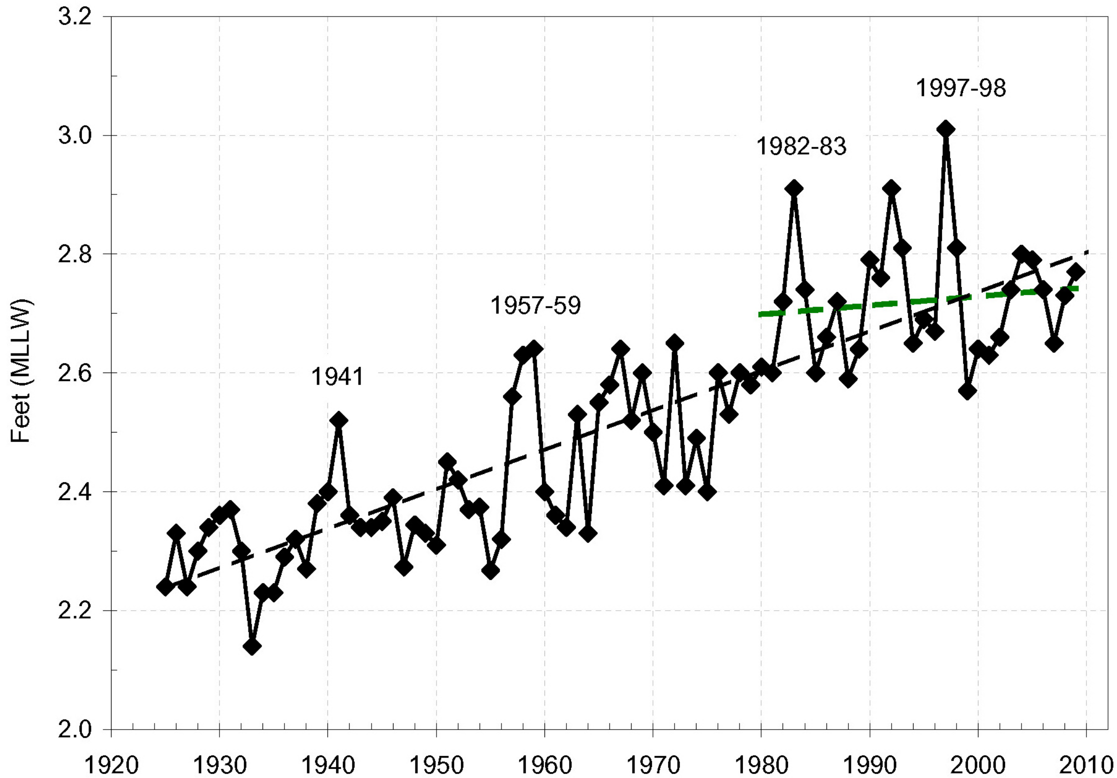


Figure 15. Annual average sea level history at La Jolla, 1925-2007. Broken line shows linear trend of 0.7 feet/century rise.

Figure 15 is a plot of the annual mean sea levels measured at the La Jolla tide gauge starting in 1925. The linear trend indicates the approximate 0.7 foot per century sea level rise. Also noticeable are the enhanced sea levels during the El Niño episodes of 1941, 1957-59, 1982-83, and 1997-98 (respectively labeled).

A notable feature of the sea level history at La Jolla is the leveling-off of sea level rise since about 1980 (Figure 15). The green broken line shows a much reduced trend of about 0.15 foot per century between 1980 and 2009, or about 4.5 times smaller than the overall trend of 0.67 foot per century. A similar reduction in the rate of sea level rise has been noted at San Francisco, which has a similar overall appearance as the La Jolla record, but is a much longer record extending back to 1856.

Figure 16 shows the global distribution of the rate of sea level change for the period of 1993-2006 (Cabanes, et al, 2001). Note that warm colors (yellow-orange-red) show areas of sea level rise (positive rates), while cool colors (green- blue) indicate falling sea level (negative rates) over the record. Inspection of the North Pacific reveals that sea levels in the western Pacific, especially in the lower latitudes, have risen at a rate of 3-9 mm/year (equivalent to 30-90 cm per century, or about 1-3 feet per century). Conversely, sea levels in the eastern Pacific, extending from Central America north to Washington State, have fallen at a rate of 0-3 mm per year (0-30 cm per century, or 0-1 foot per century). This may explain the coastal tide gauge observations (La Jolla sea level history; Figure 15) described above.

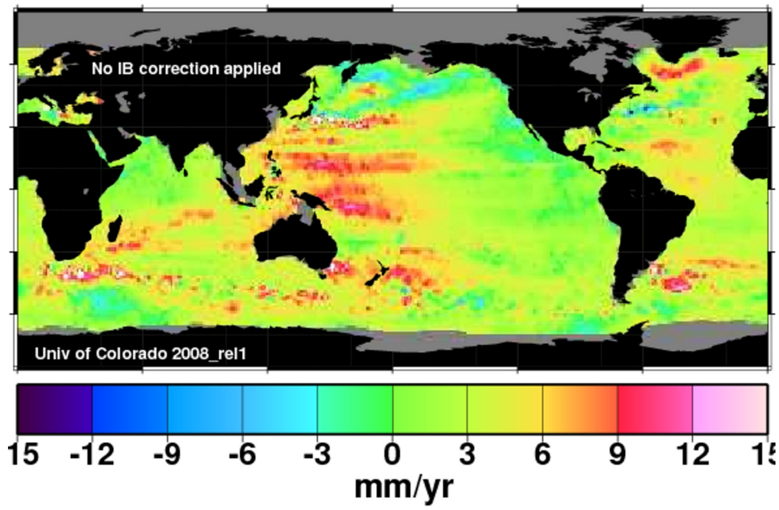
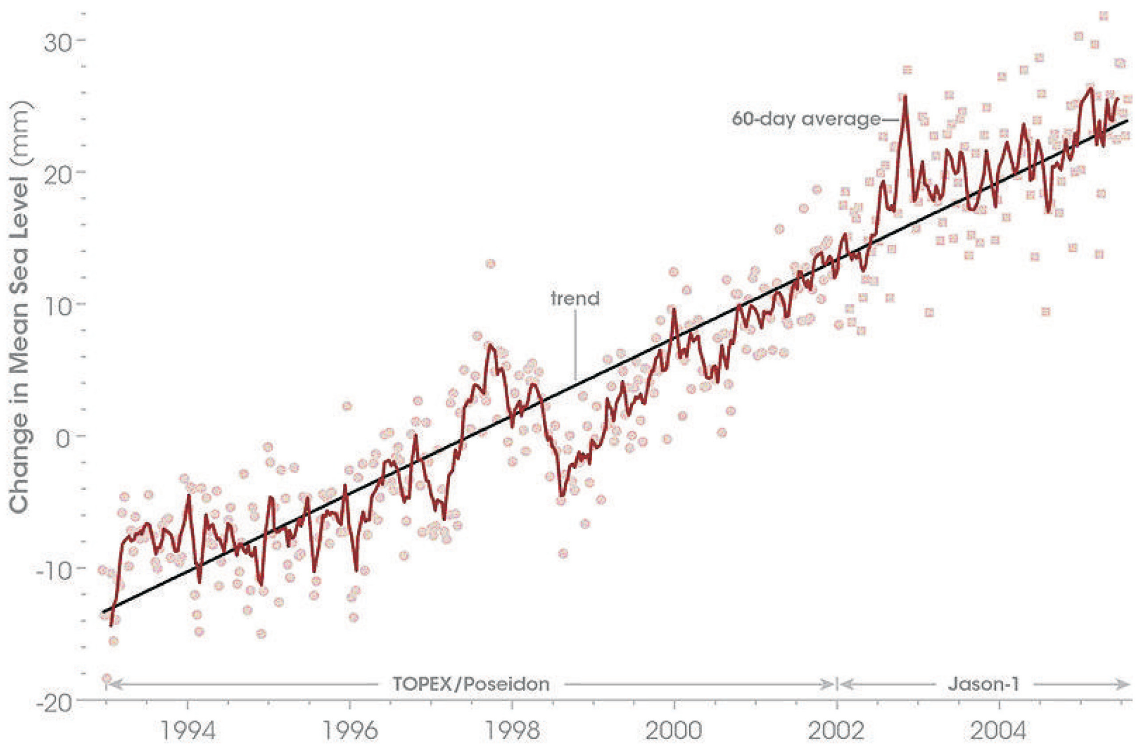


Figure 16. Global sea level change rates 1993-2006 as derived from satellite altimetry measurements, following Nerem (2006).

Bromirski, et al. (2011) determined that increases in wind stress over large parts of the Pacific Basin are largely responsible for a "dynamical suppression" of MSLR as part of a major regime-shift that occurred in the late 1970s. Any flooding or beach erosion that has occurred on this coast since about 1980 has not been affected by MSLR as future events are expected to be. In fact, it is reasonable to conclude that MSLR will resume and likely accelerate along the California coast over the next few decades (Bromirski, et al., 2012).

In sharp contrast to the recent decrease in sea level rise rates along the California coast, including La Jolla, the global mean sea level rise rate over the past two decades has increased over the rate observed for the past century, and has reached about 1 foot per century (32 cm per century). This is indicated from satellite data reporting and trend analysis shown in Figure 17 (Nerem, 2005). The exhibit illustrates how sea level change trends may vary globally and that the impacts of sea level rise may affect regions differently.



Satellite-derived global sea level elevation change from 1993-2005 after Nerem (2005). Slope of the trend line is about 1 foot per century (32 cm per century).

FIGURE 17

Figure 18 presents historical elevation return periods based on the La Jolla tide gauge data for the tide, and tide plus NTR, which includes storm surges and other sea level effects such as El Niño, but excludes wave-driven runup. Note that a maximum possible (past) joint tide plus NTR water level of 5.82 feet would have required an extremely unlikely (but not impossible) coincidence of the maximum tide (4.87 feet) and the highest (1924-2004) observed NTR (0.95 foot). Return periods as a function of elevation or vice-versa can be read directly from this graph. For example, under current MSL conditions, a joint occurrence of tide and NTR of 4.95 feet would be expected annually, while 5.3 feet would occur approximately once per decade, and about 5.6 feet once per century, on average.

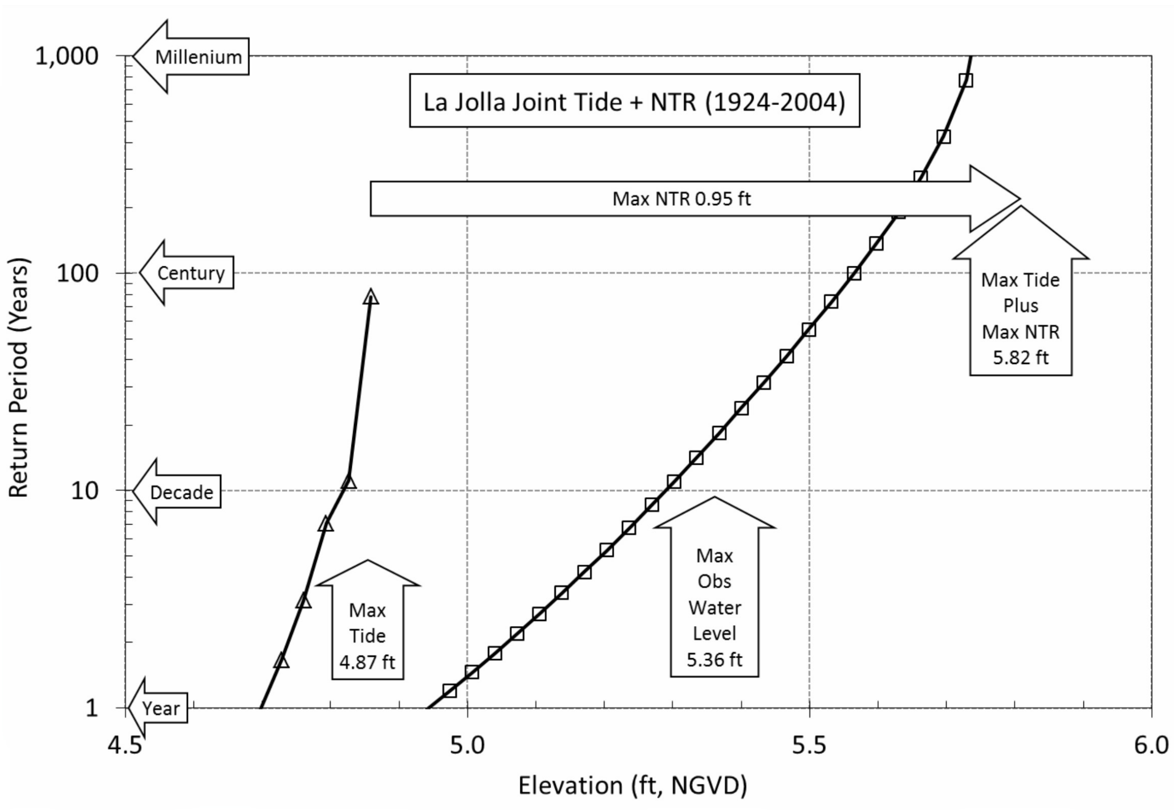


Figure 18. Historical elevation return-period curves based on La Jolla tide gauge data for tide (triangles, left) and joint occurrence of tide plus NTR (squares, right).

While many sea-level rise scenarios have been published, the California Coastal Commission, on August 12, 2015, adopted their Sea Level Rise Policy Guidance document, which provides contemporary best available science and sea level rise projections from the Third National Climate Assessment (NCA; Melillo, et al.), released in 2014, providing a set of four global sea level rise scenarios ranging from 8 inches to 7 feet by the year 2100, reflecting different amounts of future greenhouse gas emissions, ocean warming, and ice sheet loss. While the Coastal Commission's Sea Level Rise Policy Guidance document does not provide direction on the selection of a sea level rise, they do require that studies at least address the impacts of the four NCA scenarios, and then ultimately choose a sea level rise scenario as a basis for design and provide justification for that design scenario. Accordingly, and while we have evaluated the four NCA scenarios, we have selected a 75-year design life extending out to the year 2092 corresponding to an MSLR of 3 feet by 2100 consistent with the midpoint of the 2012 NAS data, as shown on Figure 13. Moreover, since the 2014 National Climate Assessment suggests future sea level rise estimates ranging from 1 to 4 feet, or 0.3 to 1.2 meters, this seems consistent with the Coastal Commission's suggested MSLR scenarios ranging from Lowest to Intermediate-High. Additional discussion on the effects of sea level rise is provided in Section 7.3, Seawall Performance.

7.2 Design MSLR Scenario

As indicated previously, the California Coastal Commissions' Sea Level Policy Guidance document requires acknowledging the Coastal Commission's current range in suggested sea level rise scenarios, and then the selection of a design sea level rise scenario for the proposed project. We have reproduced as Figure 19 the Coastal Commission's four suggested sea level rise scenarios through the year 2100, ranging from the Lowest at 0.2 meter, to the Highest at 2.0 meters, measured from the 1992 baseline. Global mean sea level rise scenarios used in the 2014 U.S. National Climate Assessment (Melillo, et al., 2014) concluded that "global sea level has risen by about 8 inches since reliable recordkeeping began in 1880. It is projected to rise another 1 to 4 feet by the year 2100." Based on recent discussions with Dr. Reinhard Flick, the State Oceanographer with the California Department of Boating and Waterways and a Research Scientist at Scripps Institution of Oceanography, global sea level has risen from 1993 through 2015 at a relatively uniform rate of 32 centimeters per century, or at the same trajectory as previously reported by Nerem (2005) and illustrated above in Figure 17. While Nerem's data extended from 1993 to 2005, the more recent recorded global sea level elevation change from 1993 to 2015 provides essentially the same data. This information is also shown on Figure 19, which from 1992 through 2015 has resulted in 7.36 centimeters of relatively uniform sea level rise in the past 23 years. If this uniform rate of sea level rise (consistent with that shown on Figure 19) were to extend out to the year 2100, this would be equivalent to a future mean sea level of 0.35 meter above the 1992 datum, and slightly above the Coastal Commission's suggested Lowest MSLR scenario.

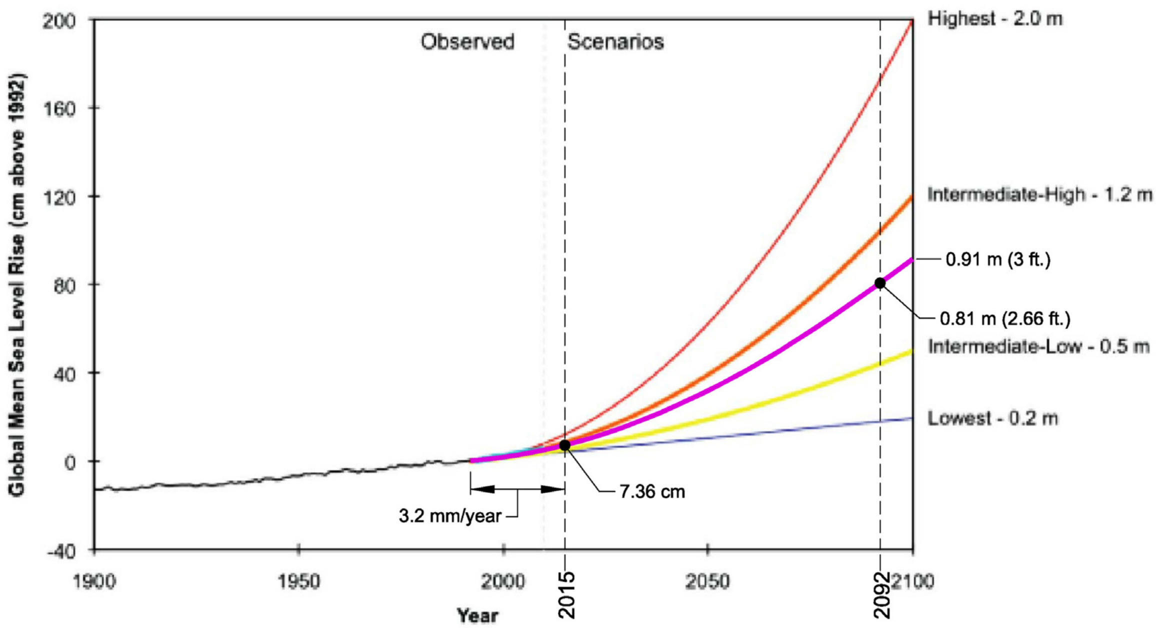


Figure 19. Modified from Figure 5 of the California Coastal Commission Sea Level Rise Policy Guidance document adopted August 12, 2015.

The real significance of the various MSLR scenarios is the rate of overtopping and the amount beyond which overtopping becomes objectionable. Regardless of the assumed MSLR scenario, future overtopping rates can be reduced by simply increasing the height of the structure or, if one does not exist, by adding a wave deflector to the top of the structure.

Recognizing that the 2014 National Climate Assessment suggests future sea level rise estimates ranging from 1 to 4 feet, or 0.3 to 1.2 meters, this seems consistent with the Coastal Commission's suggested MSLR scenarios ranging from Lowest to Intermediate-High. As a reasonable upper bound, we have chosen a design MSLR of 0.91 meter, or 3 feet, in the year 2100, which amounts to 2.66 feet in 75 years.

7.3 Seawall Performance

Given the existing seawall height of 15.1 feet NGVD 29, a certain amount of wave overtopping will occur during extreme high tide and high wave conditions (such as the January 1983 storm). The amount of overtopping is a function of several factors, including the height of the structure, the depth of scour at the base of the structure, the height of the SWL, the deep water wave height, the wave period, the direction and speed of any onshore winds, and, importantly, the extent of any future rise in sea level over the design life of the structure.

7.4 Design Stillwater

The maximum design still-water level (SWL) is critical to any wave analyses, as it determines the wave energy that can be propagated into the shoreline, eventually impacting and overtopping structures. It is the deep-water wave height superimposed upon the extreme SWL that defines the joint probability of the design storm condition, creating the largest wave forces on structures, along with the maximum runup and overtopping volume. In addition to tidal fluctuation, water levels at the shoreline are influenced by storm surge, wave setup, and surf beat. These influences, combined with the astronomical high tide, allow offshore storm waves to run up the elevated back beach and impact coastal structures. For the La Jolla area, excluding sea level rise, the likely maximum 100-year design stillwater level would be 6.8 feet NGVD 29 determined from Figure 18, as described previously, plus 1.2 feet to account for storm-induced wave runup. To account for sea level rise, we have used the criteria provided in Figure 19, assuming an MSLR scenario of 3 feet (91.4 cm) by the year 2100, or 2.66 feet for the 75-year project design life. In compliance with the California Coastal Commission, we have also evaluated MSLRs of 0.5m, 1.2m, and 2m.

7.5 Design Wave Height

Our evaluation of the maximum design wave for the subject structure is based on criteria set forth in the U.S. Army Corps of Engineers Shore Protection Manual (1984 Edition). As indicated above, we have used a design stillwater level of 6.8 feet NVGD 29, plus 2.66 feet for the design SLR condition. For purposes of computing the maximum wave height, we have also assumed a design scour elevation in front of the structure of -2 feet NGVD 29, and a foreshore slope of 1 to 50. The design scour elevation of -2 feet assumes that the bedrock shore platform elevation, currently estimated to be around elevation -1 foot NGVD 29, might experience upwards of 1 foot of additional scour during its design life.

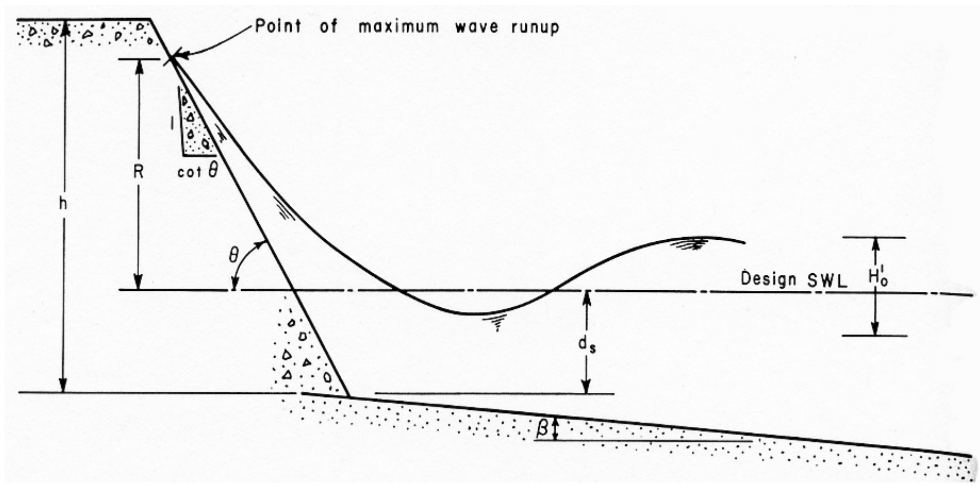
The maximum wave height that can reach the structure occurs during the period when the maximum depth of standing water exists in front of the structure, which includes both the maximum SWL combined with the maximum scour at the base of the structure. The maximum water depth at the base of the structure, d_s, for the various design scenarios are tabulated below. The resultant maximum breaking wave height occurs when a specific deep-water wave is allowed to shoal and break directly upon the structure. Using the design criteria set forth in the Army Corps of Engineers Shore Protection Manual, the design breaking wave height, H_b, is slightly less than d_s, also tabulated below.

Design Loading Condition	Assumed MSLR	Design SWL (ft, NGVD 29)	d_s, ft	H_b, ft	Design Condition
Case 1	0	6.8	6.8	6.3	1982-83 El Niño Storms
Case 2	0	6.8	8.8	7.9	Design w/no MSLR
Case 3	0.5m	8.44	10.44	9.3	Design w/0.5m MSLR in 2100
Case 4	0.81m	9.46	11.46	10.0	Project design w/3 ft MSLR in 2100
Case 5	1.2m	10.74	12.74	11.5	Design w/1.2m MSLR in 2100
Case 6	2m	13.36	15.86	12.9	Design w/2m MSLR in 2100

7.6 Wave Runup and Overtopping Analysis

Wave runup is defined as the rush of water up a beach or coastal structure that is caused by, or associated with, breaking waves. The maximum runup is the highest vertical elevation that the runup will reach above the stillwater level. If the maximum runup is higher than the top of a coastal structure, the excess represents overtopping. Runup elevation depends on the incident wave characteristics, the beach profile including profile elevation, and other factors. Most wave runup and overtopping analyses are based upon equations and nomographs provided in the U.S. Army Corps of Engineers Shore Protection Manual (SPM, USACE, 1984), and the more recent Internet-based Coastal Engineering Manual (Part VI-Chapter 5, 2006).

The following definition sketch for both wave runup and overtopping, reproduced from the 1984 SPM, graphically illustrates the point of maximum wave runup for a particular design condition.



Definition sketch: wave runup and overtopping

It should also be clear from the sketch that any wave runup exceeding the height of the structure then represents overtopping.

We evaluated both the maximum height of runup and volume of overtopping based on the U.S. Army Corps of Engineers 2006 Coastal Engineering Manual (CEM) for the various design scenarios tabulated above. We also assumed a design scour elevation of -2 feet and wave periods ranging from 6 to 20 seconds assuming storms out of the west, which resulted in the maximum design breaking wave heights tabulated above.

In assessing wave runup and overtopping values, we have analyzed the six separate cases summarized in the previous table for two different design site conditions. As indicated on the architectural drawings, there is a second-story saltwater pool at the northwest corner of the property having a top-of-pool bowl elevation of 22.3 feet NGVD 29, with the spa located near the westerly central portion of the property having a top-of-spa bowl elevation of 15.7 feet, with elevated planter walls on either side of the spa extending to elevation 22.3 feet. So in other words, discounting the perimeter walkways along the northerly and southerly property line accessing the beach from El Paseo Grande, there is an 8-foot-wide low point (the spa) at elevation 15.7 feet, with relatively tall planter walls on both sides extending to elevation 22.3 feet, with the northern wall supporting a second-floor pool.

While the 8-foot-wide spa is substantially more susceptible to wave overtopping, particularly for any elevated sea level rise scenarios, the architect has thoughtfully designed the planter walls and northwesterly pool wall to accommodate design wave forces from the design sea level rise event, and importantly, if considered necessary in the future, to incorporate a clear structural face on the westerly edge of the spa extending up to elevation 22.3 feet to substantially mitigate sea level rise.

As indicated in both the previous table and the table below, we also analyzed a more typical condition, one that is likely representative of the 1982-83 and the 1997-98 El Niño storm seasons. For this condition, we have assumed a lower design scour elevation of 0 feet NGVD 29, which we believe likely represented the worst-case storm conditions during either the 1982-83 or the 1997-98 El Niño storm seasons. This assumption results in the maximum depth at the base of the structure, d_s, of 6.8 feet, resulting in a maximum breaking wave height, H_b, of 6.3 feet. We have referred to the wave runup and overtopping analyses for this more typical current design condition as Case 1 for the 1982-83 El Niño for the 8-foot-wide spa condition having a top-of-spa elevation of 15.7 feet, and for the much taller pool/elevated planter walls at elevation 22.3 feet.

Given the preceding, the following table lists the calculated design wave runup elevation for the six design conditions, along with the calculated volume of overtopping, for both the shorter spa wall and the taller pool/planter wall. Summary calculations are also provided in Appendix A.

Design Condition	Maximum Design Wave Runup Elevation (feet)	Overtopping Volume Spa Wall (litres/s per m)	Overtopping Volume Pool Wall (litres/s per m)
Case 1	18.8	16.2	2.9
Case 2	23.3	36.4	6.5
Case 3	28.4	118.8	16.0
Case 4	31.4	239.2	25.5
Case 5	36.3	814.0[1]	59.1
Case 6	41.2	N/A	188.8

[1] Equations over-predict

As indicated in the above table, the pool wall significantly reduces the volume of calculated overtopping volumes. Importantly, the addition of a small wave deflector on the existing seawall will reduce all of the tabulated overtopping values by about 400 percent. To provide some additional perspective on overtopping volumes, we have included Figure 20, reproduced from the U.S. Army Corps of Engineers 2006 Coastal Engineering Manual for the pool/planter wall condition, both with and without the addition of a wave deflector on the existing seawall.

Table VI-5-6
Critical Values of Average Overtopping Discharges

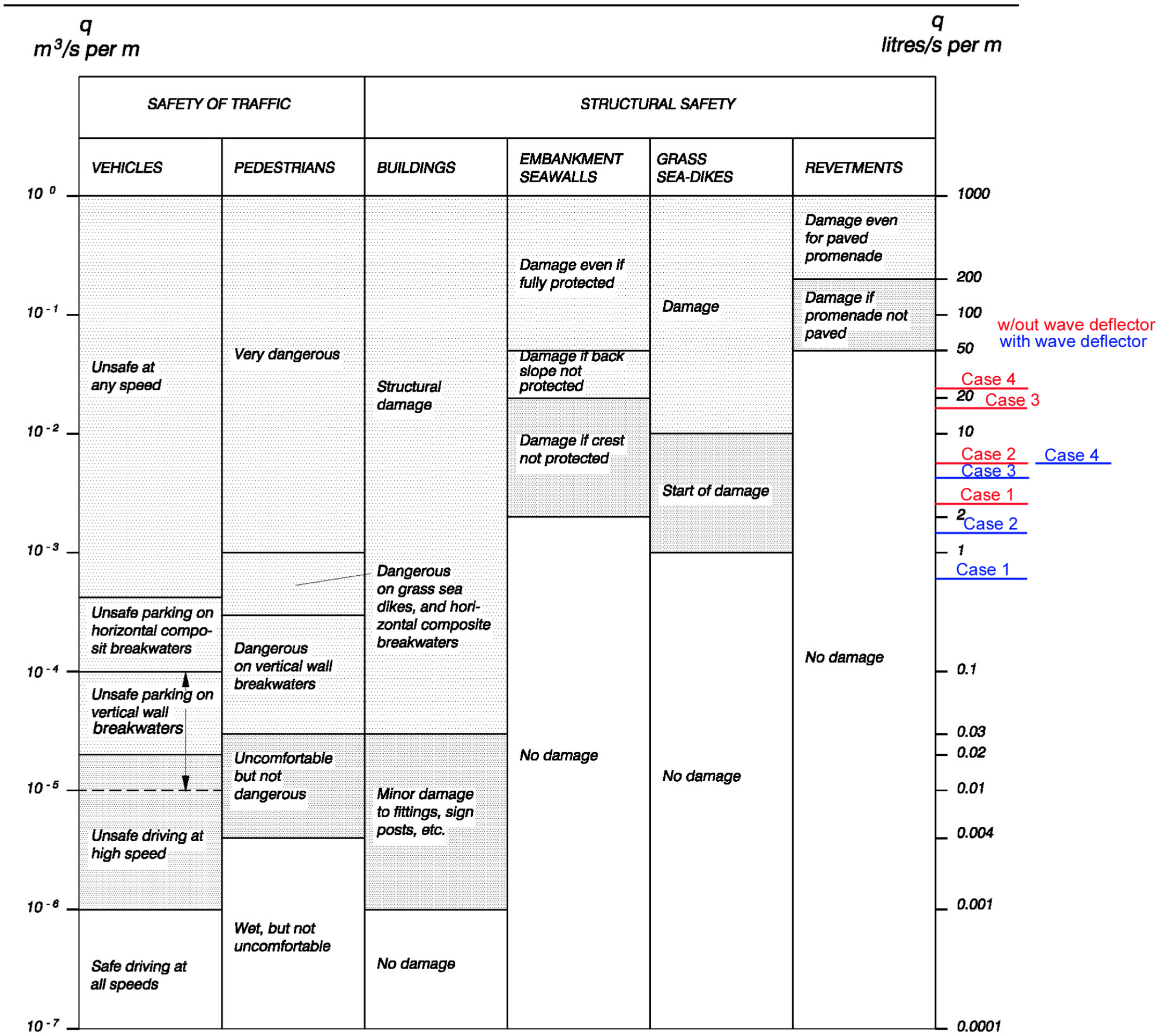
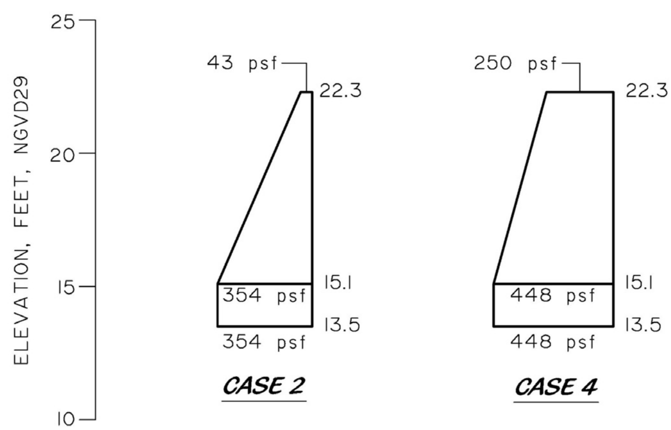


Figure 20. Results of Field Studies from Various Sources Evaluating Tolerable Overtopping Limits of Dikes and Revetments. Note that 1,000 litres/s per m = 4,830 GPM (Source: CEM 2006)

7.7 Wave-Induced Wall Loads

The types of wave forces on coastal structures can be classified as breaking, non-breaking, broken, and pulsating wall loads. Wave forces can be more specifically defined as very short duration hydrodynamic wave forces, much longer duration hydrostatic wave forces, and pulsating wave loads that consider both the hydrostatic plus the non-breaking dynamic wave force. While the hydrodynamic wave forces result in relatively high shock loads, these forces are very short in duration, lasting only a few thousandths to a few hundredths of a second and have little effect on structural improvements. Moreover, these hydrodynamic wave forces are limited to the existing seawall. Pulsating wave loads, combining both the hydrostatic plus non-breaking dynamic wave force, need to be considered in the structural evaluation of the pool/planter wall. The pressure distribution for the Case 2 and Case 4 design wave loads are illustrated below.



The proposed pool/planter wall should be designed to accommodate these pressure distributions.

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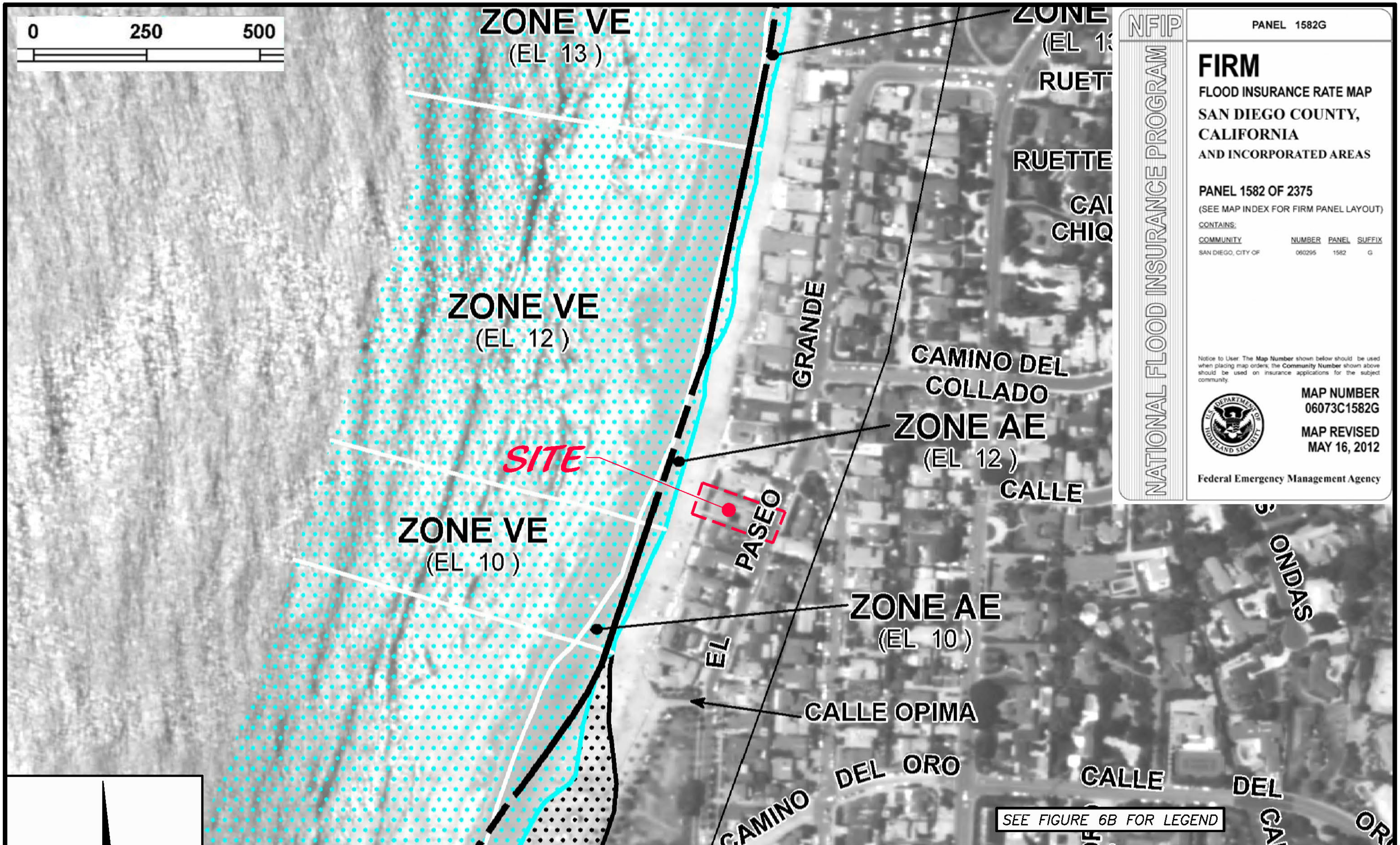

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FIGURE NUMBER	6A
PROJECT NAME	8470 EL PASEO GRANDE WAVE RUNUP STUDY
PROJECT NUMBER	2966

FEMA MAP

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{42}75^{000m}$E	1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 FT	5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

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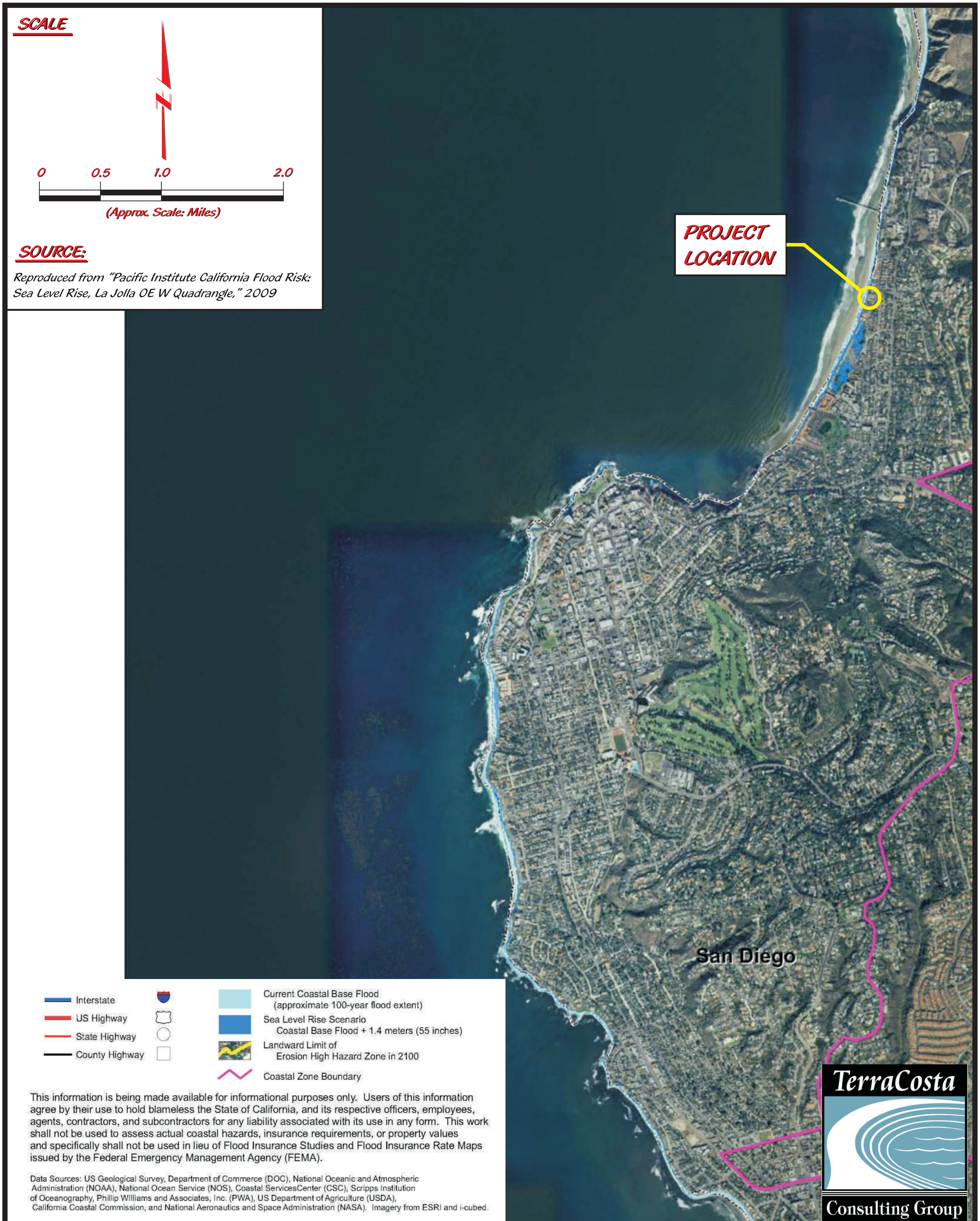
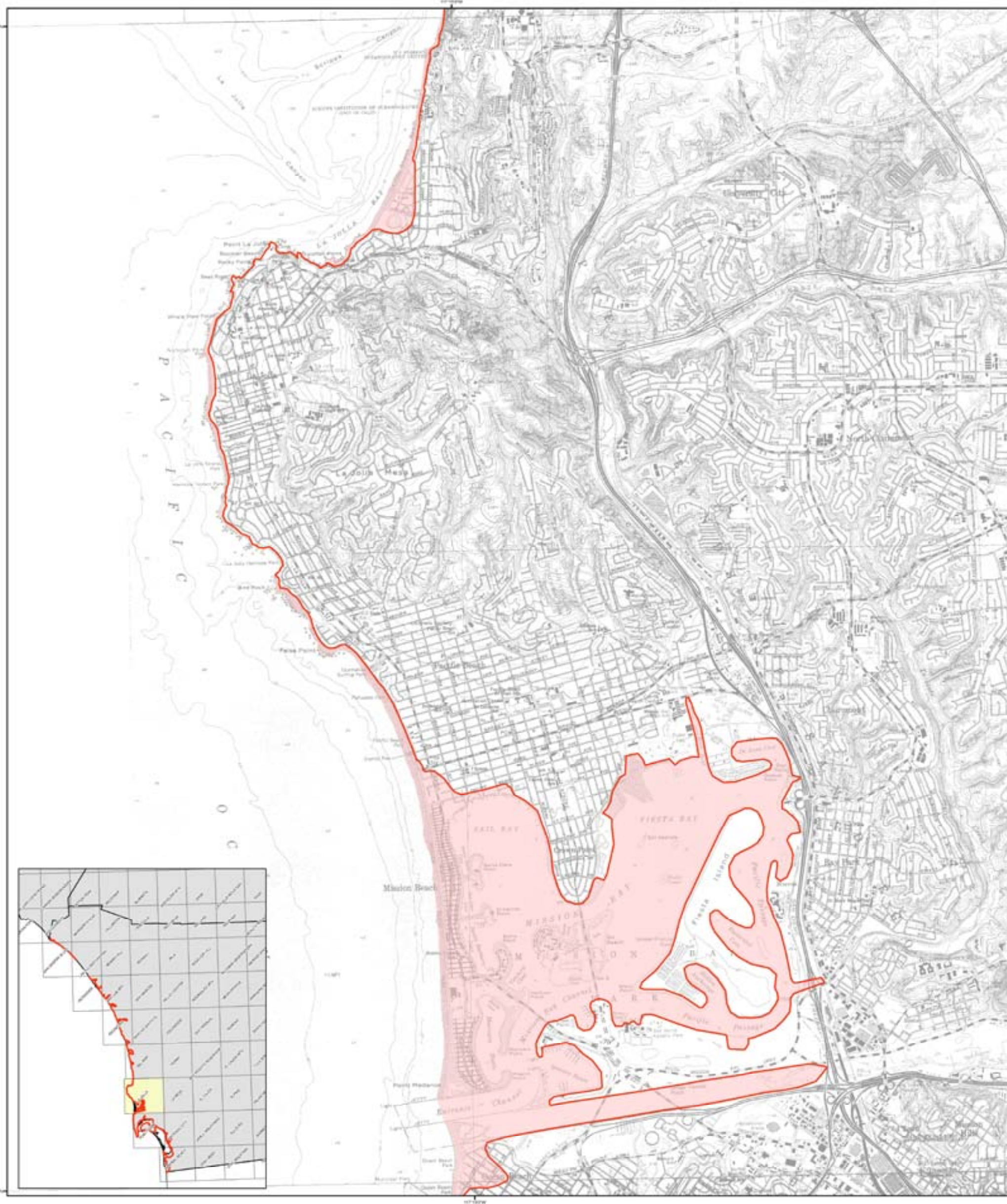
TERRACOSTA CONSULTING GROUP ENGINEERS AND GEOLOGISTS 3890 MURPHY CANYON ROAD, SUITE 200 SAN DIEGO, CA 92123 (858) 573-6900	FIGURE NUMBER **6B**
PROJECT NAME **8470 EL PASEO GRANDE WAVE RUNUP STUDY**	PROJECT NUMBER **2966**

FEMA MAP LEGEND



Project: 8470 El Paseo Grande, La Jolla | Project No. 2966 | Figure No. 7



TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of San Diego

LA JOLLA QUADRANGLE

June 1, 2009

SCALE 1:24,000

METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

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References:

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Table 1: Tsunami sources modeled for the San Diego County coastline.

Sources (M = moment magnitude used in modeled event)		Areas of Inundation Map Coverage and Sources Used: Dana Point	Oceanside	San Diego
Local Sources	Carlsbad Thrust Fault		X	X
	Catalina Fault	X	X	X
	Coronado Bank Fault			X
	Lasuen Knoll Fault	X		X
	San Clemente Fault Bend Region			X
	San Clemente Island Fault			X
	San Mateo Thrust Fault	X	X	
	Coronado Canyon Landslide #1			X
Distant Sources	Cascadia Subduction Zone #3 (M9.2)	X		X
	Central Aleutians Subduction Zone#1(M8.9)	X	X	X
	Central Aleutians Subduction Zone#2(M8.9)	X		X
	Central Aleutians Subduction Zone#3(M9.2)	X	X	X
	Chile North Subduction Zone (M9.4)	X		X
	1960 Chile Earthquake (M9.3)	X		X
	1952 Kamchatka Earthquake (M9.0)	X		
	1964 Alaska Earthquake (M9.2)	X	X	X
	Japan Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #3 (M8.8)	X		X
	Kuril Islands Subduction Zone #4 (M8.8)	X		X

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MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to assist cities and counties in identifying their tsunami hazard. It is intended for local jurisdictional, coastal evacuation planning uses only. This map, and the information presented herein, is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose.

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http://www.usc.edu/dept/tsunamis/2005/index.php

State of California Geological Survey Tsunami Information:
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National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model):
http://nctr.pmel.noaa.gov/time/background/models.html

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

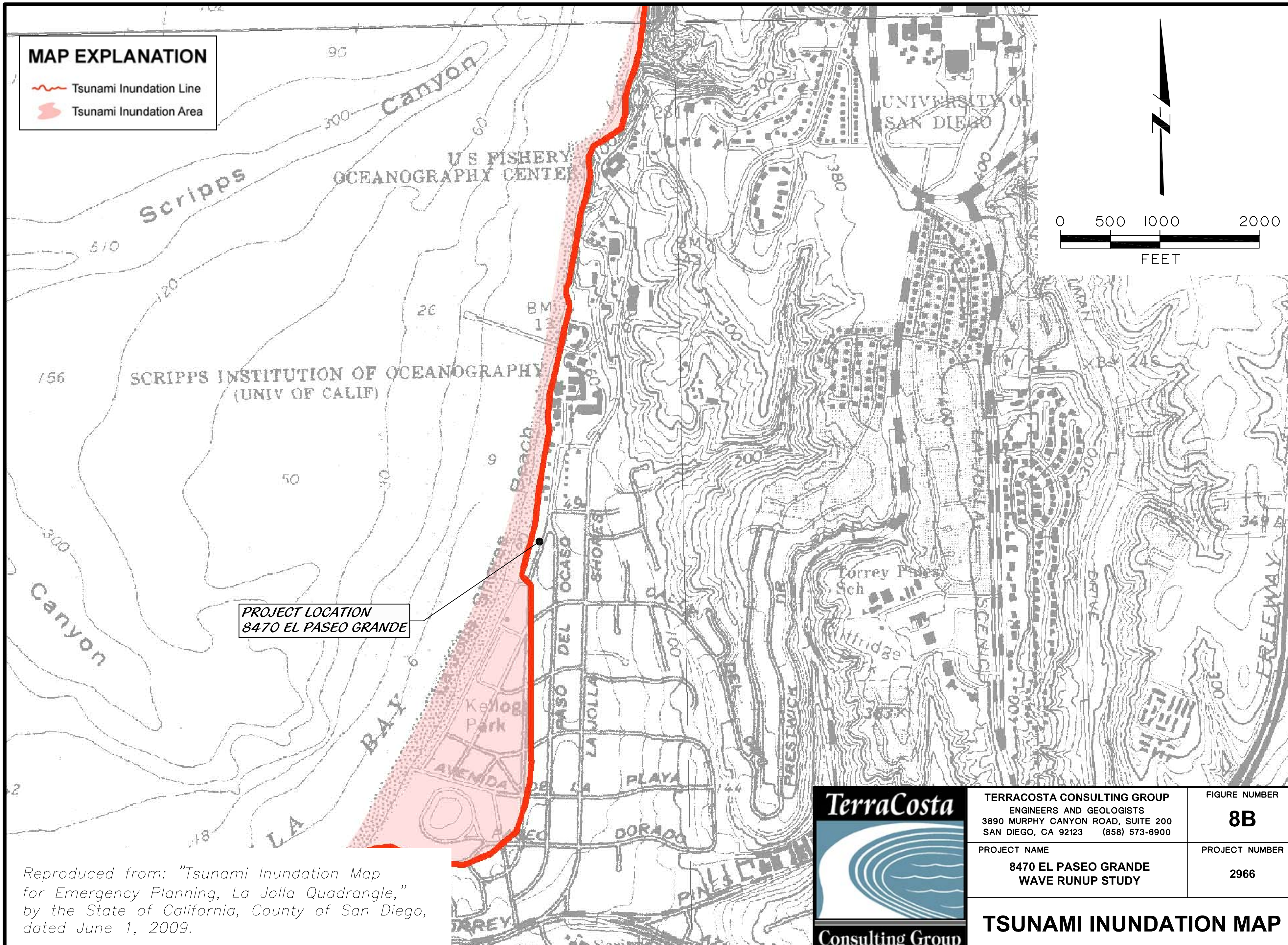
DISCLAIMER

TerraCosta
Consulting Group

FIGURE NUMBER
8A

PROJECT NUMBER
2966

**TSUNAMI INUNDATION MAP
DEL MAR**



Reproduced from: "Tsunami Inundation Map for Emergency Planning, La Jolla Quadrangle," by the State of California, County of San Diego, dated June 1, 2009.

TerraCosta Consulting Group

TERRACOSTA CONSULTING GROUP ENGINEERS AND GEOLOGISTS 3890 MURPHY CANYON ROAD, SUITE 200 SAN DIEGO, CA 92123 (858) 573-6900	FIGURE NUMBER **8B**
PROJECT NAME 8470 EL PASEO GRANDE WAVE RUNUP STUDY	PROJECT NUMBER 2966

TSUNAMI INUNDATION MAP

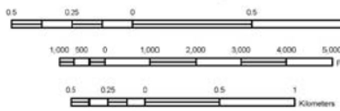
TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of San Diego

LA JOLLA QUADRANGLE

June 1, 2009

SCALE 1:24,000



METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

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	San Mateo Thrust Fault	X	X	
	Coronado Canyon Landslide #1			X
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	Central Aleutians Subduction Zone#1(M8.9)	X	X	X
	Central Aleutians Subduction Zone#2(M8.9)	X		X
	Central Aleutians Subduction Zone#3(M9.2)	X	X	X
	Chile North Subduction Zone (M9.4)	X		X
	1960 Chile Earthquake (M9.3)	X		X
	1952 Kamchatka Earthquake (M9.0)	X		
	1964 Alaska Earthquake (M9.2)	X	X	X
	Japan Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #3 (M8.8)	X		X
	Kuril Islands Subduction Zone #4 (M8.8)	X		X

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Tsunami Inundation Area

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DISCLAIMER

The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the State of California nor USC shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.

TerraCosta Consulting Group	TERRACOSTA CONSULTING GROUP ENGINEERS AND GEOLOGISTS 3890 MURPHY CANYON ROAD, SUITE 200 SAN DIEGO, CA 92123 (858) 573-6900	FIGURE NUMBER 8C
	PROJECT NAME 8470 EL PASEO GRANDE WAVE RUNUP STUDY	PROJECT NUMBER 2966
	TSUNAMI INUNDATION MAP LEGEND	

APPENDIX A

SUMMARY CALCULATIONS

8470 EL PASEO GRANDE
OVERTOPPING ANALYSES

d_s	T	d_s/gT^2	H_b/d_s	H_b	h*	R_c	h^*R_c/H_b	q/-----	q - cfs/ft	q - gpm/ft	q - liters/s per m	
6.8	6	0.0059	0.92	6.3	0.040	8.9	0.057	1.08	0.174	78	16.2	1982-83 El Nino
6.8	10	0.0021	0.96	6.5	0.014	8.9	0.019	33.35	0.641	288	59.6	
6.8	14	0.0011	0.98	6.7	0.007	8.9	0.009	305.19	1.465	658	136.2	
6.8	6	0.0059	0.92	6.3	0.040	15.5	0.099	0.19	0.031	14	2.9	1982-83 El Nino
6.8	10	0.0021	0.96	6.5	0.014	15.5	0.033	5.97	0.115	52	10.7	
6.8	14	0.0011	0.98	6.7	0.007	15.5	0.016	54.66	0.262	118	24.4	
8.8	6	0.0076	0.90	7.9	0.053	8.9	0.060	0.94	0.392	176	36.4	Design w/no SLR
8.8	10	0.0027	0.96	8.4	0.018	8.9	0.019	33.35	1.580	709	146.9	
8.8	14	0.0014	0.98	8.6	0.009	8.9	0.009	305.19	3.613	1,622	335.7	
8.8	6	0.0076	0.90	7.9	0.053	15.5	0.104	0.17	0.070	31	6.5	Design w/no SLR
8.8	10	0.0027	0.96	8.4	0.018	15.5	0.033	5.97	0.283	127	26.3	
8.8	14	0.0014	0.98	8.6	0.009	15.5	0.016	54.66	0.647	290	60.1	
10.44	6	0.0090	0.89	9.3	0.064	7.26	0.050	1.65	1.278	574	118.8	Design w/0.5M of SLR
10.44	10	0.0032	0.95	9.9	0.021	7.26	0.016	58.76	5.172	2,321	480.6	
10.44	14	0.0017	0.97	10.1	0.011	7.26	0.008	538.47	11.834	5,311	1099.7	
10.44	6	0.0090	0.89	9.3	0.064	13.86	0.095	0.22	0.172	77	16.0	Design w/0.5M of SLR
10.44	10	0.0032	0.95	9.9	0.021	13.86	0.030	7.92	0.697	313	64.7	
10.44	14	0.0017	0.97	10.1	0.011	13.86	0.015	72.54	1.594	716	148.2	
11.46	6	0.0099	0.87	10.0	0.071	6.24	0.045	2.29	2.574	1,155	239.2	Design w/0.81M of SLF
11.46	10	0.0036	0.94	10.8	0.024	6.24	0.014	87.98	10.962	4,920	1018.6	
11.46	14	0.0018	0.96	11.0	0.012	6.24	0.007	807.40	25.105	11,268	2332.9	
11.46	6	0.0099	0.87	10.0	0.071	12.84	0.092	0.24	0.275	123	25.5	Design w/0.81M of SLF
11.46	10	0.0036	0.94	10.8	0.024	12.84	0.028	9.40	1.171	525	108.8	
11.46	14	0.0018	0.96	11.0	0.012	12.84	0.014	86.22	2.681	1,203	249.1	
12.74	6	0.0110	0.90	11.5	0.077	4.96	0.033	5.77	8.760	3,932	814.0	Design w/1.2M of SLR
12.74	10	0.0040	0.94	12.0	0.026	4.96	0.011	179.26	32.352	14,521	3006.3	
12.74	14	0.0020	0.96	12.2	0.013	4.96	0.005	1645.02	74.094	33,256	6885.2	
12.74	6	0.0110	0.90	11.5	0.077	11.56	0.077	0.42	0.636	285	59.1	Design w/1.2M of SLR
12.74	10	0.0040	0.94	12.0	0.026	11.56	0.026	13.01	2.348	1,054	218.2	
12.74	14	0.0020	0.96	12.2	0.013	11.56	0.012	119.40	5.378	2,414	499.7	
15.36	6	0.0133	0.84	12.9	0.099	2.34	0.018	38.60	129.530	58,137	12036.6	Design w/2M of SLR
15.36	10	0.0048	0.93	14.3	0.032	2.34	0.005	1722.32	611.071	274,267	56784.1	
15.36	14	0.0024	0.95	14.6	0.016	2.34	0.003	15827.02	1400.826	628,733	130172.4	
15.36	6	0.0133	0.84	12.9	0.099	8.94	0.069	0.61	2.031	912	188.8	Design w/2M of SLR
15.36	10	0.0048	0.93	14.3	0.032	8.94	0.020	27.01	9.583	4,301	890.5	
15.36	14	0.0024	0.95	14.6	0.016	8.94	0.010	248.21	21.969	9,860	2041.5	

H_b/d_s ---> fig. 7-4 SPM.
h* = (d_s/H_b)(2*3.14159*d_s/g*T^2) ---> eq. 16.1 Handbook of Coastal and Ocean Engineering by Kim (2010)
R_c = freeboard, measured from top of wall to SWL
h^*R_c/H_b is only valid for computed values from 0.03 to 1.0. Over-predicts overtopping <0.04
q/------- ---> fig. 16.10 Handbook of Coastal and Ocean Engineering by Kim (2010)
q - cfs/ft --> eq. 16.4 Handbook of Coastal and Ocean Engineering by Kim (2010)

TerraCosta Consulting Group
Geotechnical Engineering
Coastal Engineering
Maritime Engineering

Project No. 2966
November 10, 2017

Mr. Claude Anthony Marengo
MARENGO MORTON ARCHITECTS, INC.
7724 Girard Avenue, Suite 200
La Jolla, California 92037

RESPONSE TO COASTAL COMMISSION COMMENTS
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

Dear Mr. Marengo:

TerraCosta Consulting Group, Inc. (TerraCosta) is responding to the August 23, 2017, emailed comments from Mr. Alex Llerandi with the California Coastal Commission. For completeness of the record, we have restated Mr. Llerandi's comments in italics, followed by our response. Only those items requiring a response are included.

*Comment No. 1: While the existing seawall is pre-coastal, there has not been any analysis presented thus far that looks at the project – which is completely new development – that does not rely on the protection of the seawall (i.e. what will be the erosion on the site over the economic life of the residence be if there was *no* seawall, taking sea level rise into account).*

Analysis of the project without the existing seawall is not required, as the seawall was lawfully constructed prior to the Coastal Act and was later improved pursuant to a Coastal Development Permit (CDP) issued by the Coastal Commission. As discussed further in the response to Comment No. 3 below, the existing seawall is in good condition and can be expected to perform as intended over the economic life of the proposed project.

The seawall was constructed prior to 1950, as shown in the recorded 1950 Ocean Terrace Subdivision Map No. 2615 and the more recent Assessor Map 346-05 (refer to Attachments 1 and 2). At the time of recordation, there were a total of six lots protected by the seawall. Consequently, the seawall is not solely owned by the project applicant, but is jointly shared with at least five other homeowners along El Paseo Grande. Five of these lots were part of a common subdivision at the time. See the now-expired Covenants, Conditions, and Restrictions recorded in 1950 (refer to Attachment 3).

Several years later, on June 28, 1983, the Coastal Commission issued CDP No. 6-83-305 for construction of approximately 62 linear feet of new concrete footing to further support the existing seawall. A Deed Restriction (refer to Attachment 4) was recorded on June 28, 1983, as a requirement of the CDP. The Deed Restriction memorialized the applicants' agreement to waive any claims of liability against the Coastal Commission or any other regulatory agency for any future damage from storms and erosion hazards.

The new footing authorized by CDP No. 6-83-305 was constructed, and the seawall remains in good condition today. It continues to protect several properties, and is expected to perform as intended over the economic life of the proposed project (refer to response to Comment No. 3 below). Acknowledging that the seawall's protection and its permitted repair is the shared responsibility amongst the original six lots of Ocean Terrace, it is not realistic to require the project applicant to analyze the project without the seawall in place. To do so would put into question all previous Coastal Development Permit approvals and the original home approvals prior to the formation of the Coastal Commission.

Lastly, the existing seawall is currently providing a necessary "public benefit" by protecting the first public right-of-way (El Paseo Grande) and related infrastructure. Likewise, the seawall reduces the potential for flanking and scouring of the adjacent La Jolla Shores Park seawall. This Park provides free public recreation and access to the general public. This philosophy is consistent with the recent 2015 Coastal Commission decision to allow for continued revetment to protect the public beach, park, and parking for Goleta Beach located in Santa Barbara County.

*Comment No. 2: There are no plans that put the projected overtopping of the seawall and the new development into context (i.e. While data on various things like beach position, water elevation, and general hazard conditions are given, there are no plans showing how they actually impact/overlay the western part of the site)***.**

Additional information regarding potential overtopping of the seawall is provided below. Based on the new owner's design criteria, the project plans have been modified subsequent to the previous project submittal. An updated elevation has been provided (refer to Attachment 5) that illustrates the subterranean finished floor having been raised by 2 feet, removal of the spa, and relocation of the pool to the north side yard. The west-facing patio doors have been eliminated, providing further protection from potential overtopping. Lastly, the existing 3-foot retaining wall will remain in place along with the existing slope on the north and south sides of the property. Fortuitously, the owner's design revisions are in concert with the Coastal Commission's goal of adaptive design.

More specifically, the existing retaining wall will prevent wave runup from coming onto or impacting the project site. As previously submitted, TerraCosta's Wave Runup/Sea Level Rise Study dated March 21, 2017 (refer to Attachment 6) calculated a seawall overtopping rate of 188 liters/s per meter (21.7 ft^3/s-ft) of seawall under the 2 meter (6.6 ft) SLR case. For SLR of 6.6 feet with an overtopping rate of 21.7 ft^3/s-ft, the water height h_1 = 3.6 feet and the velocity v_c = 8.8 ft/sec. (refer to GeoSoils' letter in Attachment 7). This results in the water going over the top of the seawall and down onto the public walkway. This will be a pulse of water with each wave that overtops the seawall. The water will drop onto the walkway and lose its momentum. This amount of overtopping will not be enough to go over the top of the retaining wall on the landward side of the walkway. In addition, this overtopping water will not damage the retaining wall. The water will drain back into the ocean through the numerous drains in the seawall at the walkway elevation. In summary, future wave overtopping, with 6.6 feet of SLR, will not significantly impact the project site. See below response to Comment No. 3.

Comment No. 3: There is no information regarding the current status of the seawall, its repair history, adequacy for durability over the economic life of the structure, etc. This is important as the entire project is based on the assumption that the seawall will be remaining in place for the next 75 years. The applicant needs to understand that in the event that the seawall proves to be inadequate (due to wear and tear or sea level rise being worse than anticipated) that there will be no automatic right to enlarge the seawall.

The current condition of the seawall has been evaluated by David W. Skelly, MS, PE, of GeoSoils, Inc., and the results are set forth in his Shore Protection Assessment Letter dated September 15, 2017 (refer to Attachment 7). The assessment found the wall to be in good condition. There has been very minor down wearing of the formational material. The beach sands will erode on a seasonal basis, but will also recover on a seasonal basis.

The formational material is not fractured to a degree that reduces its resistance to erosion. The existing seawall has periodically been painted with an epoxy-type marine paint. The seawall is in good condition and can be expected to perform as intended over the economic life (75 years), including sea level rise, as demonstrated by the previously submitted Wave Runup/Sea Level Rise Study dated March 21, 2017 (refer to Attachment 6).

In the future, if waves overtop the seawall, the retaining wall will prevent wave runup from coming onto or impacting the site. For SLR of 6.6 feet with an overtopping rate of 21.7 ft^3/s-ft, the water height h_1 = 3.6 feet and the velocity v_c = 8.8 ft/sec. The water will go over the top of the seawall and down onto the walkway. This will be a pulse of water with each wave that overtops the seawall. The water will drop onto the walkway and lose its momentum. This amount of overtopping is not enough to go over the top of the retaining wall on the landward side of the public walkway. In addition, this overtopping water will not damage the retaining wall. The water will drain back into the ocean through the numerous drains in the seawall at the walkway elevation. Future wave overtopping with 6.6 feet of SLR will not significantly impact the property.

Based upon TerraCosta's Wave Runup/Sea Level Rise Study dated March 21, 2017, (Attachment 6) and GeoSoils' Shore Protection Assessment Letter dated September 15, 2017 (Attachment 7), the proposed development is reasonably safe from coastal hazards for the next 75 years, including shoreline movement, waves and wave runup, and flooding with future sea level rise. In summary, the proposed development will neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or adjacent area.

Comment No. 4: Furthermore, the design of the pool walls and suggested plexiglass appear to act more as additional shoreline protection than as allowable rear yard accessory development, which would be a potential issue.

As discussed in our response to Comment No. 2, the project plans have been subsequently modified since the previous project submittal. We have provided an updated elevation (Attachment 5) that illustrates the removal of the spa and relocation of the pool to the north side yard. The plexiglass railing is not designed as shoreline protection, but rather serves as an aesthetic design feature and the necessary safety mechanism for the client's young family. As with the other neighboring properties with similar aesthetic material, the plexiglass railing will also provide protection from the occasional coastal wind. Again, the owner's design needs are in concert with the Coastal Commission's goal of adaptation design.

We trust that these responses satisfactorily address Coastal Staff's comments. If you have any questions, please give us a call.

Very truly yours,

TERRACOSTA CONSULTING GROUP, INC.

Walter F. Crampton, Principal Engineer
R.C.E. 23792, R.G.E. 245

Gregory A. Spaulding, Project Geologist
P.G. 5892, C.E.G. 1863

WFC/GAS/jg

cc: Chandra Slaven, Blue Heron
Michael Morton, Marengo Morton Architects, Inc.

ATTACHMENT 1

RECORDED OCEAN TERRACE
MAP NO. 2615

OCEAN TERRACE

Being a Subdivision of a portion of Pueblo Lot 1281 of the Pueblo Lands of San Diego, in the City of San Diego, County of San Diego, State of California, according to Map thereof made by James Pascoe in 1870, a certified copy of which was filed in the Office of the County Recorder of said San Diego County November 14, 1921 as Miscellaneous Map № 36, particularly described as follows: Commencing at a 2 inch iron pipe, lead and tack, which marks the intersection of the center lines of the Streets, El Paseo Grande and Avenida de la Playa, according to Map of La Jolla Shores Unit №1, Map № 1913, filed in the Office of the County Recorder of said San Diego County June 3, 1926; thence North 2°56'East (deed record North 2°55'East) 2211.92 feet; thence North 87°04'West (Record North 87°05'West) 12.83 feet to the most Easterly corner of that land conveyed to R. Y. Hayne by deed recorded September 1, 1926 in the Office of the County Recorder of San Diego County in Book 1270, Page 46 of Deeds; said point being the true point of beginning of the property herein described; thence South 68°33'30" East 0.65 feet to the Northwesterly line of that easement and right of way now known as El Paseo Grande, as said right of way was conveyed to the City of San Diego by deed recorded March 25, 1936 in Book 484, Page 258 of Official Records; thence North 21°25'30"East along said Northwesterly line of said right of way 374.31 feet to a point which is South 21°25'30"West 29.38 feet from the Southeasterly corner of that land conveyed to Guy Stillman and wife by deed recorded June 7, 1947 in the Office of the County Recorder of San Diego County in Book 2419, Page 170 of Official Records; thence North 70°41'20" West 146.09 feet to a point in the Southerly line of said land as conveyed to Stillman; thence along said Southerly line North 81°58'10"West to the mean high tide line of the Pacific Ocean; thence Southeasterly along said mean high tide line to the Northwesterly corner of the above mentioned land as conveyed to R.Y. Hayne; thence South 68°33'30"East (Record South 68°34'30"East) to the true point of beginning.

State of California
County of San Diego } S.S.

We, R. C. Lindsay, City Treasurer, and F. A. Rhodes, Director of Public Works, both of the City of San Diego, California hereby certify that there are no unpaid bonds issued under the Street Improvement Acts of the State of California against the tract, or subdivision or any part thereof, as shown on the annexed map consisting of 2 sheets and described in the caption thereof.

In Witness Whereof, we have hereunto set our hands this 31 day of JANUARY, 1950.

R. C. Lindsay City Treasurer,

F. A. Rhodes Director of Public Works.

State of California
County of San Diego } S.S.

I, J. McQuilken, City Auditor of the City of San Diego, California, hereby certify that there are no liens for unpaid City taxes, or unpaid bonds issued under the Improvement Bond Act of 1915, Statutes of 1915, page 1441, State of California, show by the books of this office except taxes not yet payable against the tract or subdivision, or any part thereof, shown on the annexed map consisting of 2 sheets and described in the caption thereof.

In Witness Whereof, I have hereunto set my hand this 27 day of Dec. 1949

J. McQuilken City Auditor

J. C. LaPorte Deputy

We, the undersigned, hereby certify that we have carefully examined each lot of the Subdivision shown on the annexed map as to its value for residential or commercial purposes and we find said Subdivision suitable for such purposes.

Dated Dec. 27 1949

A. K. Fogg City Engineer

Glenn A. Rick City Planning Director

________ Deputy

I hereby certify that I am the owner of or am interested in, the land embraced within the Subdivision to be known as OCEAN TERRACE, and I hereby consent to the preparation and recordation of this map consisting of 2 sheets, and described in the caption thereof. I hereby dedicate to public use the area shown for park purposes as shown on this map within this subdivision.

Alice J. Ewing

State of California
County of San Diego } S.S.

On this 27th day of December 1949 before me, Virginia E. Sampson a Notary Public in and for the County of San Diego, State of California, personally appeared Alice J. Ewing known to me to be the person whose name is subscribed to the above certificate and acknowledged to me that she executed the same.

In Witness Whereof, I have hereunto set my hand and affixed my Notarial Seal the day and year in this certificate first above written.

Virginia E. Sampson

Notary Public in and for said County and State. My Commission expires August 23 1953

I, Roger N. Howe, County Recorder of the County of San Diego, California, hereby approve the name OCEAN TERRACE, for the subdivision shown on the annexed map consisting of 2 sheets and described in the caption thereof.

Dated, Dec. 27 1949

ROGER N. HOWE County Recorder

by H. A. Schneider Deputy

Approved this 10th day of Jan 1950 after examination of map and certificates thereon.

J. F. DuPaul City Attorney

By Harry S. Clark Deputy

Approved and recommended this 10th day of Jan. 1950 after examination of map and certificates thereon.

CITY PLANNING COMMISSION OF THE CITY OF SAN DIEGO, CALIFORNIA

By Parke M. Ewing President

Attest Harry S. Clark Secretary

State of California
County of San Diego } S.S.

I, Albert W. Daniels, hereby certify that I am a Licensed Land Surveyor of the State of California; that the survey of this subdivision was made by me or under my direction between Dec. 5th 1949, and Dec. 31st 1949, and that the survey is true and complete as shown: that all stakes, monuments, and marks set, together with those found, are of the character and occupy the positions shown thereon and are sufficient to enable the survey to be retraced.

Dated, December, 31st 1949

Albert W. Daniels

Albert W. Daniels
Licensed Surveyor, № 2201

State of California
County of San Diego } S.S.

I, A.K. Fogg, City Engineer of the City of San Diego, California, hereby certify that I have examined the annexed map of this subdivision to be known as OCEAN TERRACE, consisting of 2 sheets and described in the caption thereof, and have found that the design is substantially the same as it appeared on the tentative map and any approved alterations there of; that all the provisions of the "Subdivision Map Act" of 1943 of the State of California, as amended, and of any local ordinance of said City applicable at the time of the approval of the tentative map have been complied with, and I am satisfied that said map is technically correct. I hereby approve and recommend said map.

Dated 1/9/50 19__

A. K. Fogg City Engineer

State of California
County of San Diego } S.S.

I, Fred W. Sick, City Clerk of the City of San Diego, California, hereby certify that the Council of said City has approved this map of OCEAN TERRACE, consisting of 2 sheets and described in the caption thereof, and has accepted on behalf of the public the area dedicated for park purposes as shown on this map.

In Witness Whereof, said Council has caused these presents to be executed by the City Clerk and attested by its seal this 19 day of January 1950.

Fred W. Sick City Clerk.

State of California
County of San Diego } S.S.

I, T. H. Sexton, Clerk of the Board of Supervisors of San Diego County, California, hereby certify that the provisions of Chapter 2, Part 2, Division 4, of the Business and Professions Code of the State of California, as amended, have been complied with, regarding deposits for taxes on the property, within this Subdivision.

Dated January 19 1950

T. H. Sexton, Clerk of the Board of Supervisors

By Marie Nasland Deputy

File № 7858

I, Roger N. Howe, County Recorder of the County of San Diego, California, hereby certify that I have accepted for recordation, this map, filed at the request of ALICE J. EWING this 20 day of JAN. 1950 at 9 o'clock A.M.

Fee: $5.00

ROGER N. HOWE County Recorder

By H. A. Schneider Deputy

Order № 457723

The UNION TITLE INSURANCE AND TRUST COMPANY, a corporation, hereby certifies that according to the Official Records of the County of San Diego, State of California on the 10th day of January 1950 at 8 o'clock A.M., Alice J. Ewing a married woman, was the only owner and the only person interested in and whose consent was necessary to pass a clear title to the land embraced within the subdivision to be known as OCEAN TERRACE as shown on this map consisting of 2 sheets and particularly described in the caption thereof.

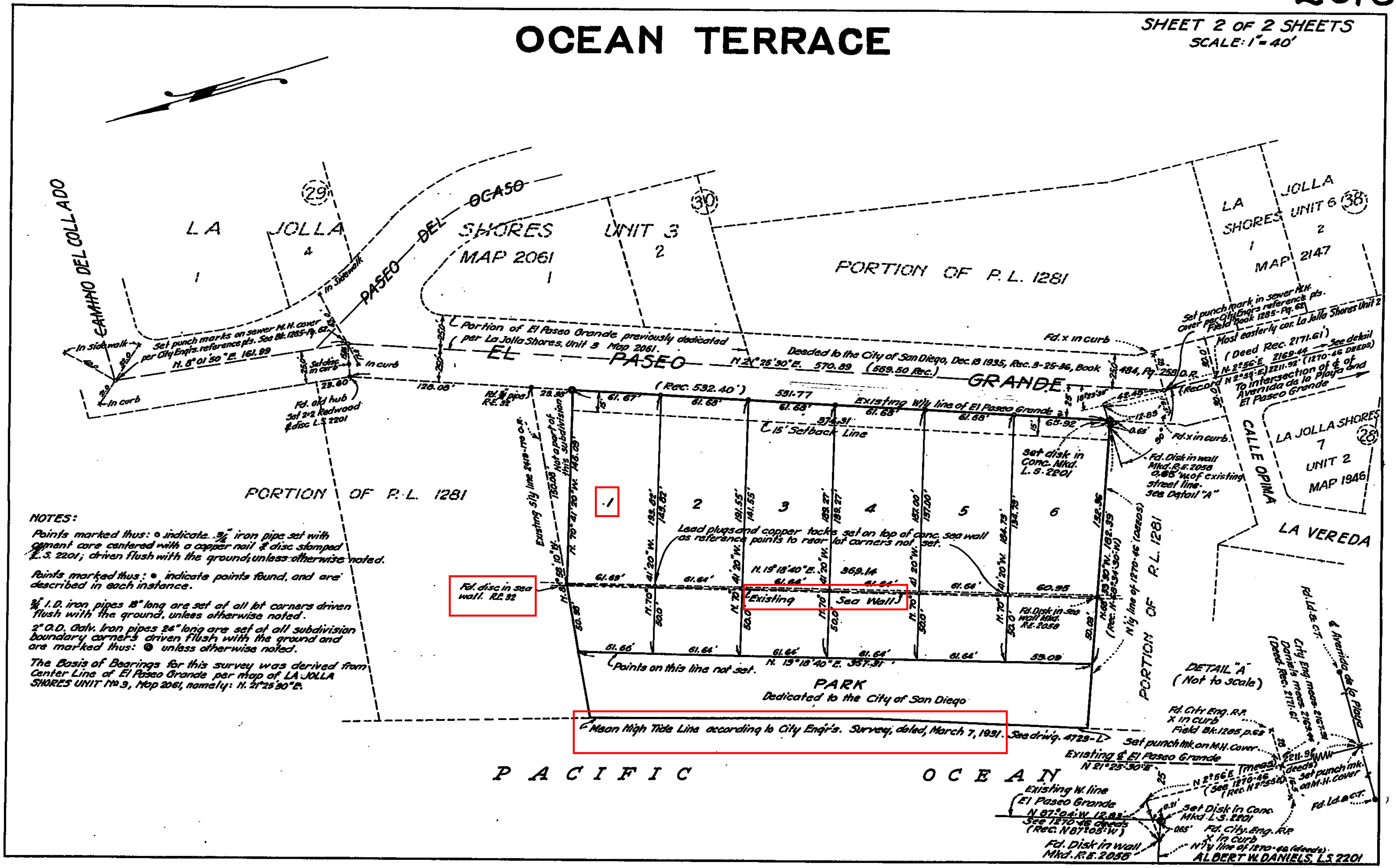
IN WITNESS WHEREOF, said Union Title Insurance and Trust Company has caused this instrument to be executed under its corporate name and seal, by its proper officers, thereunto duly authorized, the day and year in this certificate first above written.

UNION TITLE INSURANCE AND TRUST COMPANY

By M. W. Neely
Vice-President

Attest R. Pellegrin
Ass't-Secretary

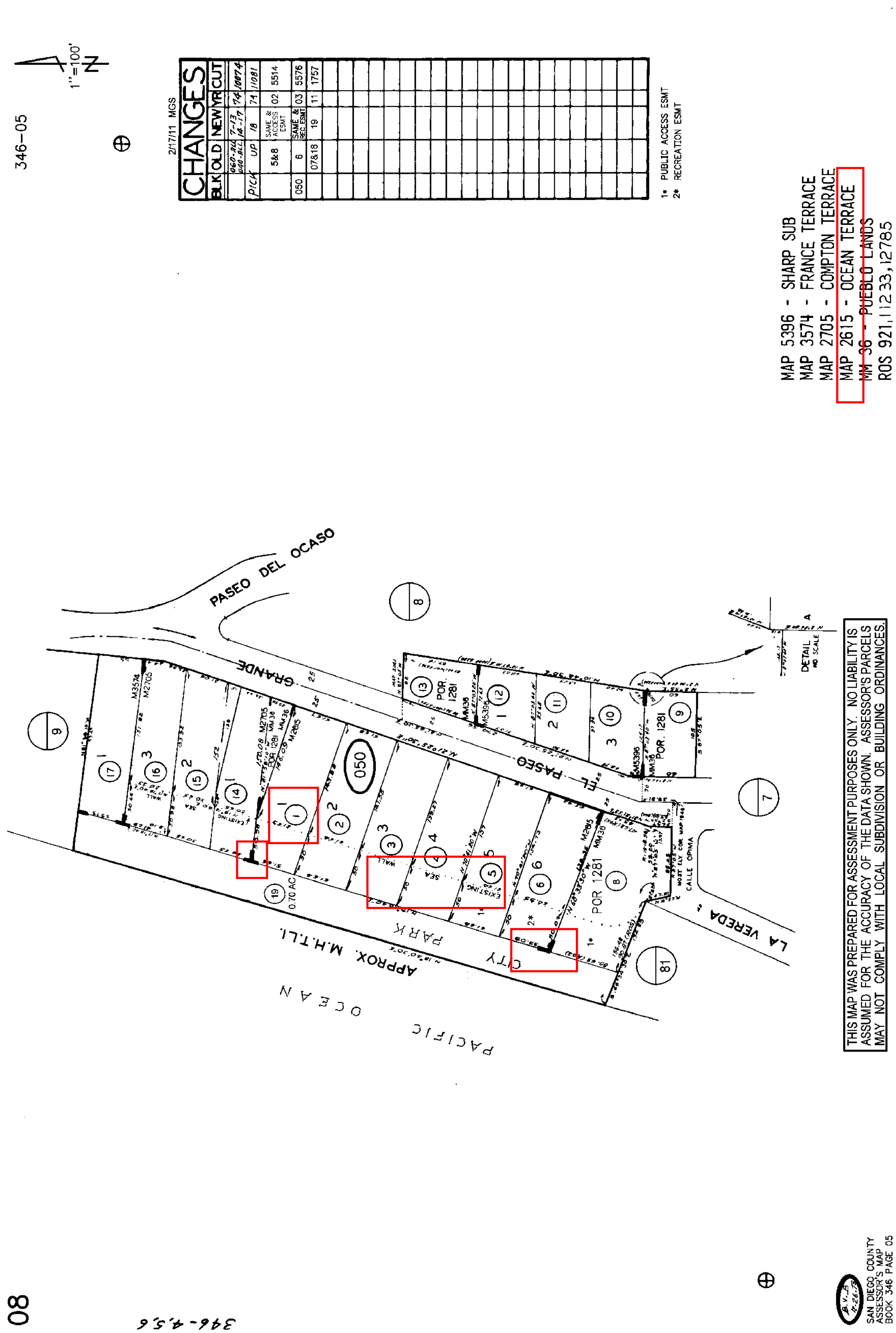
MAP Nº 2615


OCEAN TERRACE
SHEET 2 OF 2 SHEETS
SCALE: 1" = 40'
LA JOLLA SHORES UNIT 3
MAP 2061
CAMINO DEL COLLADO
PASEO DEL OCASO
EL PASEO GRANDE
PORTION OF P.L. 1281
LA JOLLA SHORES UNIT 6
MAP 2147
LA JOLLA SHORES UNIT 2
MAP 1946
CALLE OPIMA
LA VEREDA
Portion of El Paseo Grande previously dedicated per La Jolla Shores, Unit 3 Map 2061.
Deeded to the City of San Diego, Dec. 18 1935, Rec. 3-25-36, Book 484, Pg. 258 O.R.
N. 21°25'30"E. 570.89 (569.50 Rec.)
(Rec. 532.40')
15' Setback Line
Existing Wly line of El Paseo Grande
Lead plugs and copper tacks set on top of conc. sea wall as reference points to rear lot corners not set.
Existing Sea Wall
Fd. disc in sea wall. R.E. 32
Points on this line not set.
N. 19°18'40"E. 357.31
N. 19°18'40"E. 369.14
PARK
Dedicated to the City of San Diego
Mean High Tide Line according to City Engr's. Survey, dated, March 7, 1931. See drwg. 4723-L
PACIFIC OCEAN
DETAIL "A"
(Not to scale)
NOTES:
Points marked thus: ○ indicate 3/4" iron pipe set with cement core centered with a copper nail & disc stamped L.S. 2201; driven flush with the ground, unless otherwise noted.
Points marked thus: ● indicate points found, and are described in each instance.
3/4" I.D. iron pipes 18" long are set at all lot corners driven flush with the ground, unless otherwise noted.
2" O.D. Galv. Iron pipes 24" long are set at all subdivision boundary corners driven flush with the ground and are marked thus: ◎ unless otherwise noted.
The Basis of Bearings for this survey was derived from Center Line of El Paseo Grande per map of LA JOLLA SHORES UNIT No 3, Map 2061, namely: N. 21°25'30"E.
ALBERT W. DANIELS, L.S. 2201

ATTACHMENT 2

RECORDED ASSESSOR MAP 346-05

TerraCosta
Consulting Group


346-05
CHANGES
1" = 100'
MAP 5396 - SHARP SUB
MAP 3574 - FRANCE TERRACE
MAP 2705 - COMPTON TERRACE
MAP 2615 - OCEAN TERRACE
MM 36 - PUEBLO LANDS
ROS 921,11233,12785
1* PUBLIC ACCESS ESMT
2* RECREATION ESMT
PACIFIC OCEAN
APPROX. M.H.T.L.I.
CITY PARK
EXISTING SEA WALL
EL PASEO GRANDE
PASEO DEL OCASO
LA VEREDA
CALLE OPIMA
POR 1281
0.70 AC
THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.
SAN DIEGO COUNTY ASSESSOR'S MAP BOOK 346 PAGE 05
346-4,5,6
08

ATTACHMENT 3

RECORDED OCEAN TERRACE CC&Rs

TerraCosta
Consulting Group

DECLARATION OF RESTRICTIONS

THIS DECLARATION OF RESTRICTIONS, made this 20th day of January, 1950, by ALICE J. EWING, designated as the "OWNER", the owner in fee simple of all that real property situated in the City of San Diego, County of San Diego, State of California, and more particularly described as follows:

> Lots 1 to 5 inclusive of Ocean Terrace, according to Map thereof No. 2615, filed in the Office of the County Recorder of San Diego County, January 20, 1950.

NOW, THEREFORE, this Declaration of Restrictions,

W I T N E S S E T H:

I

That for the purpose of designating and creating certain conditions and restrictions upon all of said above described parcels for the direct benefit of each of the other of said described parcels, the following terms, conditions, covenants, restrictions, will apply to the above described property and each of the separate parcels thereof as well before the execution and delivery of a deed to any buyer thereof conveying the title to said property to such buyer, as after said deed shall have been executed and delivered, and shall operate as covenants running with the land, being hereby created as mutual equitable servitudes in favor of each and every portion of said lots as against each and every other portion thereof as hereinabove described.

II

IT IS UNDERSTOOD AND AGREED that every conveyance of said property is, and shall hereafter be made and accepted, and said real property is and shall hereafter be granted only upon and subject to the express conditions, provisions, restrictions and covenants herein referred to and shall bind the parties hereto and their heirs, devisees, legatees, executors, administrators, successors and assigns.

III

Such conditions are imposed upon said real property as an obligation or charge against the same for the benefit of each and every lot hereinabove described, and the owner and owners thereof, and with the rights of enforcement of said conditions, and each of them, vested in the owner or owners of any one or more of said parcels of real property.

IV

Said conditions are to be as follows, to-wit:

FIRST: That any building erected on said lots shall be placed at least 30 feet East of the Sea Wall as said Sea Wall is shown on said Map of Ocean Terrace No. 2615.

SECOND: No hedge, fence, trees, plants or any other physical objects shall be placed in the 30 foot ocean front set-back area which would interfere with the view of the other lot owners. Maximum height of planting in this area is to be 36 inches or 3 feet.

THIRD: There shall be a minimum of 5 foot side yard set-back for each lot.

FOURTH: Any house that is built on this tract shall be submitted for approval to an architectural jury consisting of the owners of the property or a committee appointed by the majority of the owners. It is understood, however, that size and price are not prime consideration for approval. It is also understood that all roofs of such buildings shall be pitched as opposed to the so-called flat roofs.

FIFTH: That any portion of any building erected in the area 100 feet East of the Sea Wall, as said Sea Wall is shown on said Map of Ocean Terrace No. 2615, shall be restricted to one story in height.

V

That the foregoing restrictions and covenants shall terminate and be of no further force and effect after January 1, 1990, but will automatically be renewed thereafter for successive periods of ten years unless the owners of fifty-one per cent (51%) of the above described parcels of real property shall file a protest or relinquishment of restrictions in the Office of the County Recorder, within the year preceding the year 1989 or any other successive date, as provided herein.

VI

That any breach or violation of the foregoing conditions, covenants or restrictions shall cause all the legal and/or equitable title to the premises with respect to which the breach occurs, together with the improvements thereon and appurtenances thereto belonging, to be forfeited to and revert to the owners, or their successors or assigns, provided, however, that the breach of any such conditions, covenants or restrictions, or the re-entry or reversion of title by reason thereof, shall not render invalid the lien or any mortgage or trust deed made for value upon said premises affected by such breach or forfeiture. As cumulative additional remedy, any such breach or violation, or the continuance thereof, may be enjoined, abated or remedied by appropriate proceedings on the part of the owner or any subsequent owner of any parcel of the real property. No waiver of, or acquiescence in, any breach of any of the covenants, conditions or restrictions herein contained shall be construed as a waiver of or acquiescence in any other or succeeding breach of the same or any other covenant, condition or restriction.

IN WITNESS WHEREOF, the OWNER has affixed her signature the day and year first above written.

/ Alice J. Ewing

Alice J. Ewing

BOOK 3464 PAGE 220

State of California } SS.
County of San Diego

On Jan 20, 1950, before me, the undersigned, a Notary Public in and for said County and State, personally appeared Alice J. Ewing

known to me to be the person... whose name... within instrument and acknowledged ... executed the same.

WITNESS my hand and official seal.

Virginia C. Sampson

(Seal) Notary Public in and for said County and State.

Form 231 8-48 Individual Acknowledgment UNION TITLE INSURANCE AND TRUST COMPANY

#C458864

When recorded mail to

UNION TITLE INSURANCE AND TRUST COMPANY

INDEXED

X Ewing

X

DOCUMENT NO. 8163
RECORDED AT REQUEST OF
UNION TITLE INSURANCE AND TRUST CO.

JAN 20 1950
at 25 Minutes Past 10
BOOK 3464 PAGE 218
OFFICIAL RECORDS
San Diego County, California
ROGER R. HOWE, County Recorder

3.40 HZ
13

ATTACHMENT 4

CDP DEED RESTRICTION

TerraCosta Consulting Group

Recording Requested by and Return to
State of California
California Coastal Commission
631 Howard Street, Fourth Floor
San Francisco, California 94105

2335

83-260475

RECORDED IN OFFICIAL RECORDS OF SAN DIEGO COUNTY, CA.

1983 JUL 28 AM 11:45

VERA L. LYLE COUNTY RECORDER

RF 12
MG

DEED RESTRICTION

I. WHEREAS, MARILYN SMITH HOWE ______________________, hereinafter referred to as Owner(s), is the record owner(s) of the real property located in the County of SAN DIEGO, described in attached Exhibit A, hereby incorporated by reference, and hereinafter referred to as the subject property; and

II. WHEREAS, the California Coastal Commission is acting on behalf of the people of the State of California; and

III. WHEREAS, pursuant to the California Coastal Act of 1976, the Owner applied to the California Coastal Commission for a coastal development of the subject property; and

IV. WHEREAS, a coastal development permit No. 6-83-305 was granted on June 9, 1983 by the California Coastal Commission based on the findings adopted by the California Coastal Commission attached in Exhibit B and hereby incorporated by reference; and

V. WHEREAS, coastal development permit No. 6-83-305 was subject to terms and conditions including but not limited to the following

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COURT PAPER
STATE OF CALIFORNIA
STD 113 (REV. 9-72)
OSP

Nº 260475

83

condition:

Prior to the transmittal of a coastal development permit for this project, the applicant shall submit to the Executive Director a deed restriction for recording, free of prior liens except for tax liens, that binds the applicant and any successors in interest. The form and content of the deed restriction shall be subject to the review and approval of the Executive Director. The deed restriction shall provide (a) that the applicants understand that the site may be subject to extraordinary hazard from waves during storms and from erosion, and the applicants assume the liability from those hazards; (b) the applicants unconditionally waive any claim of liability on the part of the Commission or any other regulatory agency for any damage from such hazards; and (c) the applicants understand that construction in the face of these known hazards may make them ineligible for public disaster funds or loans for repair, replacement, or rehabilitation of the property in the event of storms.

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NOW, THEREFORE, in consideration of the granting of Permit No. 6-83-305 to the Owner by the California Coastal Commission that there be, and hereby is, created the following restrictions on the use and enjoyment of said property, to be attached to and become a part of the deed to the property: The undersigned Owner, for himself/herself and for his/her heirs, assigns, and successors in interest, covenants and agrees that:

(a) applicants understand that the site may be subject to extraordinary hazard from waves during storms and from erosion, and the applicants assume the liability from those hazards;

(b) the applicants unconditionally waive any claim of liability on the part of the Commission or any other regulatory agency for any damage from such hazards; and

(c) the applicants understand that construction in the face of these known hazards may make them ineligible for public disaster funds or loans for repair, replacement, or rehabilitation of the property in the event of storms.

Said deed restriction shall remain in full force and effect during the period that said permit, or any modification or amendment thereof, remains effective, and during the period that the development authorized by said permit or any modification of said development, remains in existence in or upon any part of, and thereby confers benefit upon, the subject property described herein, and to that extent, said deed restriction is hereby deemed and agreed by Owner to be a covenant running with the land, and shall bind Owner and all his/her assigns or successors in interest.

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No 260475

83

Owner agrees to record this Deed Restriction in the Recorder's office for the County of San Diego as soon as possible after the date of execution.

DATED: June 28, 1983

SIGNED: ______________________

MARILYN SMITH HOWE

PRINT OR TYPE NAME OF ABOVE

SIGNED: ______________________

____

PRINT OR TYPE NAME OF ABOVE

(NOTARY ACKNOWLEDGMENT NEXT PAGE)

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NOTE TO NOTARY PUBLIC:

If your are notarizing the signature of anyone signing on behalf of a trust, corporation, partnership, etc., please use the correct notary jurat (acknowledgment) as explained in your Notary Law Book.

State of California,)

)

County of San Francisco)

On this 28th day of June, in the year 1983, before me Nina Ramos, a Notary Public, personally appeared MARILYN SMITH HOWE, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name is subscribed to this instrument, and acknowledged that he/she/they executed it.

OFFICIAL SEAL
NINA RAMOS
NOTARY PUBLIC - CALIFORNIA
My Commission Expires July 5, 1983

Nina Ramos

NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE

No 260475

83

This is to certify that the deed restriction set forth above is hereby acknowledged by the undersigned officer on behalf of the California Coastal Commission pursuant to authority conferred by the California Coastal Commission when it granted Coastal Development Permit No. 6-83-305 on 6-9-83 and the California Coastal Commission consents to recordation thereof by its duly authorized officer.

Dated: July 25, 1983

Cynthia K Long
CYNTHIA K. LONG, STAFF COUNSEL
California Coastal Commission

STATE OF California)
) ss
COUNTY OF San Francisco)

On July 25, 1983, before me Lisa K. Iwaki, a Notary Public, personally appeared Cynthia K. Long, personally known to me to be (or proved to me on the basis of satisfactory evidence) to be the person who executed this instrument as the Staff Counsel,
TITLE
and authorized representative of the California Coastal Commission and acknowledged to me that the California Coastal Commission executed it.

OFFICIAL SEAL
LISA K IWAKI
NOTARY PUBLIC - CALIFORNIA
SAN FRANCISCO COUNTY
My comm. expires JUN 22, 1987

Lisa K. Iwaki
Notary Public in and for said County and State

COURT PAPER
STATE OF CALIFORNIA
STD 113 (REV 8-72)

No 260475
83-

2341

Improved real property known as 8470 El Paseo Grande, La Jolla, CA, legally described as:

Lot 1 of Ocean Terrace, City and County of San Diego, State of California, according to Map thereof No. 2615 filed in the Office of the County Recorder of San Diego County January 20, 1950. Excepting therefrom that portion thereof heretofore or now lying below the mean high tide line of the Pacific Ocean.

EXHIBIT A

Nº 260475

83

2342

State of California, George Deukmejian, Governor

California Coastal Commission
SAN DIEGO COAST DISTRICT
6154 Mission Gorge Road, Suite 220
San Diego, CA 92120
(619)280-6992

EXHIBIT B

Staff Report

Administrative Item

FILED: May 12, 1983
49TH DAY: June 30, 1983
180TH DAY: November 8, 1983
STAFF REPORT: May 20, 1983
MEETING OF: June 8-10, 1983
STAFF: MP:am
EDITED BY:

PERMIT NUMBER: 6-83-305

APPLICANT: Marilyn Smith Howe

AGENT: Baylock-Willis & Assoc.

PROJECT LOCATION: 8470 El Paseo Grande, La Jolla, San Diego, San Diego County.
APN 346-050-01

PROJECT DESCRIPTION: Construction of approximately 62 linear feet of concrete footing for existing seawall.

LOT AREA	PARKING SPACES
BLDG. COVERAGE	ZONING SF
PAVEMENT COVERAGE	LCP PLAN DESIGNATION Residential
LANDSCAPE COVERAGE	PROJECT DENSITY
UNIMPROVED AREA	HEIGHT ABOVE FIN. GRADE
LOCAL APPROVALS RECEIVED	

EXECUTIVE DIRECTOR'S DETERMINATION. Pursuant to PRC Sec. 30624, the Executive Director hereby issues a permit for the proposed development, subject to Standard Conditions adopted by the Commission and Special Conditions below, on the grounds that, as conditioned, the development is in conformity with the provisions of Chapter 3 of the Coastal Act of 1976, will not prejudice the ability of the local government to prepare a Local Coastal Program that is in conformity with the provisions of Chapter 3, and will not have any significant adverse impacts on the environment within the meaning of the California Environmental Quality Act. Any development located between the nearest public road and the sea is in conformity with the public access and public recreation policies of Chapter 3.

ADDITIONAL FINDINGS: The proposed project will provide support for an existing concrete seawall which is located in an alignment with other walls in the area. The proposed footing will not have any effect on lateral access. The nearest vertical access is approximately 400 feet to the south at La Jolla Shores Park. As the project is located where it will be subject to wave action and storm hazard; and, the existing seawall has already been damaged by storm action, the Commission finds that a "waiver of liability" special condition is appropriate so that the potential hazards are acknowledged and present and future owners appropriately noticed.

STANDARD CONDITIONS. See Exhibit 1.

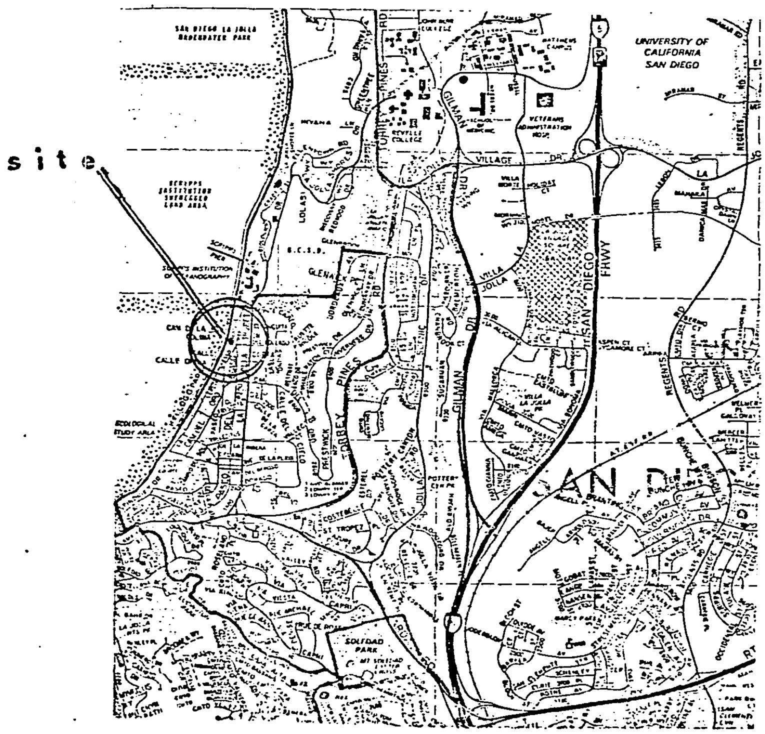
SPECIAL CONDITIONS: 1. Waiver of Liability. Prior to the transmittal of a coastal development permit for this project, the applicant shall submit to the Executive Director a deed restriction for recording, free of prior liens except for tax liens, that binds the applicant and any successors in interest. The form and content of the deed restriction shall be subject to the review and approval of the Executive Director. The deed restriction shall provide (a) that the applicants understand that the site may be subject

№ 260475

83-

to extraordinary hazard from waves during storms and from erosion, and the applicants assume the liability from those hazards; (b) the applicants unconditionally waive any claim of liability on the part of the Commission or any other regulatory agency for any damage from such hazards; and (c) the applicants understand that construction in the face of these known hazards may make them ineligible for public disaster funds or loans for repair, replacement, or rehabilitation of the property in the event of storms.

DO NOT RECORD



Nº 260475

83

STANDARD CONDITIONS:

1. Notice of Receipt and Acknowledgement. The permit is not valid and construction shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Construction shall be pursued in a diligent manner and completed in a reasonable period of time.. Application for extension of the permit must be made prior to the expiration date.

3. Compliance. All development must occur in strict compliance with the proposal as set forth in the application for permit, subject to any special conditions set forth below. Any deviation from the approved plans must be reviewed and approved by the staff and may require Commission approval.

4. Interpretation. Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.

5. Inspections. The Commission staff shall be allowed to inspect the site and the development during construction, subject to 24-hour advance notice.

6. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affadavit accepting all terms and conditions of the permit.

7. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

No 260475

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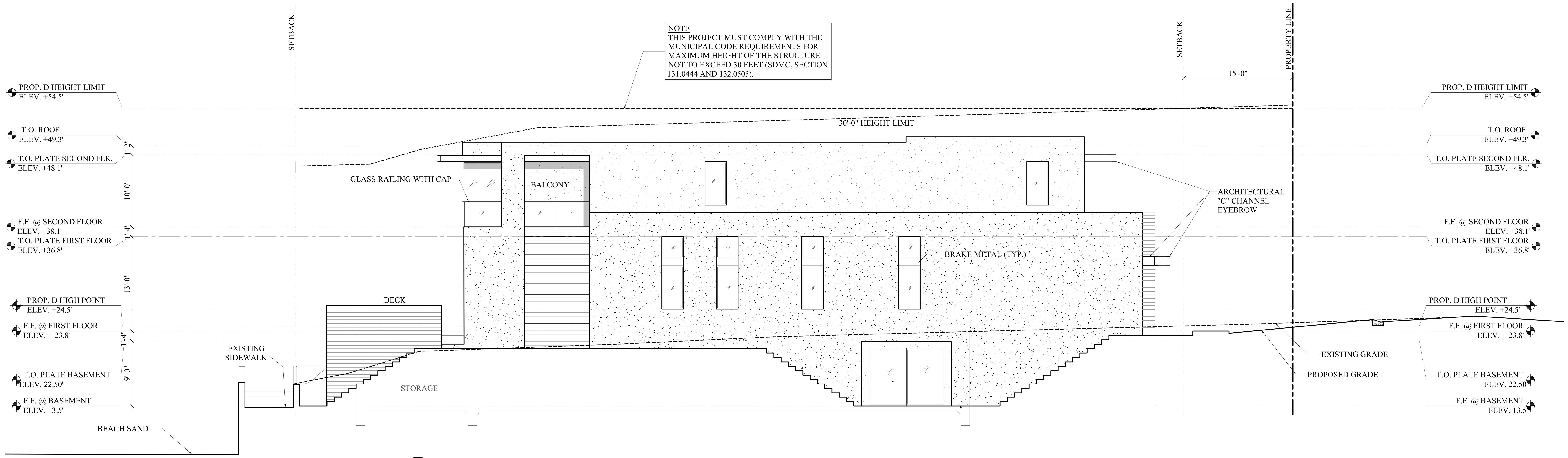
ATTACHMENT 5

UPDATED SEIDLER ELEVATION



1 PROPOSED SOUTH ELEVATION

0 2' 4' 8'

SCALE: 1/8" = 1'-0"

M2

Marengo Morton Architects

7724 Girard Ave.
Second Floor
La Jolla, CA 92037
Tel. (858) 459-3769
Fax. (858) 459-3768
Michael Morton AIA
Claude Anthony Marengo DESA

LICENSED ARCHITECT MICHAEL RENE MORTON C-19371 REN. April 30, 2019 STATE OF CALIFORNIA

BLACK HALIBUT

8470 EL PASEO GRANDE
LA JOLLA, CA, 92037

REVISIONS
06/25/2016 START OF PROJECT
03/30/2017 COASTAL RE-SUBMITTAL
08/20/2017 REDESIGN / NEW OWNER
11/08/2017 COASTAL RE-SUBMITTAL

PHASE COASTAL

PROJECT NO. 2016-22

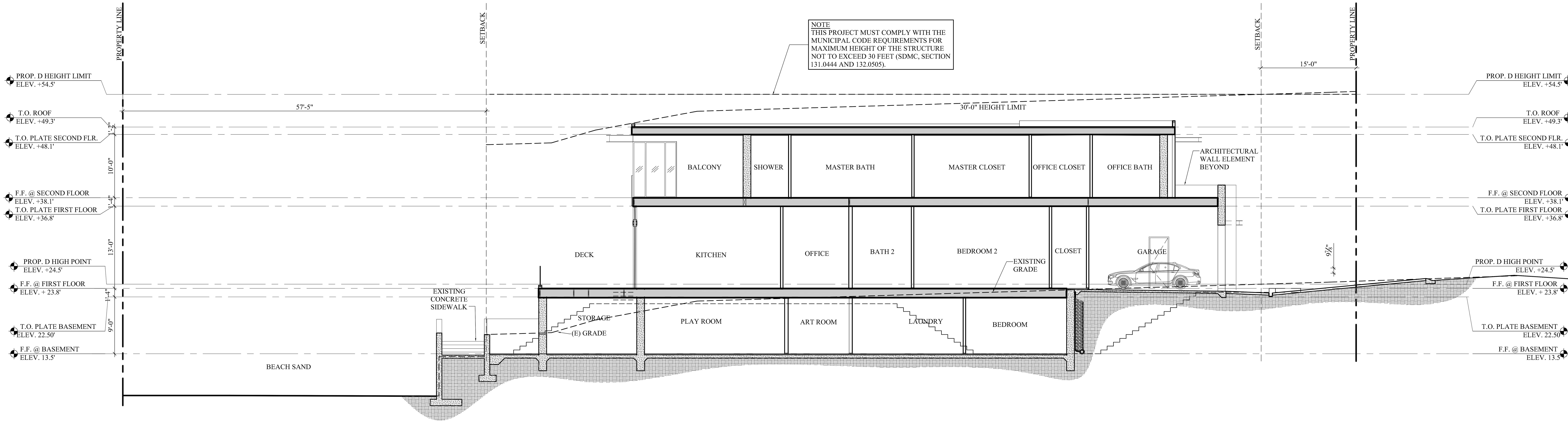
REVIEWED BY CAM

DRAWN BY JB

DATE 11/03/2017

SHEET TITLE PROPOSED EXTERIOR ELEVATIONS

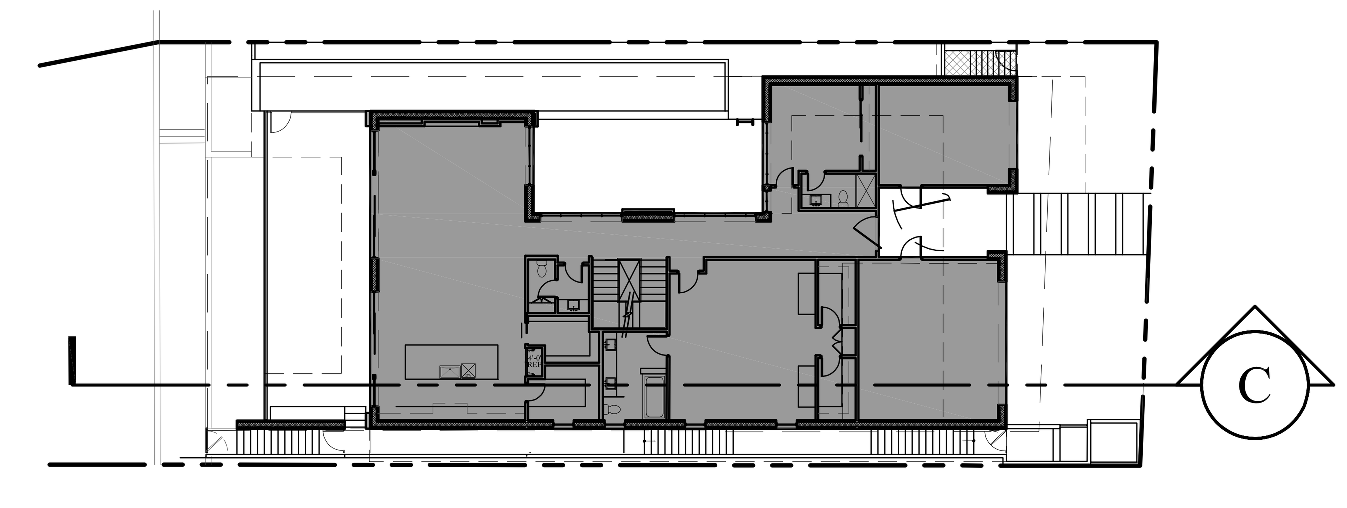
A-5.1



C SECTION

0 2' 4' 8'

SCALE: 1/8" = 1'-0"



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REVISIONS
06/25/2016 START OF PROJECT
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08/20/2017 REDESIGN / NEW OWNER
11/08/2017 COASTAL RE-SUBMITTAL

PHASE: COASTAL

PROJECT NO. 2016-22

REVIEWED BY: CAM

DRAWN BY: JB

DATE: 11/03/2017

SHEET TITLE: PROPOSED SECTIONS

A-6.3

C:\Transporter\Transporter Library\Projects\2016 Projects\2016-22 Black Halibut - El Paseo Grande\CADD Drawings\Architectural\Coastal Phase\Sheets\Black Halibut Sheets\A-6.1 SECTIONS_Black Halibut EPG.dwg Nov 03,2017-2:07pm

ATTACHMENT 6

WAVE RUNUP / SEA LEVEL RISE STUDY
Prepared by TerraCosta Consulting Group, Inc.
Dated March 21, 2017

TerraCosta
Consulting Group

WAVE RUNUP / SEA LEVEL RISE STUDY
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

Prepared for
BLUE HERON DESIGN BUILD
Las Vegas, Nevada

TerraCosta Consulting Group

Prepared by
TERRACOSTA CONSULTING GROUP, INC.
3890 Murphy Canyon Road, Suite 200
San Diego, California 92123
(858) 573-6900

Project No. 2966
March 21, 2017

TerraCosta Consulting Group

Geotechnical Engineering
Coastal Engineering
Maritime Engineering

Project No. 2966
March 21, 2017

Mr. David Lessnick
BLUE HERON DESIGN BUILD
4675 W. Teco Avenue, Suite 250
Las Vegas, Nevada 89118

WAVE RUNUP / SEA LEVEL RISE STUDY
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

Gentlemen:

In accordance with your request, TerraCosta Consulting Group, Inc. (TerraCosta) is pleased to present the results of our evaluation of the coastal processes in the site vicinity, along with an assessment of wave runup and its effect on the proposed beachfront property located at 8470 El Paseo Grande in La Jolla, California.

We have also addressed the impact of sea level rise on future inundation levels within this general segment of La Jolla, along with its effect on coastal processes, including the design wave height, wave forces, and anticipated scour extending out to the year 2100. The accompanying report describes our findings pertinent to the general coastal processes in the area, including the potential for marine erosion and its effect on the proposed improvements.

We appreciate the opportunity to be of service and trust this information meets your needs. If you have any questions or require additional information, please give us a call.

Very truly yours,

TERRACOSTA CONSULTING GROUP, INC.

Walter F. Crampton, Principal Engineer
R.C.E. 23792, R.G.E. 245

WFC/jg
Attachments

TABLE OF CONTENTS

WAVE RUNUP / SEA LEVEL RISE STUDY
8470 EL PASEO GRANDE
LA JOLLA, CALIFORNIA

1 INTRODUCTION AND PROJECT DESCRIPTION

As we understand, the proposed project consists of demolishing the existing residential structure at 8470 El Paseo Grande, and constructing a new three-story single-family residence designed by Marengo Morton Architects. A review of the architectural drawings dated March 10, 2017, indicates that the basement level of the residence is at elevation 13.5 feet, NGVD 29, while the elevation along El Paseo Grande is approximately 26 feet, NGVD 29.

An existing seawall fronts the subject property and extends from Kellogg Park to Scripps Institution of Oceanography (SIO), with the elevation of the wall in front of the subject property at 15.1 feet, NGVD 29.

Although we do not know the actual specifics, it would appear that the subject seawall is one of several seawalls that protect a total of 22 properties extending south of SIO along El Paseo Grande. The subject seawall appears to have been constructed fronting six properties, with a shared 8-foot-wide boardwalk landward of the seawall and a public access stairway located near the middle of this seawall. Low-height private walls then exist on the landward side of the boardwalk, delineating the private properties to the east, with the public access boardwalk fronting these six properties providing access to the beach.

2 SETTING

The approximately 1-mile-long beach at La Jolla Shores is located between Scripps Submarine Canyon on the north, and La Jolla Submarine Canyon and Point La Jolla on the south, which marks the southern boundary of the Oceanside Littoral Cell (Figure 1). The canyon and inter-canyon bathymetry greatly influence the local wave distribution, generally producing lower wave heights than at adjacent areas to the north and south. The Rose Canyon fault intersects the coast at the southern end of the reach and controls the local geomorphology. Beach access is excellent, especially at SIO (although parking is restricted) and at Kellogg Park with its large public parking lot. Along with Pacific Beach and Mission Beach to the south, La Jolla Shores provides a major portion of the available recreational beach area in the City of San Diego.

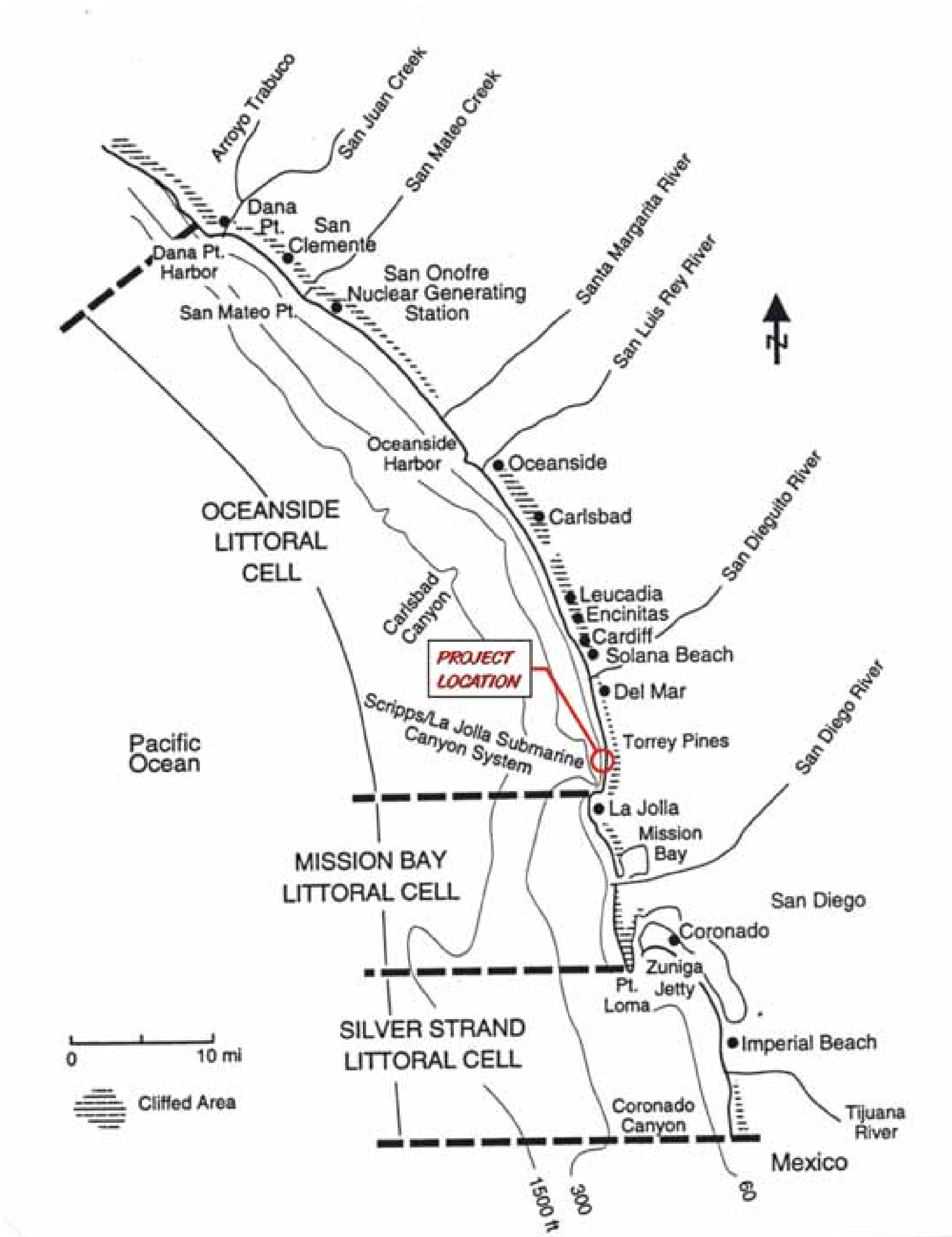


Figure 1. Littoral cells in the San Diego region. The Oceanside cell extends from Dana Point to Point La Jolla (Mt. Soledad).

Figure 2. Torrey Pines (South) and La Jolla Shores indicating project site and beach profile benchmark locations.

Figure 2 is a Google Earth image of the southern Torrey Pines and La Jolla Shores beach sections. Also indicated are the project site at 8470 El Paseo Grande and benchmark locations TP-0470, LJ-0460, and LJ-0450, used as the starting points for cross-shore beach profile measurements used to derive beach width history surveyed by Coastal Frontiers (2015) under contract to SANDAG.

The sandy beach at La Jolla Shores is moderately wide in the northern and central reaches, but tapers to the south where La Jolla Submarine Canyon intercepts sand and funnels it offshore (Inman and Frautschy, 1966). SIO and residential development back the northern half, while the low-lying Kellogg Park, a filled coastal lagoon, sits in the south-center and a hotel-resort and restaurant, and several additional residential properties, occupy the southern end.

The developed northern and southern sections are completely armored with various types of concrete seawalls of varying heights. Several armored sections are still vulnerable to wave overtopping, which will become gradually more acute as mean sea level rises. The Marine Room restaurant has a history of being occasionally damaged by wave flooding, such as occurred in 1941 and 1983. The restaurant has turned this hazard into an asset by featuring “High Tide” breakfasts and dinners from (respectively) October-March and April-September, when the daily extreme high tide “brings the waves up to our picture windows,” most recently during the 2015-16 El Niño winter.

A narrow bedrock and cobble beach forms a transition between the sandy beach at Torrey Pines State Beach and the one at La Jolla Shores to the south. Dike Rock, an outcrop of volcanic rock, acts as a natural breakwater protecting a small headland that dominates this area. The only shore protection is a short section of riprap high on the back beach protecting the “Mushroom House,” a novel, private guesthouse near Dike Rock. Proceeding south, seawall protection commences in front of the SIO marine biology research building (Hubbs Hall), and continues unbroken to Kellogg Park.

Beach conditions at the northern and central sections of La Jolla Shores are closely tied to the conditions at Torrey Pines Beach, which supplies essentially all of the available sand to the area. Gullying of the terrace and the cliff face and landslides are the dominant mechanisms of erosion at Torrey Pines (Flick, 1993; Flick and Elwany, 2006). USACE (1988) cites a 1982 landslide at Torrey Pines estimated to contain over 1.3 million cubic meters of sedimentary material, of which about 43 percent is sand-sized (Young and Ashford, 2006). Torrey Pines received 209,000 cubic yards of sand nourishment in April 2001 as part of the SANDAG regional beach nourishment project. Storm waves in November 2001 shifted some of this sand offshore and alongshore, with much of it moving south toward La Jolla Shores (Seymour, et al., 2005).

2.1 Beach Width and Stability

Figure 3 illustrates the time history of beach width at south Torrey Pines (Range TP-0470). Regular twice-yearly (spring and fall) measurements sponsored by SANDAG beginning in 1996 follow early surveys in autumn 1984 and 1989. The data suggest that beach width at Torrey Pines was between about 200 and 250 feet in 1984-1989. It ranged between about 60 and 270 feet, averaging about 200 feet between 2003 and late 2015. Beach widths were lower before the 2001 nourishment, presumably because of erosion between 1989 and 1996, during which time no measurements are available, and due to additional erosion in the 1997-98 El Niño winter. Natural beach width recovery is evident before the additional boost from the 2001 nourishments. The SANDAG data for 2016 is not available as of this writing. However, Ludka, et al. (2016), demonstrate a 90-foot decrease in beach width at Torrey Pines during the 2015-16 El Niño winter, which exceeded the typical seasonal decline of 50 to 70 feet.

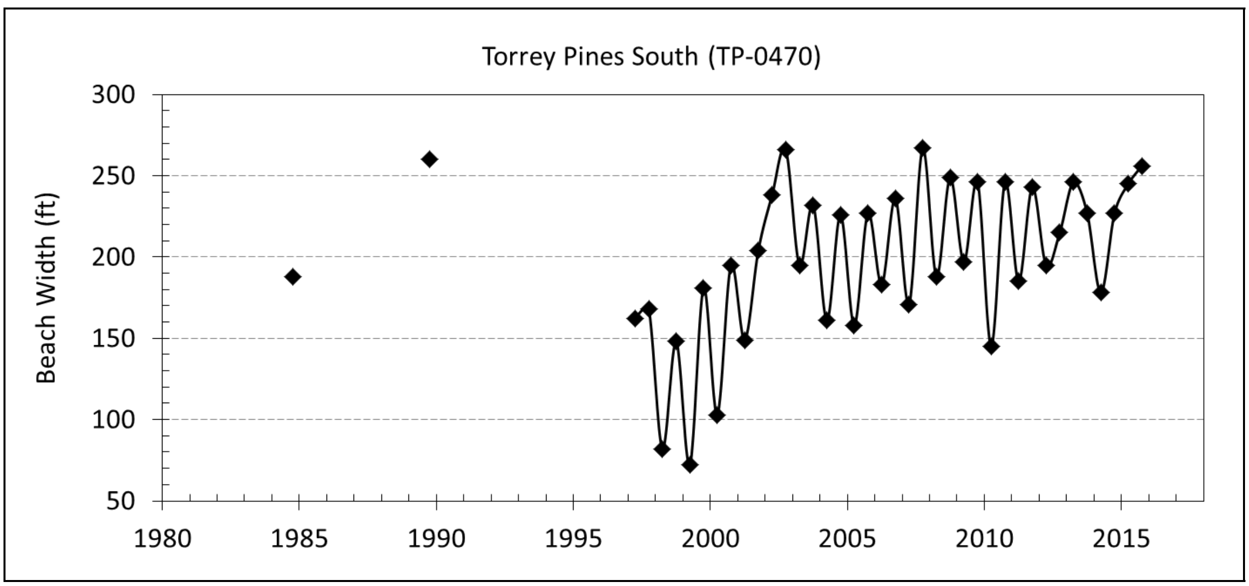


Figure 3. Beach width history at Torrey Pines (South), Range TP-0470.

Profile Range LJ-0460 is located at the foot of the concrete ramp between the Dive Locker and Center for Coastal Studies buildings at SIO. Figure 4 shows the time history of beach width at this range. The average width is about 150 feet, with a range of 60 to nearly 300 feet, similar to the width of south Torrey Pines beach. Fluctuations are slightly larger, ranging from about 70 to 100 feet. Unlike Torrey Pines, La Jolla Shores received no sand during the 2001 SANDAG nourishment project. However, a slight increase in width after 2001 suggests a direct benefit. The maximum beach width measured between 1984 and 2015 occurred in fall 2015. Forthcoming data will undoubtedly show a decrease during the winter of 2015-16, just as most other local beaches did (Ludka, et al., 2016). Sand availability in the region, both upcoast at Torrey Pines and offshore on the wide shelf between the two branches of the offshore submarine canyon system, ensures timely recovery and continued long-term stability of La Jolla Shores beach.

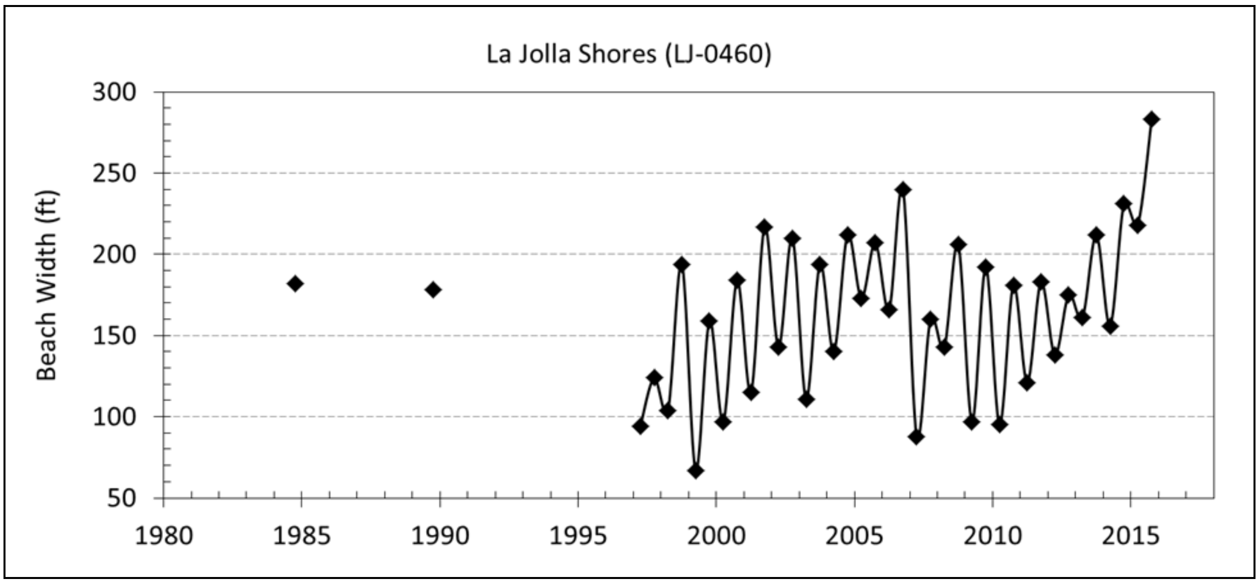


Figure 4. Beach width history at La Jolla Shores, Range LJ-0460.

Profile LJ-0450 is located approximately 1,200 feet south of the project site (Figure 2). Figure 5 shows the beach width history there, and strongly suggests long-term stability. The average beach width from 1996-2015 was about 250 feet, which is about the same as the widths measured in 1984 and 1989. Seasonal fluctuations are smaller than those at LJ-0460, ranging about 50 feet. The minimum observed beach width of about 150 feet occurred in spring 1998 after the aforementioned 1997-98 El Niño. Recovery was rapid, with beach width reaching 250 feet by fall 1998. The data also suggest some 25 to 50 feet of benefit following the 2001 Torrey Pines nourishment. Near-maximum beach widths were also recorded in late 2014 and 2015, but erosion can be anticipated in winter 2015-16, as at other locations.

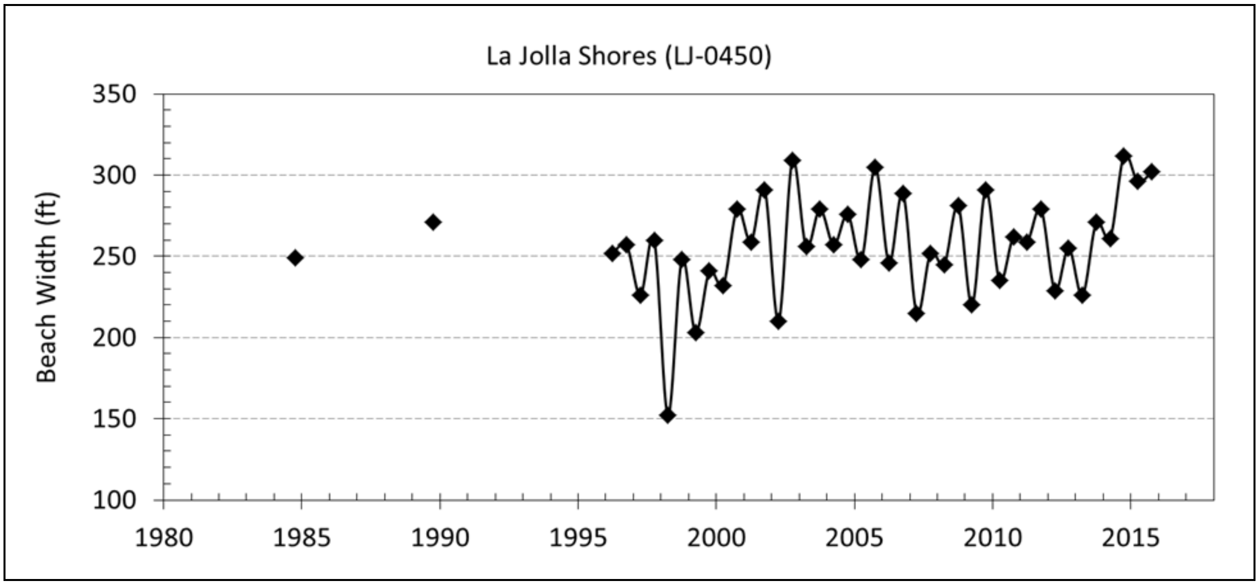


Figure 5. Beach width history at La Jolla Shores, Range LJ-0450.

3 FEMA MAPPING

We conducted a review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for the study area (Figures 6A and 6B). The proposed project falls within an X Zone (Outside the Special Flood Hazard Area), with a base flood elevation (BFE) of 12 feet, NAVD 88 (9.89 feet, NGVD 29). The X Zone designation results from a pad grade of above elevation 13.5 feet NGVD 29, or well above any typical coastal flooding.

4 COASTAL FLOOD AND EROSION HAZARD MAPPING

The Pacific Institute has developed coastal flood and erosion hazard zone maps addressing the impacts of sea level rise on the California coast by the year 2100 under funding by the California Energy Commission, the California Department of Transportation, and the Ocean Protection Counsel. The Impacts of Sea Level Rise on the California Coast report (Pacific Institute, 2009) concludes that sea level rise will inevitably change the character of the California coast and that adaptation strategies must be evaluated, tested, and implemented if the risks defined in the impacts of sea level rise on the California coast report are to be reduced or avoided. Populations and critical infrastructure at risk are shown on detailed maps prepared by the Pacific Institute. A close-up portion of the coastal flood hazard map for the La Jolla Quadrangle projected out to the year 2100 is shown on Figure 7, with the study area landward of the erosion high hazard zone in 2100. If the viewer is interested in examining the Pacific Institute's map in more detail, this map can be viewed and enlarged at: http://www2.pacinst.org/reports/sea_level_rise/hazmaps.html.

5 TSUNAMI MAPPING

The University of Southern California Tsunami Research Center, funded through the California Emergency Management Agency, has developed tsunami inundation maps for emergency planning for the entire state of California. The tsunami inundation map for the La Jolla quadrangle is shown on Figure 8A, with an enlargement showing the study area provided on Figure 8B, along with an enlargement of the map text provided on Figure 8C describing the methodology and data sources used in the model. Although the tsunami inundation map provides almost no detailed information on the inundation area along the shoreline, Figure 8B indicates a fairly extensive inundation area throughout the low-lying areas around Kellogg Park. While exact inundation elevations are not available through the University of Southern California Tsunami Research Center, tsunami inundation elevations can be approximated by comparing actual ground surface elevations along the tsunami inundation limits in the vicinity of Kellogg Park, with an estimated inundation elevation, using this admittedly somewhat crude approach, being on the order of 11 feet NGVD 29.

6 WAVE CLIMATE

Waves provide nearly all of the energy input that drives shoreline processes along the California coast. As illustrated in Figure 9, incoming waves along the southern California coast fall into three main categories: Longer period northern and southern hemisphere swell, and locally short-period generated seas. North hemisphere swell from the North Pacific Ocean dominate the winter wave conditions off California, while southern hemisphere swell is more important in the summer. Short-period seas are produced by storms sweeping through the area. The offshore islands, shallow banks, submarine canyons and generally complex bathymetry of southern California greatly complicate the wave climate at the coast.

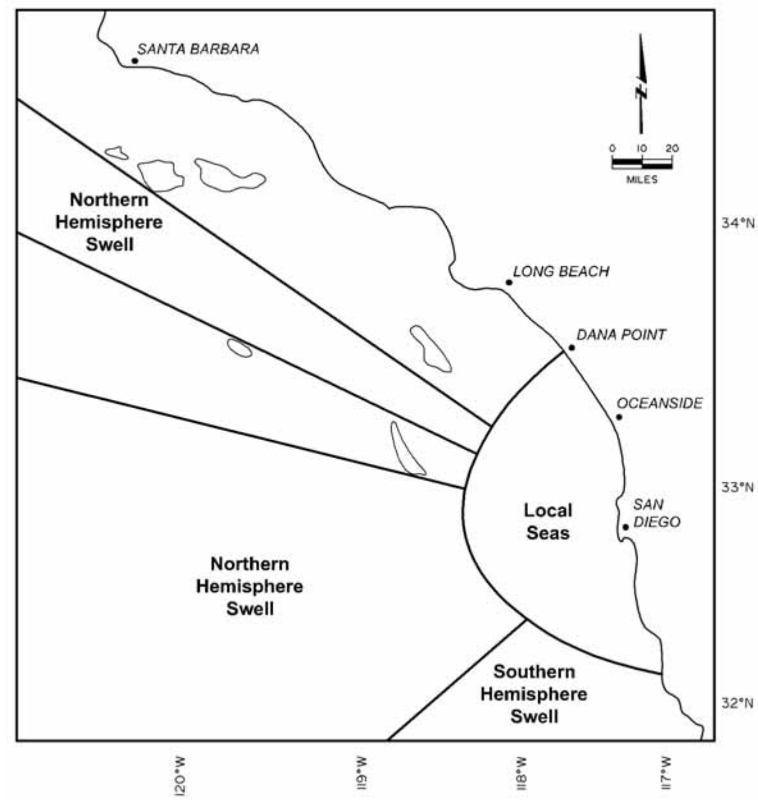


Figure 9. Map showing generalized wave exposure for southern California.

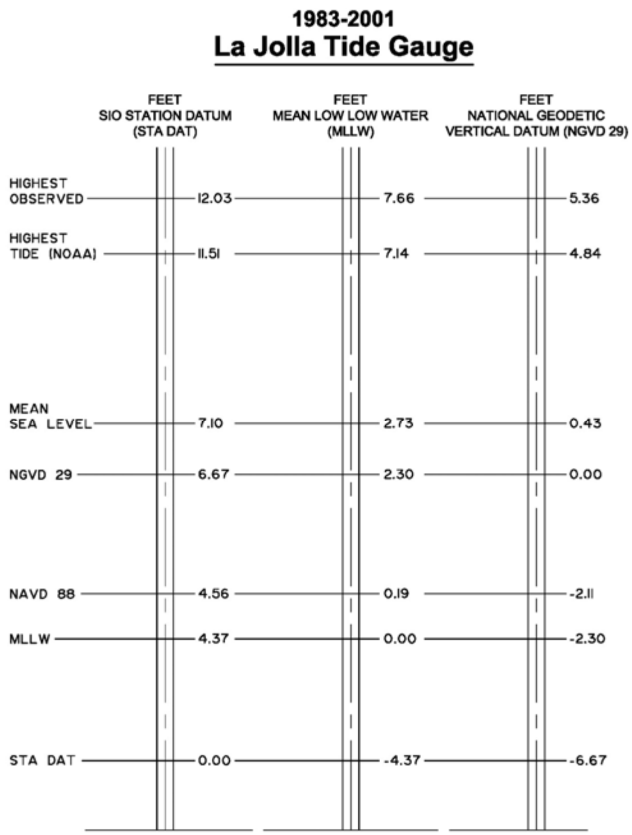
Coastal orientation, and the islands and banks greatly influence the swell propagating toward shore by partially sheltering southern California, especially from directions north of west. Because of the complicated effects of bathymetry and island shadowing, the wave height at the shoreline is sensitive to relatively small changes in the incoming direction of the deep ocean waves.

While waves along the San Diego County shoreline generally range in height from 2 to 5 feet, deep water waves off the coast have been recorded with deep water significant wave heights approaching 10 meters (33 feet).

7 WATER LEVELS

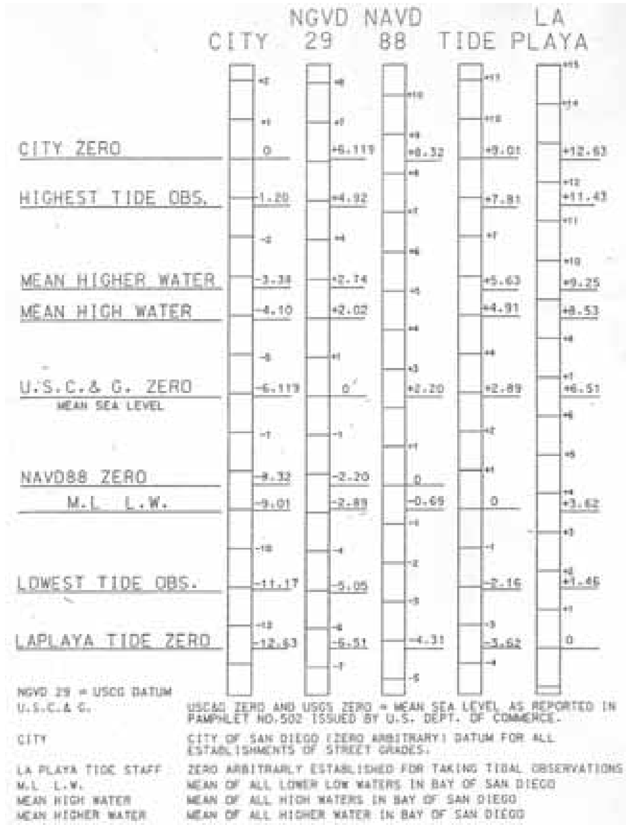
Past water elevations are based on the tide gauge data from La Jolla, which has been collected at SIO Pier since 1924. These data are applicable to the San Diego region open-ocean coastline. The tidal and geodetic reference relationships at La Jolla are illustrated in

Figure 10. Note that similar relationships derived for La Playa inside San Diego Bay (Figure 11) are often used. However, the tide range in San Diego Bay is about 10 percent larger than along the open coast, so that the La Jolla tidal datums are preferred for coastal locations.



Tidal and geodetic datum relationships for the latest (1983-2001) tidal epoch at La Jolla (Scripps Pier). These are applicable to the open-coast of the San Diego region.

Figure 10. Sea Level Datums



Tidal and geodetic datum relationships in the San Diego Bay based on La Playa (behind present-day Shelter Island) where a tide gauge was located from 1853-72. Note that the currently operating San Diego tide gauge has been located at or near Navy Pier off downtown San Diego since 1906.

Figure 11. Datum Relationships

Tide gauges measure total water level outside the breaker zone, which includes contributions from the tide, as well as storm surges and other factors that raise sea level over the short and long term, including the effects of El Niño. All non-tide sea level influences measured by the tide gauges are termed "non-tide residuals, or "NTR." Importantly, tide gauges do not include the effects of waves, including wave setup and wave-driven runup. At the shoreline and on beaches, wave-driven runup is a crucial component of the design water elevation and must be determined by means other than tide gauge data.

The projected future total maximum water level elevations include the contributions from the predicted tides, and projected storm effects, El Niño influences, and wave runup. Projected NTR and wave runup were derived from a National Center for Atmospheric Research (NCAR) global circulation model (GCM) run using the IPCC (2007) A2 future greenhouse gas (GHG) emission scenario. The A2 scenario is a moderately aggressive one, with only limited reductions in the rate of future GHG emissions from current levels. This is, therefore, a conservative scenario. This information is available from a study recently completed by TerraCosta Consulting Group for SPAWAR Systems Center Pacific that seeks to determine the impacts of future MSLR on the beach training areas at Naval Base Coronado (Chadwick, et al., 2011). The results are directly applicable to the issues being addressed in this report.

Figure 12 illustrates projected MSLR scenarios equal to 0.5, 1.0, 1.5, and 2.0 m by 2100. These projections are the ones being considered by SPAWAR and span the currently accepted range of scientific consensus of possible future scenarios, although the higher ranges are deemed less likely than the central tendencies (Nichols, et al., 2011; Houston, 2012).

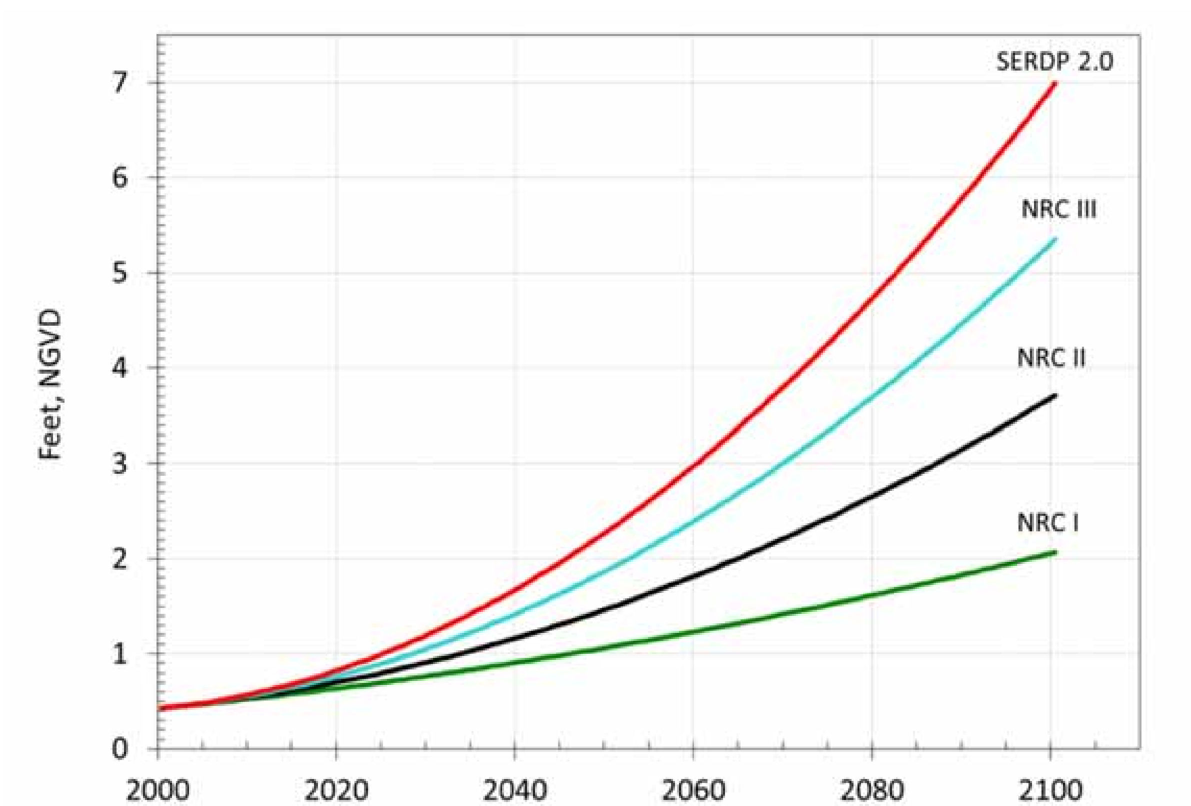


Figure 12. Four illustrative future MSLR scenarios spanning the equivalent of 0.5, 1.0, 1.5, and 2.0 meter increase from 2000-2100 (in feet relative to NGVD).

Figure 13 summarizes future MSLR scenarios developed in a new National Research Council (NRC 2012) study that the California Ocean Protection Council is currently seeking to adopt and provide as guidance for state and local agencies.

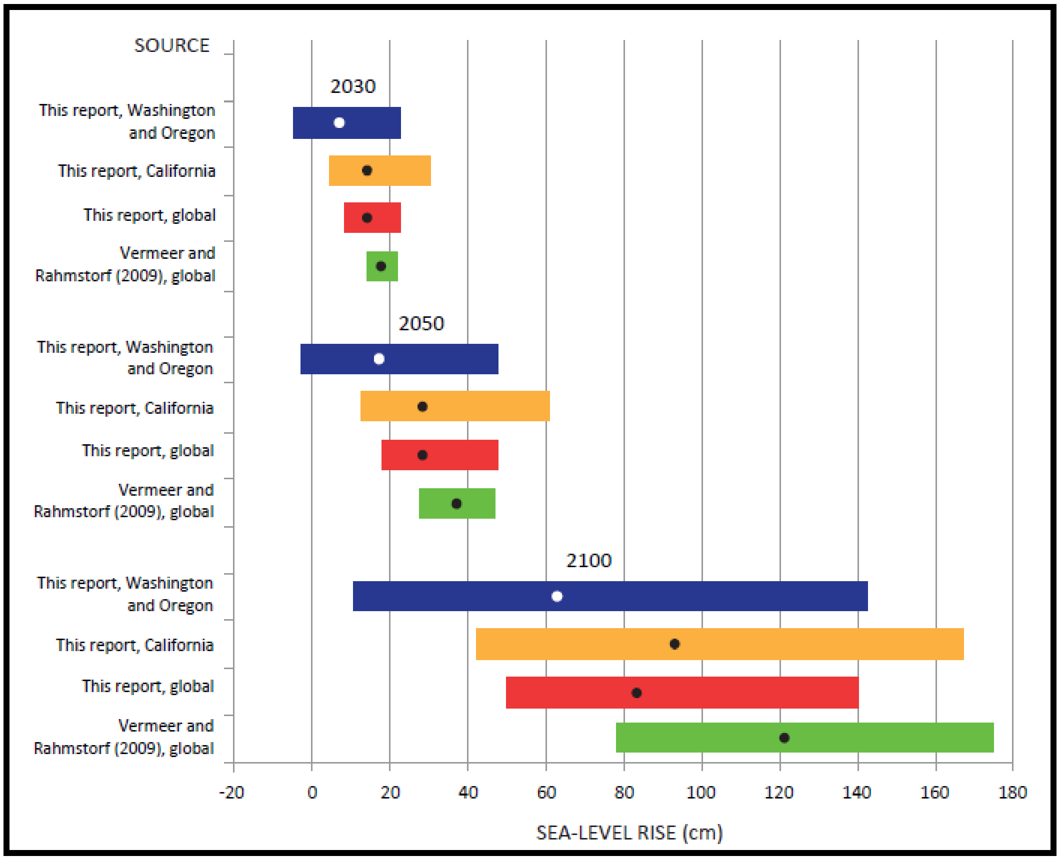


Figure 13. NAS (2012) summary of global, Washington, Oregon, and California (south of Cape Mendocino) MSLR projections for 2030, 2050, and 2100 relative to 2000.

7.1 Sea Level Rise

Past and possible future changes in mean sea level (MSL) are of interest in design and planning for all coastal cities, as well as for any engineering activities on the coast. Figure 14 shows the time history of maximum monthly sea level observed at the La Jolla tide gauge from 1924 to 2011. These data are routinely tabulated by the National Oceanic and Atmospheric Administration (NOAA) as part of their national tide gaging program (Flick *et* *al.*, 2003). Peak observed values (relative to NGVD) are 5.36 feet (January 2005) and 5.35 feet (November 1997).

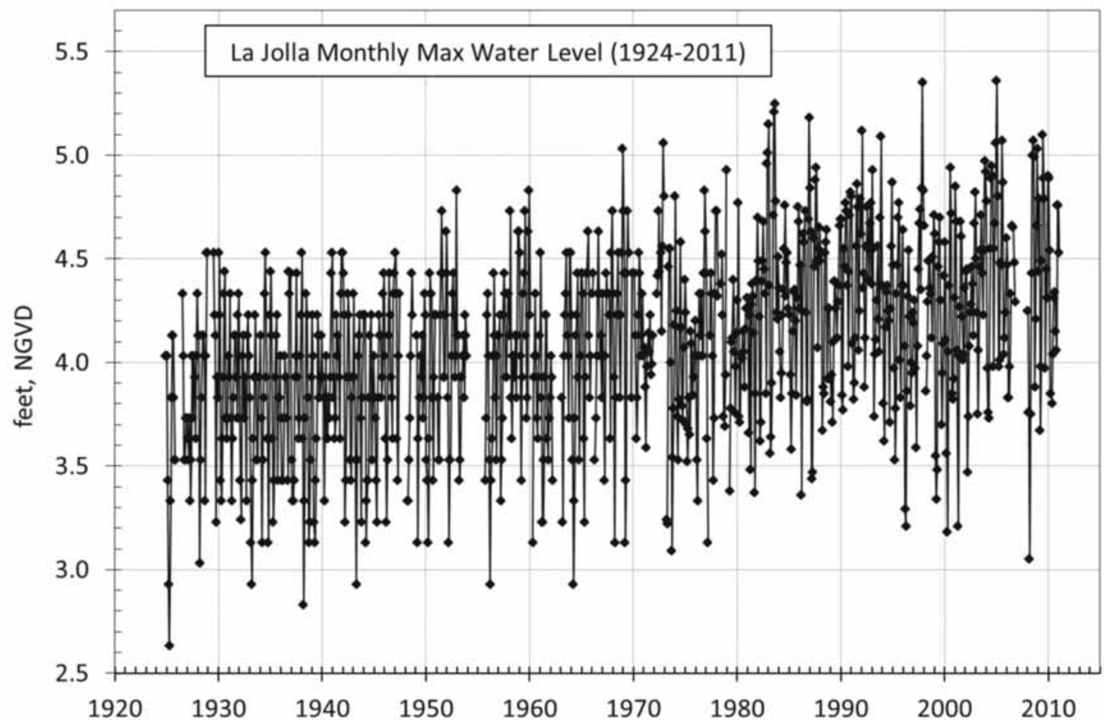


Figure 14. Time history of maximum monthly sea level observed at the La Jolla tide gauge 1924-2011.

Global mean sea level rose at least 300 feet, and perhaps as much as 400 feet, during the past 18,000 years or so (CLIMAP, 1976). Sea level, both globally and along California, rose approximately 0.7 foot over the past century, as shown in Figure 15. Furthermore, evidence suggests that the rate of global mean sea level rise has accelerated since the mid-1800s, or even earlier (Church and White, 2006; Jevrejeva, et al., 2008), and that it has now reached a rate of about 1 foot per century over the past decade or so (Nerem, et al., 2006).

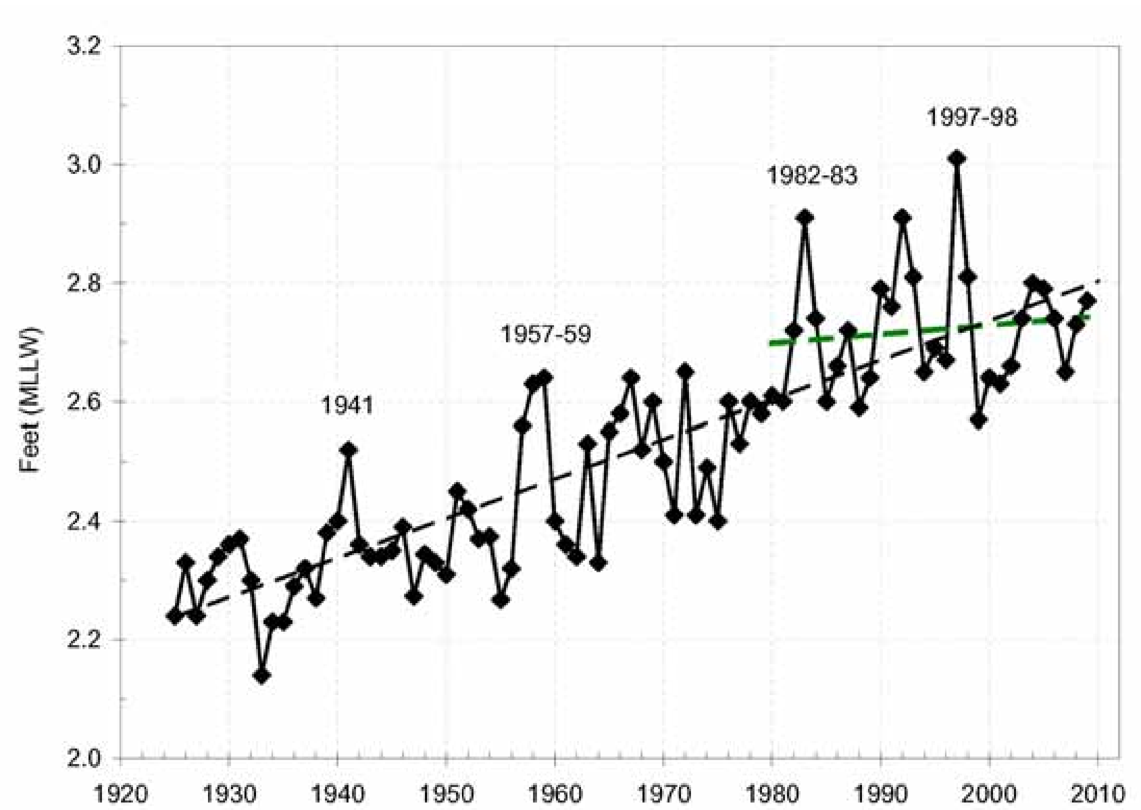


Figure 15. Annual average sea level history at La Jolla, 1925-2007. Broken line shows linear trend of 0.7 feet/century rise.

Figure 15 is a plot of the annual mean sea levels measured at the La Jolla tide gauge starting in 1925. The linear trend indicates the approximate 0.7 foot per century sea level rise. Also noticeable are the enhanced sea levels during the El Niño episodes of 1941, 1957-59, 1982-83, and 1997-98 (respectively labeled).

A notable feature of the sea level history at La Jolla is the leveling-off of sea level rise since about 1980 (Figure 15). The green broken line shows a much reduced trend of about 0.15 foot per century between 1980 and 2009, or about 4.5 times smaller than the overall trend of 0.67 foot per century. A similar reduction in the rate of sea level rise has been noted at San Francisco, which has a similar overall appearance as the La Jolla record, but is a much longer record extending back to 1856.

Figure 16 shows the global distribution of the rate of sea level change for the period of 1993-2006 (Cabanes, et al, 2001). Note that warm colors (yellow-orange-red) show areas of sea level rise (positive rates), while cool colors (green- blue) indicate falling sea level (negative rates) over the record. Inspection of the North Pacific reveals that sea levels in the western Pacific, especially in the lower latitudes, have risen at a rate of 3-9 mm/year (equivalent to 30-90 cm per century, or about 1-3 feet per century). Conversely, sea levels in the eastern Pacific, extending from Central America north to Washington State, have fallen at a rate of 0-3 mm per year (0-30 cm per century, or 0-1 foot per century). This may explain the coastal tide gauge observations (La Jolla sea level history; Figure 15) described above.

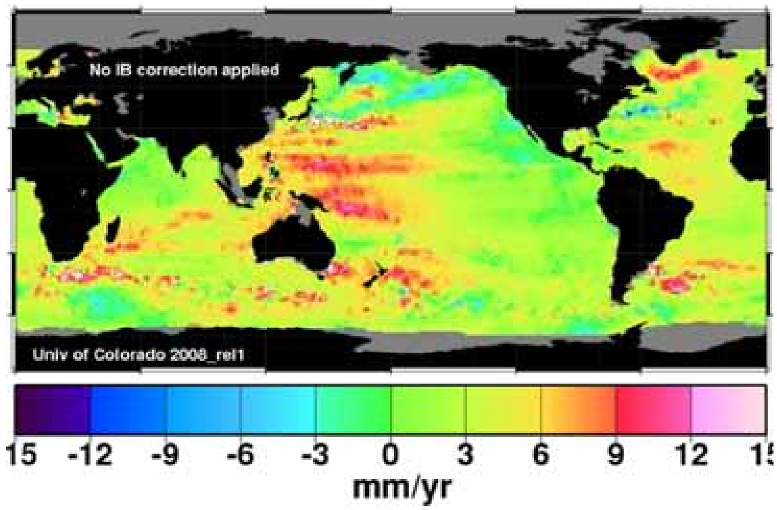
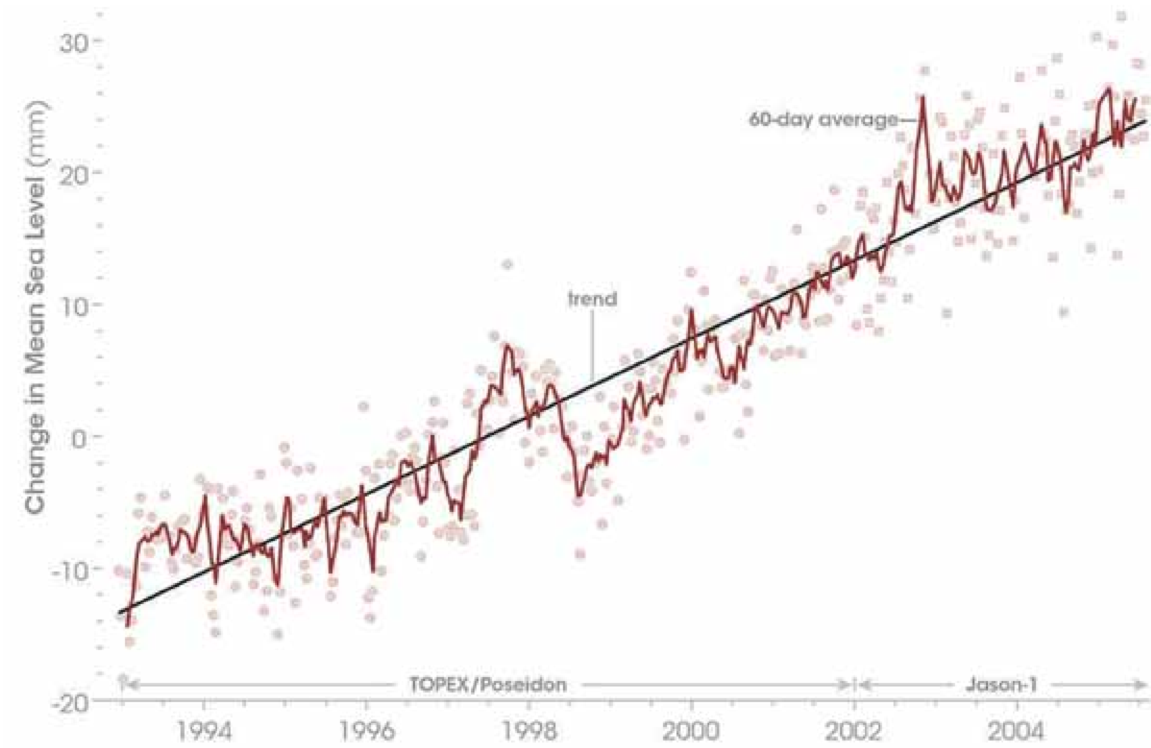


Figure 16. Global sea level change rates 1993-2006 as derived from satellite altimetry measurements, following Nerem (2006).

Bromirski, et al. (2011) determined that increases in wind stress over large parts of the Pacific Basin are largely responsible for a "dynamical suppression" of MSLR as part of a major regime-shift that occurred in the late 1970s. Any flooding or beach erosion that has occurred on this coast since about 1980 has not been affected by MSLR as future events are expected to be. In fact, it is reasonable to conclude that MSLR will resume and likely accelerate along the California coast over the next few decades (Bromirski, et al., 2012).

In sharp contrast to the recent decrease in sea level rise rates along the California coast, including La Jolla, the global mean sea level rise rate over the past two decades has increased over the rate observed for the past century, and has reached about 1 foot per century (32 cm per century). This is indicated from satellite data reporting and trend analysis shown in Figure 17 (Nerem, 2005). The exhibit illustrates how sea level change trends may vary globally and that the impacts of sea level rise may affect regions differently.



Satellite-derived global sea level elevation change from 1993-2005 after Nerem (2005). Slope of the trend line is about 1 foot per century (32 cm per century).

FIGURE 17

Figure 18 presents historical elevation return periods based on the La Jolla tide gauge data for the tide, and tide plus NTR, which includes storm surges and other sea level effects such as El Niño, but excludes wave-driven runup. Note that a maximum possible (past) joint tide plus NTR water level of 5.82 feet would have required an extremely unlikely (but not impossible) coincidence of the maximum tide (4.87 feet) and the highest (1924-2004) observed NTR (0.95 foot). Return periods as a function of elevation or vice-versa can be read directly from this graph. For example, under current MSL conditions, a joint occurrence of tide and NTR of 4.95 feet would be expected annually, while 5.3 feet would occur approximately once per decade, and about 5.6 feet once per century, on average.

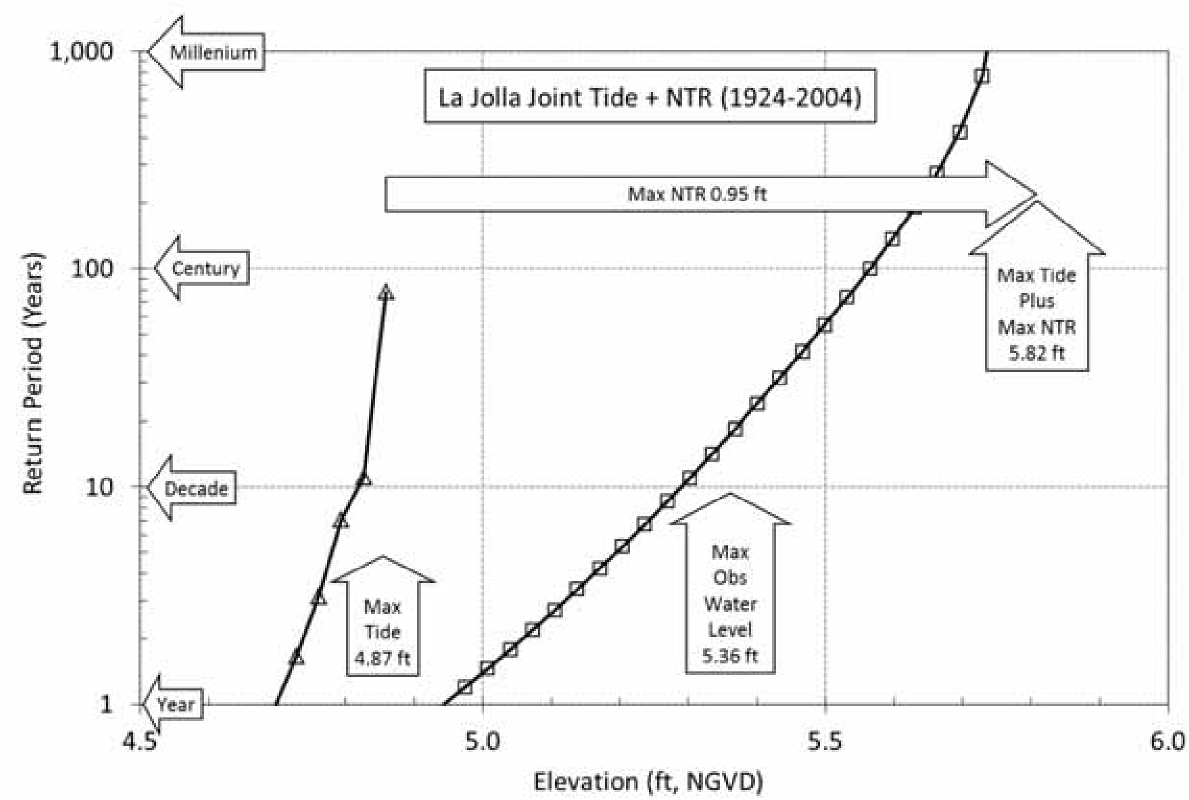


Figure 18. Historical elevation return-period curves based on La Jolla tide gauge data for tide (triangles, left) and joint occurrence of tide plus NTR (squares, right).

While many sea-level rise scenarios have been published, the California Coastal Commission, on August 12, 2015, adopted their Sea Level Rise Policy Guidance document, which provides contemporary best available science and sea level rise projections from the Third National Climate Assessment (NCA; Melillo, et al.), released in 2014, providing a set of four global sea level rise scenarios ranging from 8 inches to 7 feet by the year 2100, reflecting different amounts of future greenhouse gas emissions, ocean warming, and ice sheet loss. While the Coastal Commission's Sea Level Rise Policy Guidance document does not provide direction on the selection of a sea level rise, they do require that studies at least address the impacts of the four NCA scenarios, and then ultimately choose a sea level rise scenario as a basis for design and provide justification for that design scenario. Accordingly, and while we have evaluated the four NCA scenarios, we have selected a 75-year design life extending out to the year 2092 corresponding to an MSLR of 3 feet by 2100 consistent with the midpoint of the 2012 NAS data, as shown on Figure 13. Moreover, since the 2014 National Climate Assessment suggests future sea level rise estimates ranging from 1 to 4 feet, or 0.3 to 1.2 meters, this seems consistent with the Coastal Commission's suggested MSLR scenarios ranging from Lowest to Intermediate-High. Additional discussion on the effects of sea level rise is provided in Section 7.3, Seawall Performance.

7.2 Design MSLR Scenario

As indicated previously, the California Coastal Commissions' Sea Level Policy Guidance document requires acknowledging the Coastal Commission's current range in suggested sea level rise scenarios, and then the selection of a design sea level rise scenario for the proposed project. We have reproduced as Figure 19 the Coastal Commission's four suggested sea level rise scenarios through the year 2100, ranging from the Lowest at 0.2 meter, to the Highest at 2.0 meters, measured from the 1992 baseline. Global mean sea level rise scenarios used in the 2014 U.S. National Climate Assessment (Melillo, et al., 2014) concluded that "global sea level has risen by about 8 inches since reliable recordkeeping began in 1880. It is projected to rise another 1 to 4 feet by the year 2100." Based on recent discussions with Dr. Reinhard Flick, the State Oceanographer with the California Department of Boating and Waterways and a Research Scientist at Scripps Institution of Oceanography, global sea level has risen from 1993 through 2015 at a relatively uniform rate of 32 centimeters per century, or at the same trajectory as previously reported by Nerem (2005) and illustrated above in Figure 17. While Nerem's data extended from 1993 to 2005, the more recent recorded global sea level elevation change from 1993 to 2015 provides essentially the same data. This information is also shown on Figure 19, which from 1992 through 2015 has resulted in 7.36 centimeters of relatively uniform sea level rise in the past 23 years. If this uniform rate of sea level rise (consistent with that shown on Figure 19) were to extend out to the year 2100, this would be equivalent to a future mean sea level of 0.35 meter above the 1992 datum, and slightly above the Coastal Commission's suggested Lowest MSLR scenario.

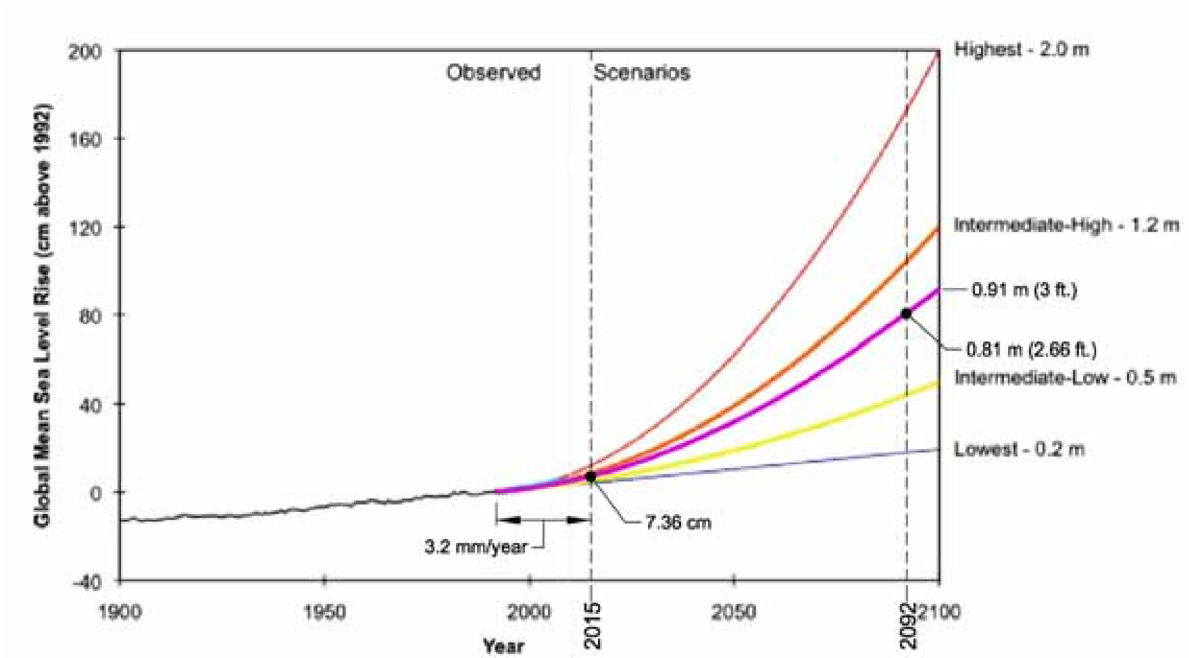


Figure 19. Modified from Figure 5 of the California Coastal Commission Sea Level Rise Policy Guidance document adopted August 12, 2015.

The real significance of the various MSLR scenarios is the rate of overtopping and the amount beyond which overtopping becomes objectionable. Regardless of the assumed MSLR scenario, future overtopping rates can be reduced by simply increasing the height of the structure or, if one does not exist, by adding a wave deflector to the top of the structure.

Recognizing that the 2014 National Climate Assessment suggests future sea level rise estimates ranging from 1 to 4 feet, or 0.3 to 1.2 meters, this seems consistent with the Coastal Commission's suggested MSLR scenarios ranging from Lowest to Intermediate-High. As a reasonable upper bound, we have chosen a design MSLR of 0.91 meter, or 3 feet, in the year 2100, which amounts to 2.66 feet in 75 years.

7.3 Seawall Performance

Given the existing seawall height of 15.1 feet NGVD 29, a certain amount of wave overtopping will occur during extreme high tide and high wave conditions (such as the January 1983 storm). The amount of overtopping is a function of several factors, including the height of the structure, the depth of scour at the base of the structure, the height of the SWL, the deep water wave height, the wave period, the direction and speed of any onshore winds, and, importantly, the extent of any future rise in sea level over the design life of the structure.

7.4 Design Stillwater

The maximum design still-water level (SWL) is critical to any wave analyses, as it determines the wave energy that can be propagated into the shoreline, eventually impacting and overtopping structures. It is the deep-water wave height superimposed upon the extreme SWL that defines the joint probability of the design storm condition, creating the largest wave forces on structures, along with the maximum runup and overtopping volume. In addition to tidal fluctuation, water levels at the shoreline are influenced by storm surge, wave setup, and surf beat. These influences, combined with the astronomical high tide, allow offshore storm waves to run up the elevated back beach and impact coastal structures. For the La Jolla area, excluding sea level rise, the likely maximum 100-year design stillwater level would be 6.8 feet NGVD 29 determined from Figure 18, as described previously, plus 1.2 feet to account for storm-induced wave runup. To account for sea level rise, we have used the criteria provided in Figure 19, assuming an MSLR scenario of 3 feet (91.4 cm) by the year 2100, or 2.66 feet for the 75-year project design life. In compliance with the California Coastal Commission, we have also evaluated MSLRs of 0.5m, 1.2m, and 2m.

7.5 Design Wave Height

Our evaluation of the maximum design wave for the subject structure is based on criteria set forth in the U.S. Army Corps of Engineers Shore Protection Manual (1984 Edition). As indicated above, we have used a design stillwater level of 6.8 feet NVGD 29, plus 2.66 feet for the design SLR condition. For purposes of computing the maximum wave height, we have also assumed a design scour elevation in front of the structure of -2 feet NGVD 29, and a foreshore slope of 1 to 50. The design scour elevation of -2 feet assumes that the bedrock shore platform elevation, currently estimated to be around elevation -1 foot NGVD 29, might experience upwards of 1 foot of additional scour during its design life.

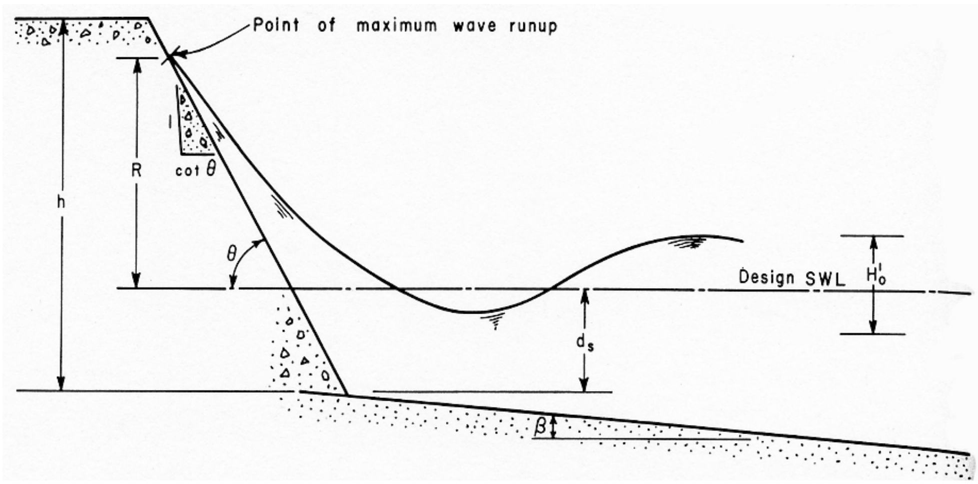
The maximum wave height that can reach the structure occurs during the period when the maximum depth of standing water exists in front of the structure, which includes both the maximum SWL combined with the maximum scour at the base of the structure. The maximum water depth at the base of the structure, d_s, for the various design scenarios are tabulated below. The resultant maximum breaking wave height occurs when a specific deep-water wave is allowed to shoal and break directly upon the structure. Using the design criteria set forth in the Army Corps of Engineers Shore Protection Manual, the design breaking wave height, H_b, is slightly less than d_s, also tabulated below.

Design Loading Condition	Assumed MSLR	Design SWL (ft, NGVD 29)	d_s, ft	H_b, ft	Design Condition
Case 1	0	6.8	6.8	6.3	1982-83 El Niño Storms
Case 2	0	6.8	8.8	7.9	Design w/no MSLR
Case 3	0.5m	8.44	10.44	9.3	Design w/0.5m MSLR in 2100
Case 4	0.81m	9.46	11.46	10.0	Project design w/3 ft MSLR in 2100
Case 5	1.2m	10.74	12.74	11.5	Design w/1.2m MSLR in 2100
Case 6	2m	13.36	15.86	12.9	Design w/2m MSLR in 2100

7.6 **Wave Runup and Overtopping Analysis**

Wave runup is defined as the rush of water up a beach or coastal structure that is caused by, or associated with, breaking waves. The maximum runup is the highest vertical elevation that the runup will reach above the stillwater level. If the maximum runup is higher than the top of a coastal structure, the excess represents overtopping. Runup elevation depends on the incident wave characteristics, the beach profile including profile elevation, and other factors. Most wave runup and overtopping analyses are based upon equations and nomographs provided in the U.S. Army Corps of Engineers Shore Protection Manual (SPM, USACE, 1984), and the more recent Internet-based Coastal Engineering Manual (Part VI-Chapter 5, 2006).

The following definition sketch for both wave runup and overtopping, reproduced from the 1984 SPM, graphically illustrates the point of maximum wave runup for a particular design condition.



Definition sketch: wave runup and overtopping

It should also be clear from the sketch that any wave runup exceeding the height of the structure then represents overtopping.

We evaluated both the maximum height of runup and volume of overtopping based on the U.S. Army Corps of Engineers 2006 Coastal Engineering Manual (CEM) for the various design scenarios tabulated above. We also assumed a design scour elevation of -2 feet and wave periods ranging from 6 to 20 seconds assuming storms out of the west, which resulted in the maximum design breaking wave heights tabulated above.

In assessing wave runup and overtopping values, we have analyzed the six separate cases summarized in the previous table for two different design site conditions. As indicated on the architectural drawings, there is a second-story saltwater pool at the northwest corner of the property having a top-of-pool bowl elevation of 22.3 feet NGVD 29, with the spa located near the westerly central portion of the property having a top-of-spa bowl elevation of 15.7 feet, with elevated planter walls on either side of the spa extending to elevation 22.3 feet. So in other words, discounting the perimeter walkways along the northerly and southerly property line accessing the beach from El Paseo Grande, there is an 8-foot-wide low point (the spa) at elevation 15.7 feet, with relatively tall planter walls on both sides extending to elevation 22.3 feet, with the northern wall supporting a second-floor pool.

While the 8-foot-wide spa is substantially more susceptible to wave overtopping, particularly for any elevated sea level rise scenarios, the architect has thoughtfully designed the planter walls and northwesterly pool wall to accommodate design wave forces from the design sea level rise event, and importantly, if considered necessary in the future, to incorporate a clear structural face on the westerly edge of the spa extending up to elevation 22.3 feet to substantially mitigate sea level rise.

As indicated in both the previous table and the table below, we also analyzed a more typical condition, one that is likely representative of the 1982-83 and the 1997-98 El Niño storm seasons. For this condition, we have assumed a lower design scour elevation of 0 feet NGVD 29, which we believe likely represented the worst-case storm conditions during either the 1982-83 or the 1997-98 El Niño storm seasons. This assumption results in the maximum depth at the base of the structure, d_s, of 6.8 feet, resulting in a maximum breaking wave height, H_b, of 6.3 feet. We have referred to the wave runup and overtopping analyses for this more typical current design condition as Case 1 for the 1982-83 El Niño for the 8-foot-wide spa condition having a top-of-spa elevation of 15.7 feet, and for the much taller pool/elevated planter walls at elevation 22.3 feet.

Given the preceding, the following table lists the calculated design wave runup elevation for the six design conditions, along with the calculated volume of overtopping, for both the shorter spa wall and the taller pool/planter wall. Summary calculations are also provided in Appendix A.

Design Condition	Maximum Design Wave Runup Elevation (feet)	Overtopping Volume Spa Wall (litres/s per m)	Overtopping Volume Pool Wall (litres/s per m)
Case 1	18.8	16.2	2.9
Case 2	23.3	36.4	6.5
Case 3	28.4	118.8	16.0
Case 4	31.4	239.2	25.5
Case 5	36.3	814.0(1)	59.1
Case 6	41.2	N/A	188.8

(1) Equations over-predict

As indicated in the above table, the pool wall significantly reduces the volume of calculated overtopping volumes. Importantly, the addition of a small wave deflector on the existing seawall will reduce all of the tabulated overtopping values by about 400 percent. To provide some additional perspective on overtopping volumes, we have included Figure 20, reproduced from the U.S. Army Corps of Engineers 2006 Coastal Engineering Manual for the pool/planter wall condition, both with and without the addition of a wave deflector on the existing seawall.

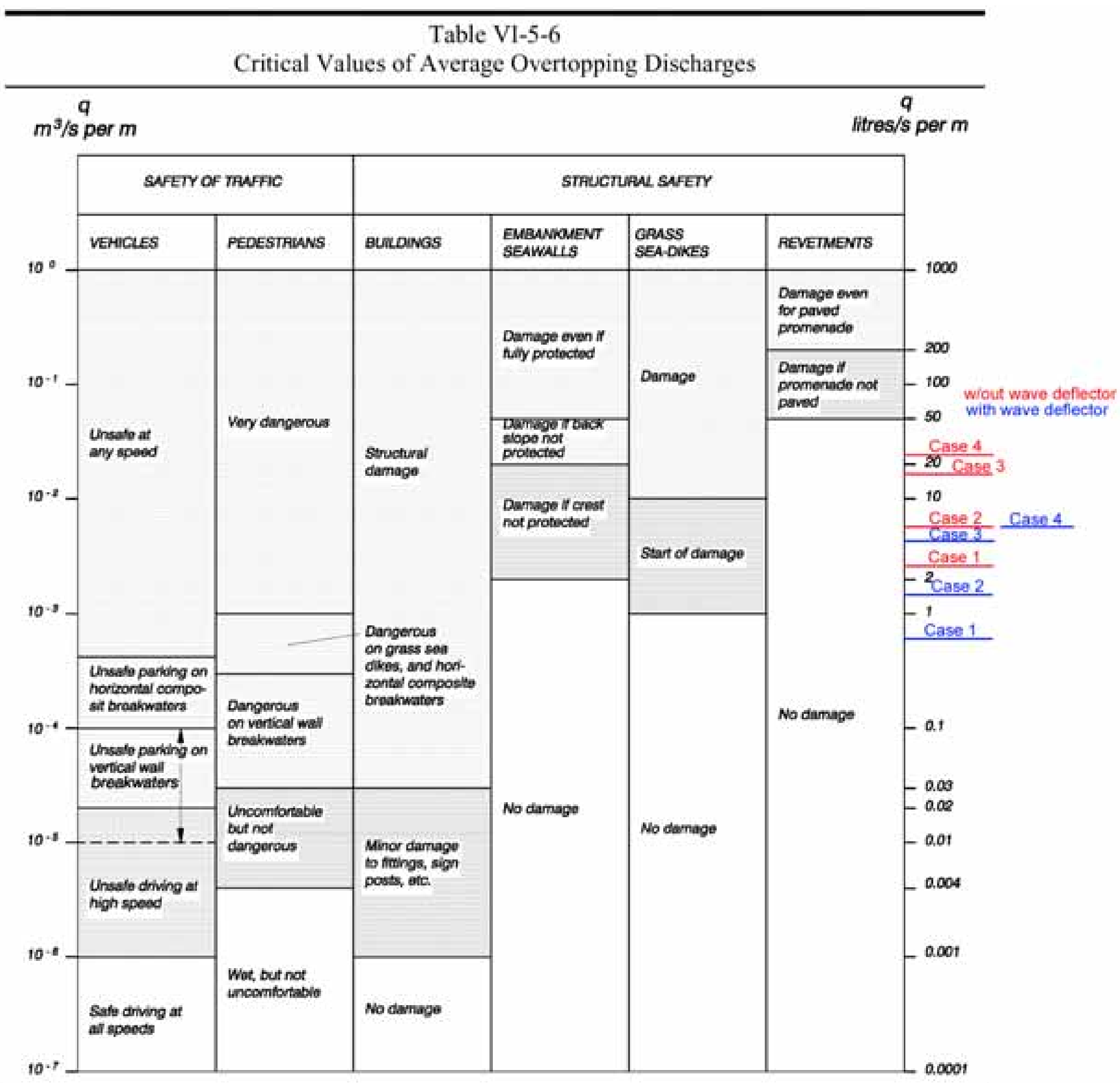
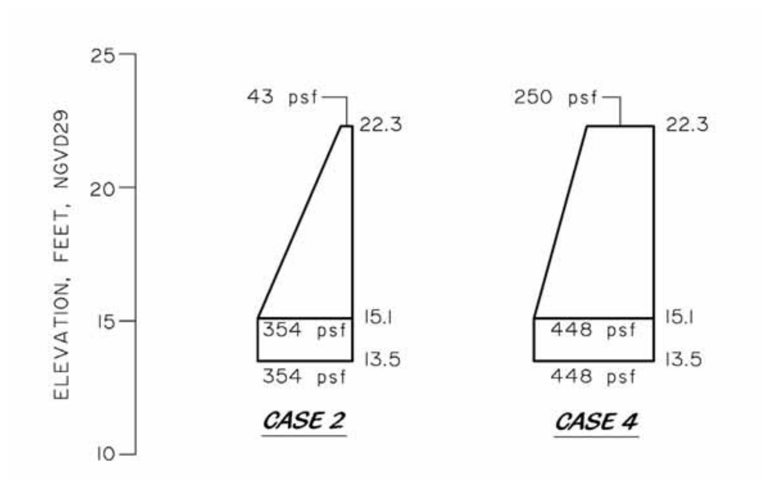


Figure 20. Results of Field Studies from Various Sources Evaluating Tolerable Overtopping Limits of Dikes and Revetments. Note that 1,000 litres/s per m = 4,830 GPM (Source: CEM 2006)

7.7 Wave-Induced Wall Loads

The types of wave forces on coastal structures can be classified as breaking, non-breaking, broken, and pulsating wall loads. Wave forces can be more specifically defined as very short duration hydrodynamic wave forces, much longer duration hydrostatic wave forces, and pulsating wave loads that consider both the hydrostatic plus the non-breaking dynamic wave force. While the hydrodynamic wave forces result in relatively high shock loads, these forces are very short in duration, lasting only a few thousandths to a few hundredths of a second and have little effect on structural improvements. Moreover, these hydrodynamic wave forces are limited to the existing seawall. Pulsating wave loads, combining both the hydrostatic plus non-breaking dynamic wave force, need to be considered in the structural evaluation of the pool/planter wall. The pressure distribution for the Case 2 and Case 4 design wave loads are illustrated below.



The proposed pool/planter wall should be designed to accommodate these pressure distributions.

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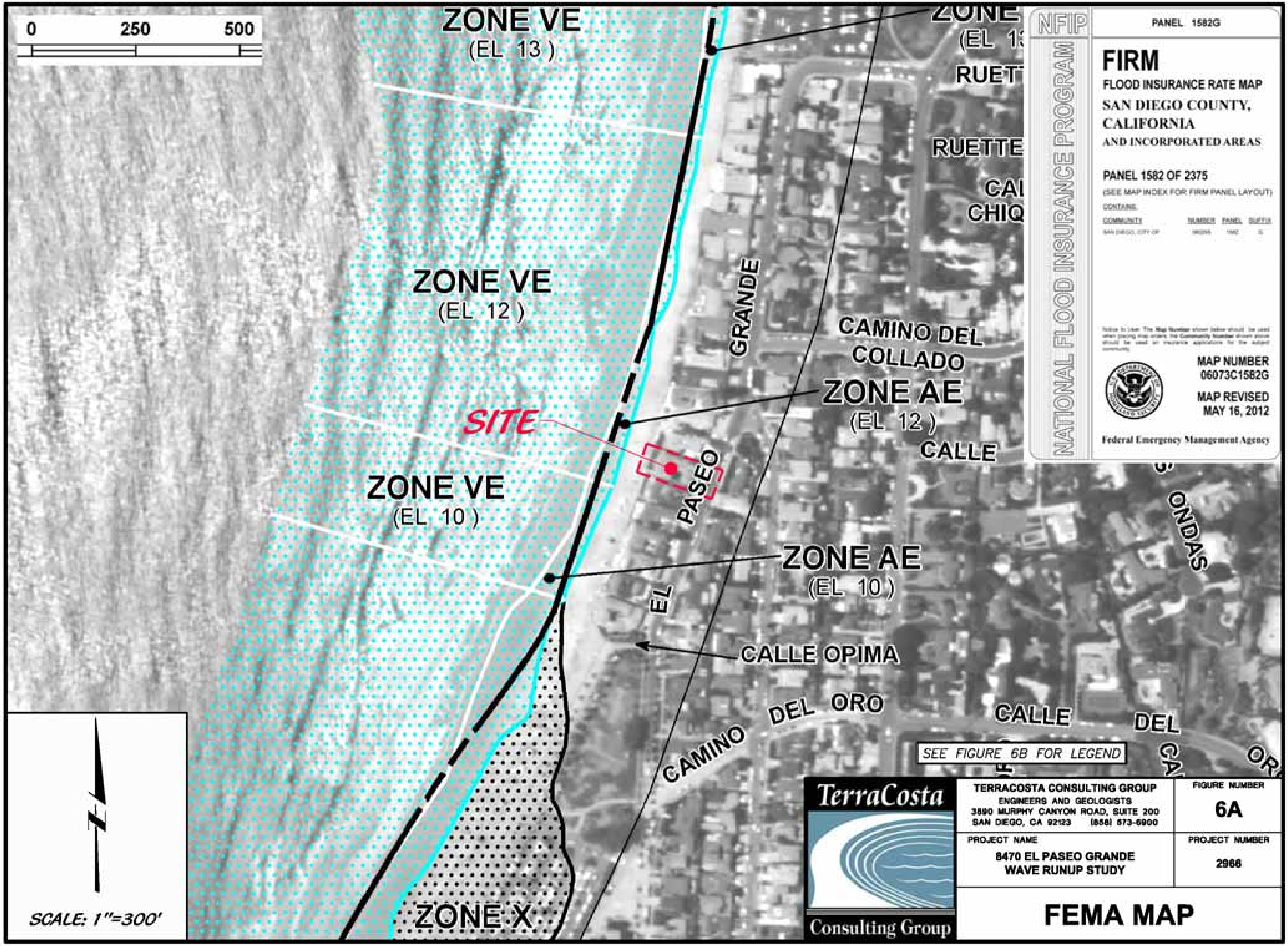

0
250
500
ZONE VE
(EL 13)
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ZONE VE
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SITE
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RUETTE
CHIQ
GRANDE
CAMINO DEL
COLLADO
CALLE
PASEO
EL
ONDAS
CALLE OPIMA
CAMINO DEL ORO
CALLE DEL
SEE FIGURE 6B FOR LEGEND
SCALE: 1"=300'
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 1582G
FIRM
FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY, CALIFORNIA
AND INCORPORATED AREAS
PANEL 1582 OF 2375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
06073C1582G
MAP REVISED
MAY 16, 2012
Federal Emergency Management Agency
TerraCosta
Consulting Group
TERRACOSTA CONSULTING GROUP
ENGINEERS AND GEOLOGISTS
3890 MURPHY CANYON ROAD, SUITE 200
SAN DIEGO, CA 92123 (858) 573-6900
FIGURE NUMBER
6A
PROJECT NAME
8470 EL PASEO GRANDE
WAVE RUNUP STUDY
PROJECT NUMBER
2966
FEMA MAP

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23)- - - - - - - -(23)	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE	1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 FT	5000-foot grid values: California State Plane coordinate system, Zone VI (FIPSZONE = 406), Lambert projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

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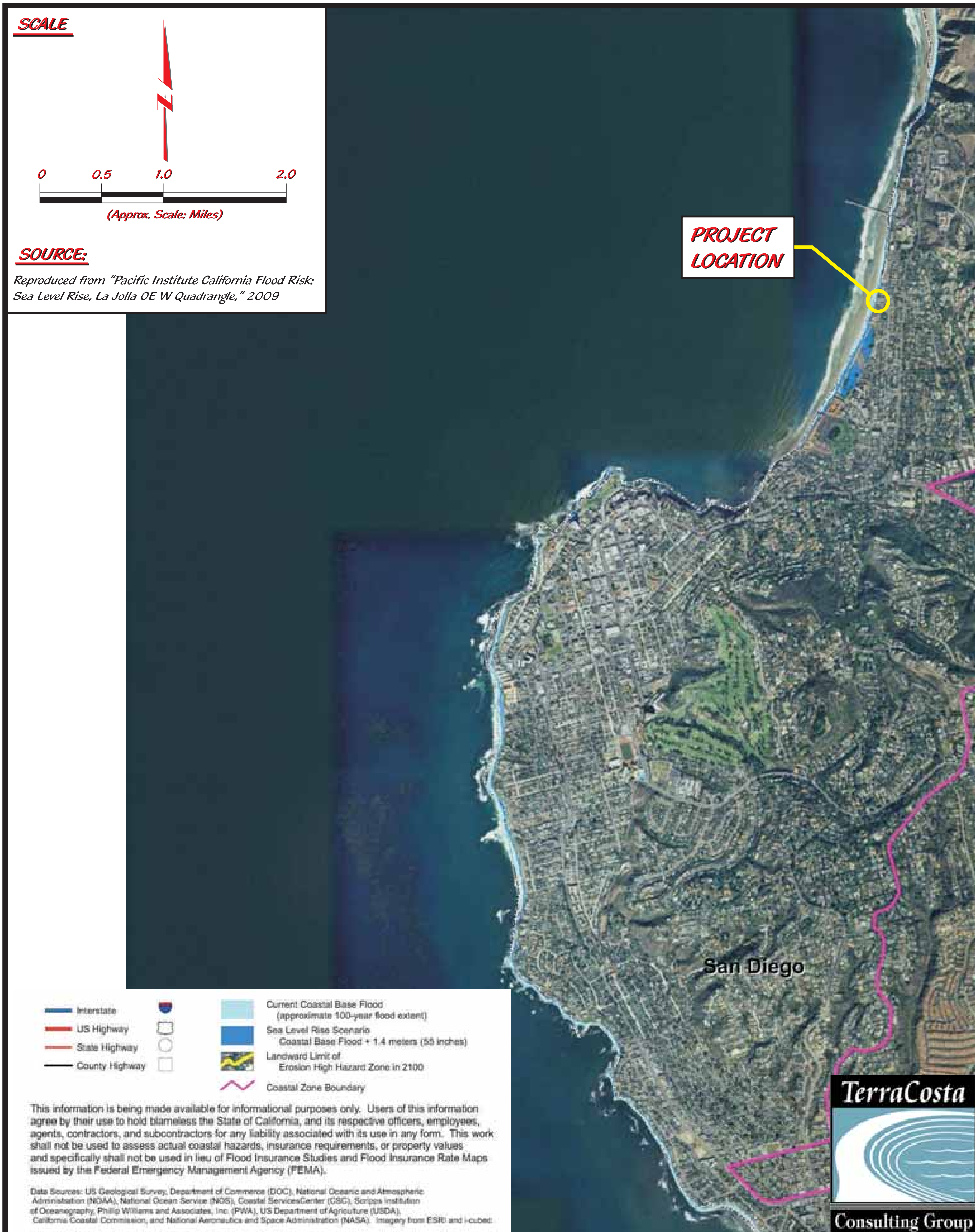
FIGURE NUMBER: 6B

PROJECT NAME: 8470 EL PASEO GRANDE WAVE RUNUP STUDY

PROJECT NUMBER: 2966

FEMA MAP LEGEND

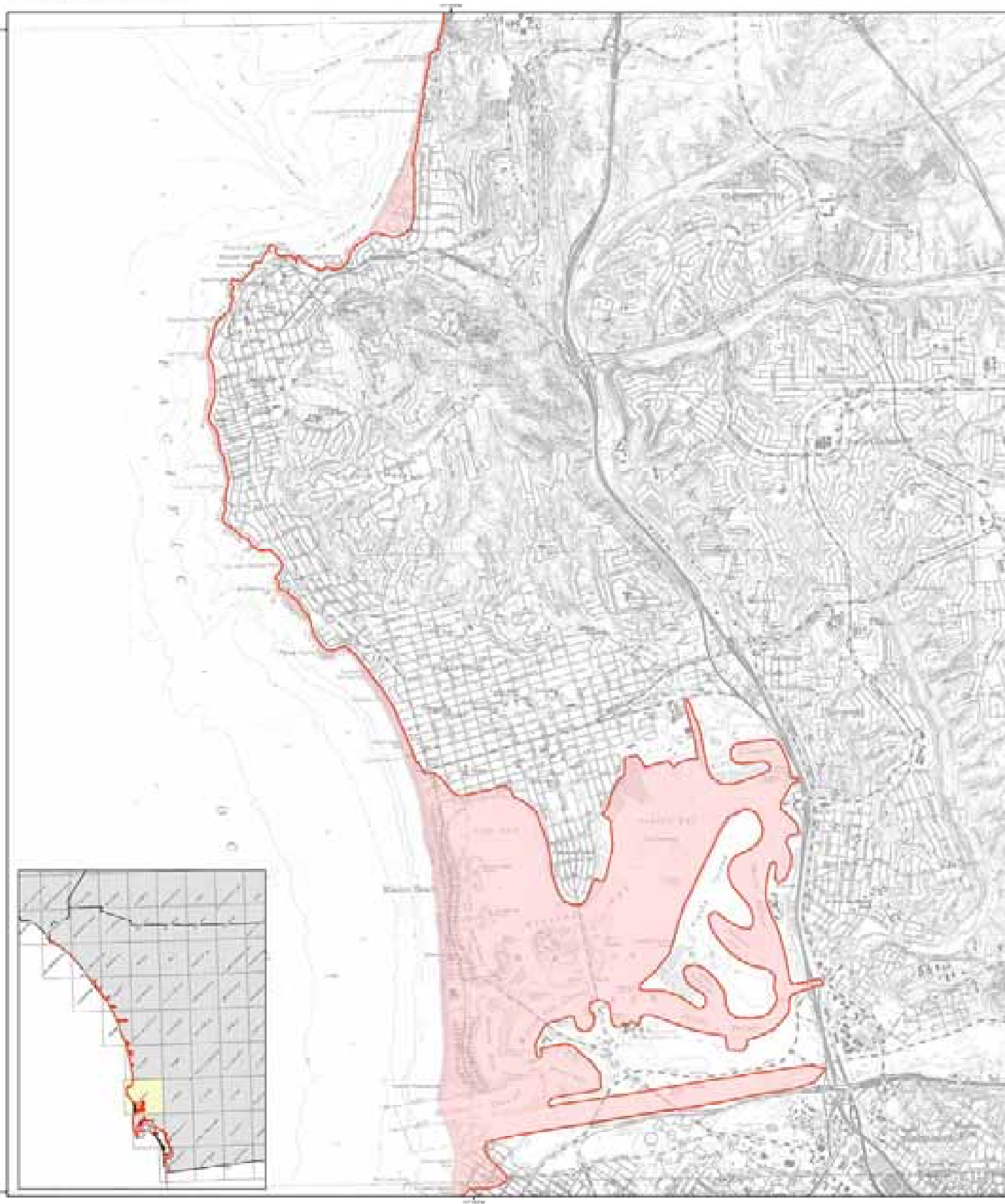


Project: 8470 El Paseo Grande, La Jolla　　Project No. 2966　　Figure No. 7

California Emergency Management Agency
California Geological Survey
University of Southern California

Tsunami Inundation Map for Emergency Planning
La Jolla Quadrangle

State of California
County of San Diego



TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of San Diego

LA JOLLA QUADRANGLE

June 1, 2009

SCALE 1:24,000

METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

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Table 1: Tsunami sources modeled for the San Diego County coastline.

Sources (M = moment magnitude used in modeled event)		Areas of Inundation Map Coverage and Sources Used: Dana Point	Oceanside	San Diego
Local Sources	Carlsbad Thrust Fault		X	X
	Catalina Fault	X	X	X
	Coronado Bank Fault			X
	Lasuen Knoll Fault	X		X
	San Clemente Fault Bend Region			X
	San Clemente Island Fault			X
	San Mateo Thrust Fault	X	X	
	Coronado Canyon Landslide #1			X
Distant Sources	Cascadia Subduction Zone #3 (M9.2)	X		X
	Central Aleutians Subduction Zone#1(M8.9)	X	X	X
	Central Aleutians Subduction Zone#2(M8.9)	X		X
	Central Aleutians Subduction Zone#3(M9.2)	X	X	X
	Chile North Subduction Zone (M9.4)	X		X
	1960 Chile Earthquake (M9.3)	X		X
	1952 Kamchatka Earthquake (M9.0)	X		
	1964 Alaska Earthquake (M9.2)	X	X	X
	Japan Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #3 (M8.8)	X		X
	Kuril Islands Subduction Zone #4 (M8.8)	X		X

MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

PURPOSE OF THIS MAP

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The inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami runup from a number of extreme, yet realistic, tsunami sources. Tsunamis are rare events; due to a lack of known occurrences in the historical record, this map includes no information about the probability of any tsunami affecting any area within a specific period of time.

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http://www.oes.ca.gov/WebPage/oeswebsite.nsf/Content/B1EC51BA215931768825741F005E8D80?OpenDocument

University of Southern California – Tsunami Research Center:
http://www.usc.edu/dept/tsunamis/2005/index.php

State of California Geological Survey Tsunami Information:
http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/index.htm

National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model):
http://nctr.pmel.noaa.gov/time/background/models.html

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

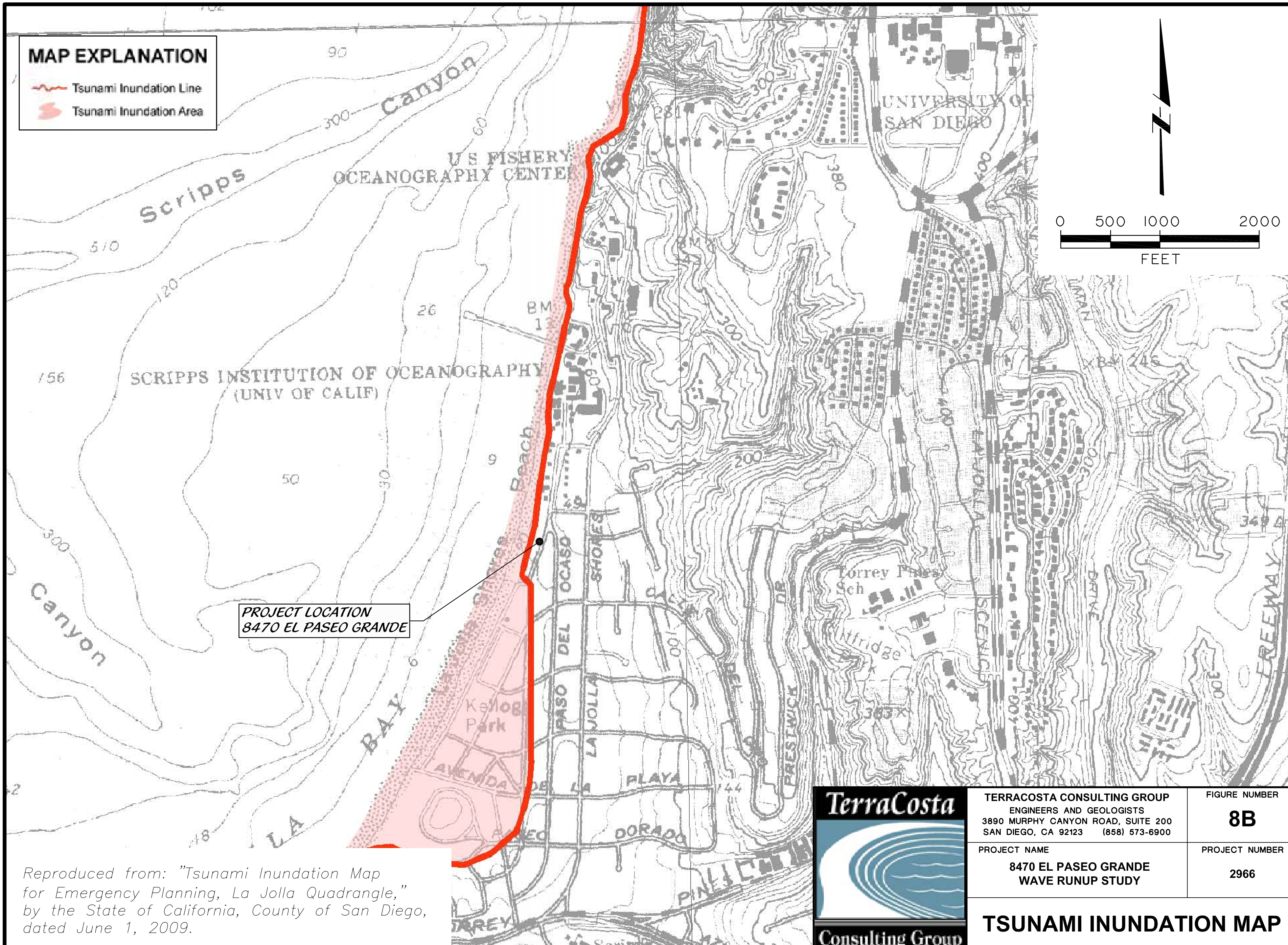
The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation [illegible]

TerraCosta Consulting Group

FIGURE NUMBER
8A

PROJECT NUMBER
2966

TSUNAMI INUNDATION MAP
DEL MAR



Reproduced from: "Tsunami Inundation Map for Emergency Planning, La Jolla Quadrangle," by the State of California, County of San Diego, dated June 1, 2009.

TerraCosta Consulting Group

TERRACOSTA CONSULTING GROUP
ENGINEERS AND GEOLOGISTS
3890 MURPHY CANYON ROAD, SUITE 200
SAN DIEGO, CA 92123 (858) 573-6900

FIGURE NUMBER	8B
PROJECT NAME: 8470 EL PASEO GRANDE WAVE RUNUP STUDY	PROJECT NUMBER: 2966

TSUNAMI INUNDATION MAP

TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of San Diego

LA JOLLA QUADRANGLE

June 1, 2009

METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

References:

Intermap Technologies, Inc., 2003, Intermap product handbook and quick start guide: Intermap NEXTmap document on 5-meter resolution data, 112 p.

Lander, J.F., Lockridge, P.A., and Kozuch, M.J., 1993, Tsunamis Affecting the West Coast of the United States 1806-1992: National Geophysical Data Center Key to Geophysical Record Documentation No. 29, NOAA, NESDIS, NGDC, 242 p.

National Atmospheric and Oceanic Administration (NOAA), 2004, Interferometric Synthetic Aperture Radar (IfSAR) Digital Elevation Models from GeoSAR platform (EarthData): 3-meter resolution data.

Titov, V.V., and Gonzalez, F.I., 1997, Implementation and Testing of the Method of Tsunami Splitting (MOST): NOAA Technical Memorandum ERL PMEL – 112, 11 p.

Titov, V.V., and Synolakis, C.E., 1998, Numerical modeling of tidal wave runup: Journal of Waterways, Port, Coastal and Ocean Engineering, ASCE, 124 (4), pp 157-171.

U.S. Geological Survey, 1993, Digital Elevation Models: National Mapping Program, Technical Instructions, Data Users Guide 5, 48 p.

SCALE 1:24,000

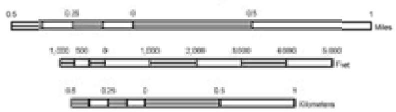


Table 1: Tsunami sources modeled for the San Diego County coastline.

Sources (M = moment magnitude used in modeled event)		Areas of Inundation Map Coverage and Sources Used		
		Dana Point	Oceanside	San Diego
Local Sources	Carlsbad Thrust Fault		X	X
	Catalina Fault	X	X	X
	Coronado Bank Fault			X
	Lasuen Knoll Fault	X		X
	San Clemente Fault Bend Region			X
	San Clemente Island Fault			X
	San Mateo Thrust Fault	X	X	
	Coronado Canyon Landslide #1			X
Distant Sources	Cascadia Subduction Zone #3 (M9.2)	X		X
	Central Aleutians Subduction Zone#1 (M8.9)	X	X	X
	Central Aleutians Subduction Zone#2(M8.9)	X		X
	Central Aleutians Subduction Zone#3(M9.2)	X	X	X
	Chile North Subduction Zone (M9.4)	X		X
	1960 Chile Earthquake (M9.3)	X		X
	1952 Kamchatka Earthquake (M9.0)	X		
	1964 Alaska Earthquake (M9.2)	X	X	X
	Japan Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #2 (M8.8)	X		X
	Kuril Islands Subduction Zone #3 (M8.8)	X		X
	Kuril Islands Subduction Zone #4 (M8.8)	X		X

Cal EMA

CGS CALIFORNIA GEOLOGICAL SURVEY

USC UNIVERSITY OF SOUTHERN CALIFORNIA

MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

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State of California Geological Survey Tsunami Information:
http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/index.htm

National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model):
http://nctr.pmel.noaa.gov/time/background/models.html

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DISCLAIMER

The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the State of California nor USC shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.

TerraCosta Consulting Group	TERRACOSTA CONSULTING GROUP ENGINEERS AND GEOLOGISTS 3890 MURPHY CANYON ROAD, SUITE 200 SAN DIEGO, CA 92123 (858) 573-6900	FIGURE NUMBER 8C
	PROJECT NAME 8470 EL PASEO GRANDE WAVE RUNUP STUDY	PROJECT NUMBER 2966
	TSUNAMI INUNDATION MAP LEGEND	

APPENDIX A

SUMMARY CALCULATIONS

TerraCosta
Consulting Group

8470 EL PASEO GRANDE
OVERTOPPING ANALYSES

d_s	T	d_s/gT^2	H_b/d_s	H_b	h*	R_c	h^*R_c/H_b	q/-----	q - cfs/ft	q - gpm/ft	q - liters/s per m	
6.8	6	0.0059	0.92	6.3	0.040	8.9	0.057	1.08	0.174	78	16.2	1982-83 El Nino
6.8	10	0.0021	0.96	6.5	0.014	8.9	0.019	33.35	0.641	288	59.6	
6.8	14	0.0011	0.98	6.7	0.007	8.9	0.009	305.19	1.465	658	136.2	
6.8	6	0.0059	0.92	6.3	0.040	15.5	0.099	0.19	0.031	14	2.9	1982-83 El Nino
6.8	10	0.0021	0.96	6.5	0.014	15.5	0.033	5.97	0.115	52	10.7	
6.8	14	0.0011	0.98	6.7	0.007	15.5	0.016	54.66	0.262	118	24.4	
8.8	6	0.0076	0.90	7.9	0.053	8.9	0.060	0.94	0.392	176	36.4	Design w/no SLR
8.8	10	0.0027	0.96	8.4	0.018	8.9	0.019	33.35	1.580	709	146.9	
8.8	14	0.0014	0.98	8.6	0.009	8.9	0.009	305.19	3.613	1,622	335.7	
8.8	6	0.0076	0.90	7.9	0.053	15.5	0.104	0.17	0.070	31	6.5	Design w/no SLR
8.8	10	0.0027	0.96	8.4	0.018	15.5	0.033	5.97	0.283	127	26.3	
8.8	14	0.0014	0.98	8.6	0.009	15.5	0.016	54.66	0.647	290	60.1	
10.44	6	0.0090	0.89	9.3	0.064	7.26	0.050	1.65	1.278	574	118.8	Design w/0.5M of SLR
10.44	10	0.0032	0.95	9.9	0.021	7.26	0.016	58.76	5.172	2,321	480.6	
10.44	14	0.0017	0.97	10.1	0.011	7.26	0.008	538.47	11.834	5,311	1099.7	
10.44	6	0.0090	0.89	9.3	0.064	13.86	0.095	0.22	0.172	77	16.0	Design w/0.5M of SLR
10.44	10	0.0032	0.95	9.9	0.021	13.86	0.030	7.92	0.697	313	64.7	
10.44	14	0.0017	0.97	10.1	0.011	13.86	0.015	72.54	1.594	716	148.2	
11.46	6	0.0099	0.87	10.0	0.071	6.24	0.045	2.29	2.574	1,155	239.2	Design w/0.81M of SLF
11.46	10	0.0036	0.94	10.8	0.024	6.24	0.014	87.98	10.962	4,920	1018.6	
11.46	14	0.0018	0.96	11.0	0.012	6.24	0.007	807.40	25.105	11,268	2332.9	
11.46	6	0.0099	0.87	10.0	0.071	12.84	0.092	0.24	0.275	123	25.5	Design w/0.81M of SLF
11.46	10	0.0036	0.94	10.8	0.024	12.84	0.028	9.40	1.171	525	108.8	
11.46	14	0.0018	0.96	11.0	0.012	12.84	0.014	86.22	2.681	1,203	249.1	
12.74	6	0.0110	0.90	11.5	0.077	4.96	0.033	5.77	8.760	3,932	814.0	Design w/1.2M of SLR
12.74	10	0.0040	0.94	12.0	0.026	4.96	0.011	179.26	32.352	14,521	3006.3	
12.74	14	0.0020	0.96	12.2	0.013	4.96	0.005	1645.02	74.094	33,256	6885.2	
12.74	6	0.0110	0.90	11.5	0.077	11.56	0.077	0.42	0.636	285	59.1	Design w/1.2M of SLR
12.74	10	0.0040	0.94	12.0	0.026	11.56	0.026	13.01	2.348	1,054	218.2	
12.74	14	0.0020	0.96	12.2	0.013	11.56	0.012	119.40	5.378	2,414	499.7	
15.36	6	0.0133	0.84	12.9	0.099	2.34	0.018	38.60	129.530	58,137	12036.6	Design w/2M of SLR
15.36	10	0.0048	0.93	14.3	0.032	2.34	0.005	1722.32	611.071	274,267	56784.1	
15.36	14	0.0024	0.95	14.6	0.016	2.34	0.003	15827.02	1400.826	628,733	130172.4	
15.36	6	0.0133	0.84	12.9	0.099	8.94	0.069	0.61	2.031	912	188.8	Design w/2M of SLR
15.36	10	0.0048	0.93	14.3	0.032	8.94	0.020	27.01	9.583	4,301	890.5	
15.36	14	0.0024	0.95	14.6	0.016	8.94	0.010	248.21	21.969	9,860	2041.5	

H_b/d_s ---> fig. 7-4 SPM.
$h^* = (d_s/H_b)(2*3.14159*d_s/g*T^2)$ ---> eq. 16.1 Handbook of Coastal and Ocean Engineering by Kim (2010)
R_c = freeboard, measured from top of wall to SWL
h^*R_c/H_b is only valid for computed values from 0.03 to 1.0. Over-predicts overtopping <0.04
q/------- ---> fig. 16.10 Handbook of Coastal and Ocean Engineering by Kim (2010)
q - cfs/ft --> eq. 16.4 Handbook of Coastal and Ocean Engineering by Kim (2010)

ATTACHMENT 7

SHORE PROTECTION ASSESSMENT
Prepared by GeoSoils, Inc.
Dated September 15, 2017

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way • Carlsbad, California 92010 • (760) 438-3155 • FAX (760) 931-0915 • www.geosoilsinc.com

September 15, 2017 WO S7350

Black Halibut, LLC
2313 Warmlands Avenue
Vista, CA 92084

SUBJECT: Shore Protection Assessment, 8470 El Paseo Grande, La Jolla, San Diego County, California.

REFERENCE: "Wave Runup/Sea Level Rise Study, 8470 El Paseo Grande, La Jolla California,"by TerraCosta Consulting Group, Inc. dated March 21, 2017.

Dear Black Halibut, LLC:

GeoSoils Inc. (GSI) is pleased to provide this letter report in response to your request for a shore protection assessment at 8470 El Paseo Grande, La Jolla. The purpose of this analysis is to provide the California Coastal Commission (CCC) the necessary information requested in a August 23, 2017 email from Alexander Llerandi, CCC Program Analyst, addressed to the City of San Diego. The site is currently developed with an existing residential structure fronted by a pre-Coastal Act walkway/seawall. The walkway is shared by the adjacent properties and is open to the public. The shore protection at the site is primarily the vertical concrete seawall with secondary protection by the ~3 feet high concrete retaining wall on the landward side of the walkway. Both the seawall and the retaining wall are on the subject property. The proposed project is to replace the existing residential structure with a new structure. The project is adjacent to La Jolla Shores Beach and the Pacific Ocean. Due to the project proximity to the ocean this type of development may be subject to coastal hazards from waves and wave overtopping flooding. The above referenced study by TerraCosta Consulting Group, Inc. (TCCG) investigated the potential for these hazards to impact the development over the next 75 years and determined that the site was reasonably safe from coastal hazards. The focus of this report is to assess the condition of the shore protection and the adequacy of the shore protection to protect the development over the next 75 years, including consideration of sea level rise (SLR).

SITE INSPECTION

The site, seawall, walkway, and retaining wall were inspected by the undersigned on September 13, 2017. In addition, the seawall fronting the site has been observed periodically by the undersigned for the last four decades while visiting the beach. The subject site is a rectangular shaped lot with the seaward side of the lot protected from extreme wave attack by a pre-Coastal Act seawall and walkway. Behind the seawall and walkway is a retaining wall that supports the site grades above +16.5 feet NGVD29. Figure 1 is an photograph of the seawall taken during the site inspection. There are no signs of deterioration of the seawall face such as spalling or reenforcing steel rusting. During the site inspection a 3 foot long " bubble level" was placed on the seawall in several locations. The seawall is vertical with no rotated or "out of plumb" sections. The seawall appears to have been maintained over the years. The base of the seawall was observed in March of 2016 when the beach fronting the site was severely eroded. The seawall is founded into an erosion resistant bedrock formation and no signs of undercutting were observed. Figure 2 shows the significant erosion along La Jolla Shores during the 2016 winter. Figure 1 shows that the beach has fully recovered from the March 2016 eroded conditions.

Figure 1. Subject seawall in September 2017 during inspection.

Figure 2. Significant erosion of the beach fronting the seawall in winter 2015 -2016. Note the dark bedrock formation fronting the site.

Based upon the previous 50 years of shoreline erosion in this area, there has been very minor down wearing of the formational material and perhaps in some locations, no down wearing at all. In summary, the beach sands will erode on a seasonal basis, but will also recover on a seasonal basis. The formational material is not fractured to a degree that reduces its resistance to erosion. The cast-in-place steel reinforced seawall is about 50 years old. The seawall has periodically been painted with an epoxy type marine paint. The seawall is in good condition and can be expected to perform as intended over the economic life (75 years), including sea level rise (SLR), as demonstrated by TCCG.

Behind the seawall is a concrete walkway and a ~3 feet high concrete retaining wall. This wall was also inspected during the September 2017 inspection. There are no signs of deterioration of the wall face such as spalling, water staining, or reenforcing steel rusting. During the site inspection a 3 foot long “ bubble level” was placed on the wall in several locations. The wall is vertical and true. The retaining wall appears to have been maintained over the years. Figure 3 shows the retaining wall during the site inspection.

Figure 3. Retaining wall on the landward side of the walkway during inspection.

In the future if waves overtop the seawall, this second wall will prevent wave runup from coming onto or impacting the site. TCCG calculated a seawall overtopping rate of 188 liters/s per meter (21.7 ft^3/s-ft) of seawall under the 2 meter (6.6 ft) SLR case. Using the TCCG calculated overtopping rate, the height of water(h_1) and the velocity (v_c)of this water can be calculated using the following empirical formulas provided by the USACOE (Protection Alternatives for Levees and Floodwalls in Southeast Louisiana, May 2006, equations 3.1 and 3.6) based upon the calculated overtopping rate q.

$$q = 0.5443\sqrt{g},h_1^{\ 3/2} \qquad\qquad v_c = \sqrt{\frac{2}{3}gh_1}$$

where g = 32.2 ft/sec^2

For SLR of 6.6 feet with an overtopping rate of 21.7 ft^3/s-ft, the water height h_1= 3.6 feet and the velocity v_c = 8.8 ft/sec. The water will go over the top of the seawall and down onto the walkway. This will be a pulse of water with each wave that overtops the seawall. The water will drop onto the walkway and lose its momentum. This amount of overtopping is not enough to go over the top of the retaining wall on the landward side of the walkway. In addition, this overtopping water will not damage the retaining wall. The water will drain back into the ocean thru the numerous drains in the seawall at the walkway elevation (see Figure 1). Future wave overtopping, with 6.6 feet of SLR will not impact the property.

CONCLUSIONS

- The existing seawall and retaining wall ('the shore protection") are in good condition.
- No additional protective devices will be necessary to protect the proposed development from any existing or anticipated future coastal hazards for the next 75 years or more.

RECOMMENDATIONS

Based upon the TCCG report and discussion herein, the proposed development is reasonably safe from coastal hazards for the next 75 years including shoreline movement, waves and wave runup, and flooding with future SLR. The proposed development will neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or adjacent area. There are no recommendations necessary for additional shore protection and it is very unlikely that any new form of shore protection will be needed in the next 75 years.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils Inc.

REGISTERED PROFESSIONAL ENGINEER
DAVID W. SKELLY
No. RCE 47857
Exp. 12-31-17
CIVIL
STATE OF CALIFORNIA

GeoSoils Inc.
David W. Skelly MS, PE