Appendix D Foundation Report, Osuna Segment of the Coast to Crest Trail Project

PRELIMINARY FOUNDATION REPORT

OSUNA TRAIL BRIDGE
AT SAN DIEGUITO RIVER
OSUNA SEGMENT OF COAST TO CREST TRAIL PROJECT
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

KIMLEY-HORN AND ASSOCIATES, INC.
SAN DIEGO, CALIFORNIA

JULY 27, 2021
PROJECT NO. G2680-22-01

Project No. G2680-22-01
July 27, 2021

Kimley-Horn and Associates, Inc.
401 B Street, Suite 600
San Diego, California 92101

Attention: Ms. Marie Santos

Subject: PRELIMINARY FOUNDATION REPORT
OSUNA TRAIL BRIDGE AT SAN DIEGUITO RIVER
OSUNA SEGMENT OF COAST TO CREST TRAIL PROJECT
SAN DIEGO, CALIFORNIA

Dear Ms. Santo:

In accordance with your request, we herein submit our Preliminary Foundation Report (PFR) for the subject Osuna Trail Bridge at San Dieguito River in San Diego, California. The accompanying report presents the findings and conclusions from our study.

We appreciate the opportunity to work with you on this project. Should you have questions concerning the contents of this report, or if Geocon may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Yong Wang
GE 2775

YW:JJV:arm

(e-mail) Addressee

Joseph J. Vettel
GE 2401

TABLE OF CONTENTS

PRELIMINARY FOUNDATION REPORT

1. INTRODUCTION

This Preliminary Foundation Report (PFR) presents the results of a geotechnical study for the proposed Osuna Trail Bridge at San Dieguito River in San Diego, California. The purpose of this study was to document the available data regarding the subsurface condition at the proposed bridge site, provide preliminary site-specific seismic recommendations, provide preliminary foundation recommendations, and identify the need for an additional field investigation and study.

Our scope of work included:

- Reviewing published geologic maps, aerial photographs, in-house documents, and other literature pertaining to the site to aid in the evaluation of geologic conditions and hazards that may be present.
- Reviewing currently available project information regarding the proposed Osuna Trail Bridge.
- Performing a field reconnaissance to note the general existing conditions of the project site and surrounding areas.
- Performing engineering analyses to evaluate site liquefaction potential, seismic design criteria, and foundation design criteria.
- Preparing this PFR in general accordance with the Caltrans *Foundation Reports for Bridges* (January 2021).

2. PROJECT DESCRIPTION

Preliminary project plans regarding the proposed bridge are being developed at the time of preparing this PFR. Based on the currently available project information and *Osuna Valley Trail Bridge Feasibility Study*, prepared by Kleinfelder, dated August 2015, the proposed Osuna Trail Bridge site is located approximately 1,700 feet east of Via De La Valle, and within the northern limits of the City of San Diego south of the County of San Diego, as shown on the *Vicinity Map* (see Figure 1). The Osuna Trail Bridge will span over the San Dieguito River (US Waters) at the downstream side of the existing golf cart bridge of the Morgan Run Club and Resort. For the purpose of this PFR, the approximate site coordinates used for the bridge are 32.98536° (latitude) and -117.21156° (longitude).

The general configuration of the project site is shown on Figure 2 (*Site Plan*). We understand from the current available project information that a single-span, prefabricated steel bridge is being considered for the proposed crossing to provide an elevated boardwalk connecting the trail along the adjacent wetland and riparian areas. We further understand that shallow and deep foundations are being considered for the support of the proposed bridge.

The existing surface elevations of the project site are generally ranging between 15 to 25 feet (NAVD88). The project vertical datum is based on NAVD 88.

3. EXCEPTION TO POLICES AND PROCEDURES

Unless otherwise stated in this PFR, this study and the preliminary recommendations contained herein are in general conformance with current Caltrans specification and policy.

4. GEOTECHNICAL INVESTIGATION

Geotechnical investigation for this proposed bridge has not been performed at this time. For the purposes of this PFR, we have reviewed the available log of one adjacent boring drilled in 2018. The boring was drilled for a then proposed recycled water line of Olivenhain Municipal Water District (OMWD) installed beneath the San Dieguito River via horizontal directional drilling (HDD). The boring log, limited details of the exploration, and associated project plans are included in Appendices A and C of this PFR.

5. LABORATORY TESTING PROGRAM

No laboratory testing program and data are available for review at the time of preparing this report.

6. GEOTECHNICAL CONDITIONS

6.1 Geology

Geologic Map of The San Diego 30' x 60' Quadrangle shows that the site is underlain by young alluvial flood-plain deposits (Holocene and late Pleistocene) and the San Dieguito River channel is filled with wash deposits (late Holocene). The *Regional Geologic Map* is shown on Figure 3.

6.2 Surface Conditions

The San Dieguito River is a 100-yr floodway per FEMA Map. The adjacent riparian area and wetland are located within the 100-yr floodplain that is generally covered with dense brush and trees. The existing site topography generally consists of flat to sloping terrains. The open water within the San Dieguito River channel is collected from the upstream watershed areas and flows downstream southwestward. Based on the project plans in Appendix C, the approximate elevations of the water surface and the river channel bottom are expected to be around 14.3 feet (NAVD 88) and 9.6 feet (NAVD 88), respectively.

The project site is located within the City of San Diego and near the boundary line of County of San Diego at the north. An existing golf cart bridge is located on the upstream side of the site. In addition, an 8-inch-diameter recycled water line is installed beneath the San Dieguito River at approximate 50 feet deep via trenchless construction method. Besides the floodplain and the potential for seismic induced liquefaction and/or lateral spreading, no other geologic hazards have been identified at this time.

6.3 Subsurface Conditions

Based on a review of the previous boring log (Appendix A) for the adjacent recycled water line project and our experiences in the area, the subject site is likely underlain by thick young alluvial deposits in the San Dieguito River Basin overlying Eocene-age Torrey Sandstone.

The alluvial soil generally consists of very loose to loose, poorly-graded sand and silty sand with varying amounts of gravel, and interbeds of soft clay and silt with sand. The alluvium encountered in the previous boring extended approximately 120 feet below the grade. Besides the potential for liquefaction and lateral spreading as discussed in Section 11, the fine portions of the alluvium would be compressible and could result in consolidation settlement under additional loading condition. The Torrey Sandstone generally consists of weathered sandstone and mudstone.

The depth to rock-like materials in the proposed bridge area is expected to be on the order of 120 to 130 feet below the existing grade.

7. GROUNDWATER

Groundwater was depicted on the log of the previous drilled boring for the recycled water line project in 2018. Assuming the approximate ground surface elevation of 25 feet (NAVD 88) at the previous boring location, the groundwater level encountered in the boring was 13 feet below the grade, or at the approximate elevation of 12 feet (NAVD 88). In the zone adjacent to the river channel, the groundwater level may be near the water level in the open channel. Therefore, groundwater in the project area is likely between elevations of 12 and 14 feet (NAVD 88).

8. AS-BUILT DATA

There is no existing bridge at the subject site. Therefore As-Built data is not applicable for this PFR.

9. SCOUR DATA

The site is located within the tributary drainage channel margins (San Dieguito River). The scour evaluation should refer to the project hydraulic/hydrologic report. The bridge supports should be founded below the maximum anticipated depth of scour at channel crossings.

10. CORROSION EVALUATION

According to Caltrans Corrosion Guidelines (Version 3.2, May 2021), a site is considered corrosive to structural elements if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: chloride concentration is 500 ppm or greater, sulfate concentration is 1500 ppm or greater, or the pH is 5.5 or less. Caltrans LRFD Memo to Designer 3-1 (MTD 3-1, June 2014) provides the similar criteria with an additional condition that the soil has a minimal resistivity of 1000 ohm-centimeters or less.

Historical corrosion data is not available for this site. The preliminary evaluation of the corrosion potential of onsite soil should be incorporated into the scope of future geotechnical investigation for this project.

11. SEISMIC INFORMATION

11.1 Ground Motion Hazard

A design response spectrum for the proposed structure at the site was developed in accordance with the probabilistic data generated by the Caltrans *ARS Online* application (Version 3.0.2) and Appendix B of Seismic Design Criteria (Version 2.0). Site-specific information used in the procedure included the latitude of 32.9854° and the longitude of -117.2116°. The site is not located within a deep sedimentary basin per Caltrans *ARS Online*. The recommended ground motion parameters are listed in Table 11.1 below:

TABLE 11.1
RECOMMENDED GROUND MOTION PARAMETERS FOR GEOTECHNICAL DESIGN

Site Parameters			**Design Ground Motion Parameters (Return Period = 975 years)**		
Locations		Shear-Wave Velocity Vs30, m/sec	Horizontal Peak Ground Acceleration (HPGA) [1], g	Mean Earthquake [2] M, Moment Magnitude	Mean Site-to-Fault/Rupture Surface Distance [2] Rrup, km
Latitude, degrees	Longitude, degrees				
32.9854	-117.2116	180	0.37	6.6	36.5

1. Based on the Caltrans web tool ARS Online (Version v3.0.2).

2. Based on hazard de-aggregation analysis for the design of HPGA using the web based USGS Uniform Hazard Tool (Edition: Dynamic: Conterminous U.S. 2014 (Updated) (V4.2.0)).

The soil profile below the bridge foundation is generally expected to consist of granular soils with potential for liquefaction, lateral spreading, or scour. The fine portions of the alluvium (silts and clays) would be compressible and result in consolidation settlements under additional loads. The characteristics of the onsite soils are not expect to meet the criteria for competent soils (Class S1) per

Seismic Design Criteria (Version 2.0) with respect to the standard penetration test data and shear wave velocity. We recommend the onsite soil profile be classified as the non-competent, marginal soils (Class S2). For a preliminary estimate of the site controlling horizontal peak ground acceleration (HPGA), a shear wave velocity, Vs30 of approximately 180 m/sec is considered appropriate for the soil profile based on the subsurface conditions encountered in the previous exploratory boring (Appendix A) near the subject site. Some details associated with the previous boring such as the type of drill rig used, drilling methods, and the energy ratio of the hammer used for the Standard Penetration Test (SPT) are not available at this time. For the purpose of this PFR, some assumptions were made based on the lithology descriptions provided by the boring log.

The *Design Response Spectrum* developed from Caltrans *ARS Online* application (Version 3.0.2) based on the USGS Seismic Hazard Map (2014) for the 5% in 50 years probability of exceedance (or 975-year return period) is included in Appendix B of this PFR. The HPGA generated by the design spectrum is 0.37g (where "g" represents the acceleration due to gravity). The seismic design date obtained from Caltrans *ARS Online (Version 3.0.2)* is also included in Appendix B.

The preliminary data included in this PFR will be verified during the pending investigation for the project Foundation Report (FR).

11.2 Other Seismic Hazards

The site is not located within an Alquist-Priolo Earthquake Fault Zone or 1000 feet from any Holocene or younger age fault. Therefore, per MTD 20-10, the proposed structure is not considered susceptible to surface fault rupture hazards.

Due to the presence of loose and soft alluvial materials and shallow groundwater beneath the site, the potential for soil liquefaction is present at the site. The liquefiable zone at the site extends from approximate elevation of 12 feet NAVD 88 (groundwater level) to approximate elevation of -97 feet NAVD 88 (bottom of alluvium). The liquefaction-induced settlement of the ground surface is expected on the order of 30 inches.

There is a potential for lateral spreading of the embankment slope towards the river channel due to the presence of liquefiable soils at this site. Further evaluation would be performed during the pending geotechnical investigation for FR, when the general configuration of the proposed embankments and specific geotechnical data become available.

Planned earthwork may include fill slopes along portions of the approach embankments or abutments. Assuming that fill materials meet Caltrans' specifications for structural backfill of 2:1 (horizontal:vertical), we expect the proposed abutment slopes should have adequate factors of safety

against deep-seated and shallow failures under the static and pseudo-static (seismic) loading (a horizontal seismic load of 1/3 HPGA up to 0.20g). The further analysis together with the potential for seismically induced horizontal deformations/displacements would be evaluated (based on the recommended design parameters including the HPGA of 0.37g and earthquake magnitude (moment) of 6.6) during the pending geotechnical investigation for FR, when the general configuration of the proposed embankments and specific geotechnical data become available.

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The site is not located within the tsunami inundation area shown on *California Official Tsunami Inundation Map for Emergency Planning, County of San Diego County, Del Mar Quadrangle (June 1, 2009)*. Based on the above information and per MTD 20-13, a the potential for tsunami does not exist at the site.

12. GEOTECHNICAL RECOMMENDATIONS

The proposed trail bridge is located within the wetland and riparian areas of San Dieguito River. The thick alluvial deposits underlying the site are loose and soft and therefore provide relatively low bearing resistance. Settlement would be expected for structures supported by the onsite alluvium under additional loads. In the event of a major earthquake, liquefaction-induced settlement and the potential for lateral spreading should be expected at the site.

A trail bridge is a structure that is typically designed for the traffic of pedestrian, bike, equestrian, and occasional service vehicle. The risk category associated with a trail bridge would be relatively low as compared with critical and/or essential facilities. It is our opinion that site mitigation for the potential liquefaction and/or lateral spreading via deep foundation and/or ground improvement are technically feasible but not likely economical for the proposed trail bridge.

A site specific geotechnical investigation for the proposed bridge has not been performed and the preliminary project plans are not available at this time. A specific geotechnical investigation and laboratory testing program for the bridge FR should be performed in general accordance with Caltrans guidelines. The future investigation should include at least one boring at each proposed abutment location and extending into the underlying formation. For the purpose of this PFR, we have assumed that the finished grade elevation and the groundwater level in the proposed abutment areas would be approximately 25 feet (NAVD 88) and 14 feet (NAVD 88), respectively. Our preliminary foundation recommendations are provided in the following sections.

12.1 Shallow Foundations

We recommend spread footings for the support of the proposed bridge abutments. The alluvial deposits in their present condition are not suitable for the support of additional structural fill soils and/or settlement-sensitive improvements: therefore, the alluvial deposits above groundwater should be removed (where practical) and recompacted. To provide a relatively uniform support, the upper 3 feet of soil below the proposed abutment footings should be replaced with structure fill and/or slurry. Excavation bottom stabilization with a geotextile fabric and crushed rock blanket maybe necessary. Surcharge should also be considered to mitigate the settlement of the foundation soil.

The following tables provide the preliminary foundation recommendations. Permissible settlement of 1.5 inches is estimated based on the assumed footing dimensions under the net contact stress of 1.2 kips per square foot (ksf). The differential settlement would be 50 percent of the estimated total settlement.

TABLE 12.1.1
FOUNDATION DATA

Support Location	Finished Grade Elevation (ft)	Bottom of Footing Elevation (ft)	Footing Dimensions (ft)		Permissible Settlement under Service Load (in)*
			B	L	
Abutment 1	25	20	20	20	1.5
Abutment 2	25	20	20	20	1.5

* Based on Caltrans' current practice, the total permissible settlement of one inch for multi-span structures with continuous spans or multi-column bents, one inch for single span structures with diaphragm abutments, and two inches for single span structures with seat abutments. Different permissible settlement under services loads may be allowed if structure analysis verifies that required level of serviceability is met. The permissible settlement of 1.5 inches is assumed for this PFR.

TABLE 12.1.2
PRELIMINARY FOUNDATION DATA FOR ABUTMENTS

Support Location	Effective Footing Width B' (ft)	Gross Nominal Bearing Resistance q_n (ksf)	Permissible Net Contact Stress (Settlement) q_{pn} (ksf)	Factored Gross Nominal Bearing Resistance (Strength) qR (ksf)
Abutment 1	20	2.7	1.2	1.2
Abutment 2	20	2.7	1.2	1.2

Foundation Location: Soil; Friction Angle: 28°; permissible Settlement: 1.5 inches; Resistance factor (Strength) - φb: 0.45; Resistance Factor (Seismic) - φb: 1.0; Based on L' = 20 ft.

TABLE 12.1.3
FOUNDATION DESIGN RECOMMENDATIONS FOR SPREAD FOOTING

Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Minimum Footing Embedment Depth (ft)	Total Permissible Support Settlement (in)	Service Limit State	Strength Limit State (φ_b = 0.45)	Extreme Event Limit State (φ_b = 1.0)
	B	L				Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Abut 1	20	20	20	5	1.5	1.2	1.2	N/A
Abut 2	20	20	20	5	1.5	1.2	1.2	N/A

Foundation Location: Soil; Friction Angle: 28°; permissible Settlement: 1.5 inches; Resistance factor (Strength) - φb: 0.45; Resistance Factor (Seismic) - φb: 1.0; Based on L' = 20 ft.

12.2 Deep Foundations

Deep foundations typically consist of driven piles and/or CIDH concrete piles. Based on the currently available geotechnical data, the onsite thick alluvial deposits are loose and soft, and would not develop the adequate side and tip resistances along the piles. For appropriate load supports and settlement mitigation, the piles should be extended at least 10 or more feet into the underlying formational materials that are located approximately 120 to 130 feet below the existing grade. Therefore, we do not recommend a deep foundation system for the support of the proposed trail bridge based on the currently available data. The option of deep foundations should be furthered evaluated during the specific geotechnical investigation for the project FR.

12.3 Approach Fills

New fills are expected to establish finish grades for the proposed abutments. All grading should be performed in conformance with Caltrans Standard Specifications or equivalent. Backfill placed at and behind abutment walls should be have a low expansion potential. The extent and placement of the low-expansive soils should conform to Caltrans Standard Specifications 19-5.03. Backfill should have an Expansion Index (EI) no greater than 50, or a Sand Equivalent of 20 or greater. Ponding or jetting of backfill should not be permitted.

Backfill placed within the full width of the embankment and within 150 feet of the abutment is considered structural backfill. All structural backfill should be compacted to 95 percent of the maximum density as determined by ASTM D 1557. All compaction on the project should be based on this test method. All other backfill should be compacted to a minimum of 90 percent relative compaction. Existing undocumented fills and alluvial soils at expected abutment locations are not

adequate for the support of new fill loads, and partial removal and recompaction will be necessary prior to the placement of new structure backfill and foundation construction.

Surface settlements can be expected where substantial thicknesses of new fill will be placed. If calculated settlements will exceed allowable settlement, a waiting period or surcharge may be necessary. Further evaluation and recommendations can be provided when the specific geotechnical for the bridge FR and project plans regarding the proposed embankment configuration become available.

13. REPORT COPY LIST

This PFR is prepared for Kimley-Horn and Associates, Inc. in accordance with the project document procedure. The PFR should be forwarded to the Structural Designer of the project per Caltrans requirement.

14. CLOSURE

14.1 Foundation and Grading Plan Review

Geocon Incorporated should review the grading plans and foundation plans prior to final design submittal to determine whether additional analysis and/or recommendations are required.

14.2 Limitations and Uniformity of Conditions

The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that

supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials was not part of the scope of services provided by Geocon Incorporated.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

15. REFERENCES

1. California Department of Transportation, 2019, *California Amendments to AASHTO LRFD Bridge Design Specifications, 2017 (8th Edition),* dated April.

2. California Department of Transportation, 2021, *Foundation Reports for Bridges,* dated January.

3. California Department of Transportation, 2018, *Highway Design Manual (Sixth Edition).*

4. California Department of Transportation, 2015, *Memo to Designers 1-0,* dated January 26.

5. California Department of Transportation, 2012, *Methodology for Developing Design Response Spectrum for Use in Seismic Design Recommendations*, dated month of November.

6. California Department of Transportation, 2018, *Standard Plans,* undated.

7. United States Geological Survey (USGS), 2009, *Unified Hazard Tool*, 5% probability of being exceeded in 50 years, accessed October 14.

8. Kennedy, M. P., and S. S. Tan, *Geologic Map of the Oceanside 30' X 60' Quadrangle, California,* 2005,

9. Tan, S. S., and D. G. Giffen, *Landslide Hazards in the Northern Part of the San Diego County, California*, California Division of Mines and Geology, Open-File Report 95-04, 1995.

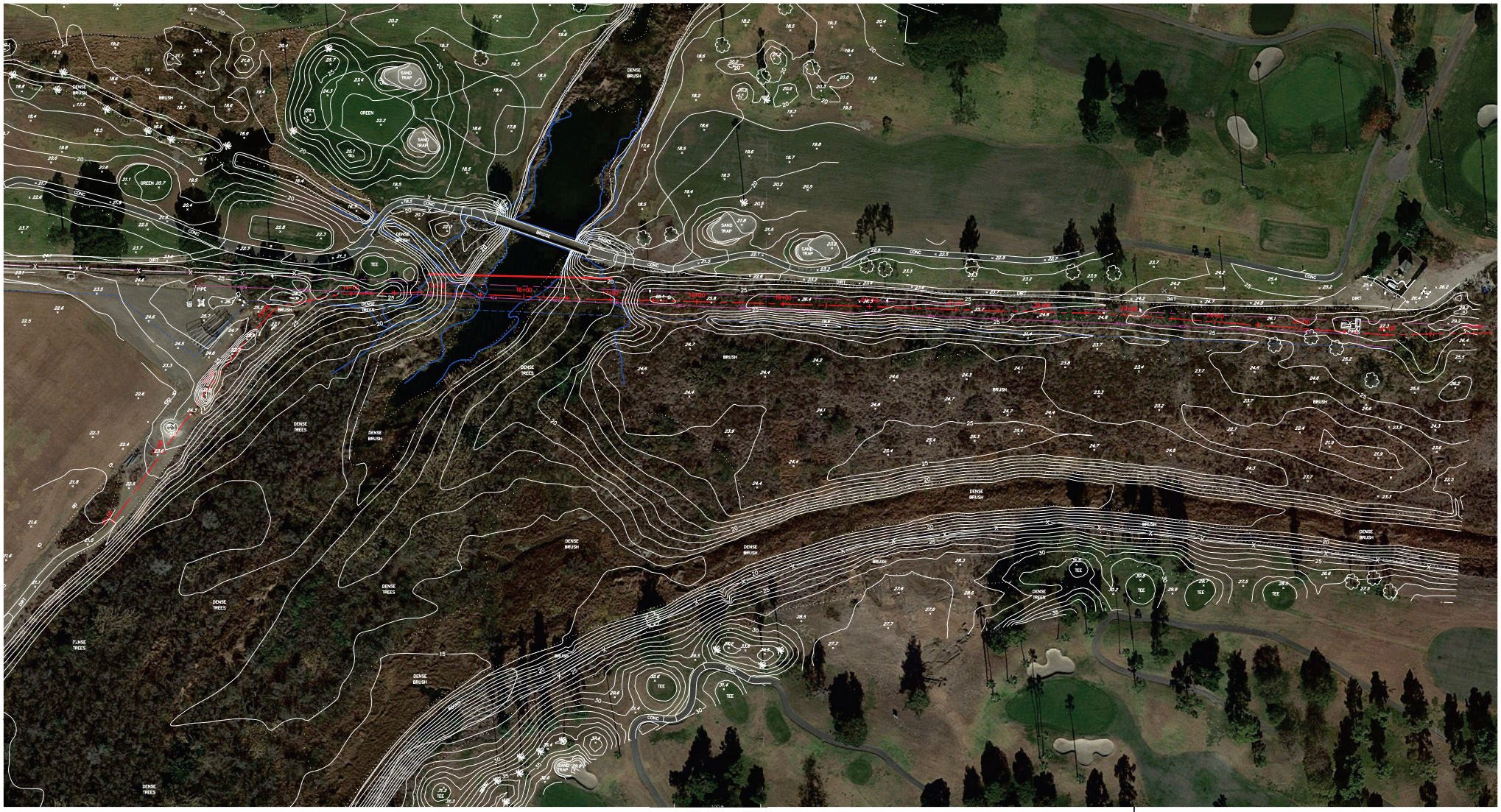
10. Unpublished reports, aerial photographs, and maps on file with Geocon Incorporated.

11. Youd, L. T., I. M. Idriss, *et al.*, *Liquefaction Resistance of Soils: Summary Report from 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils,* Journal of Geotechnical and Geoenvironmental Engineering, October 2001.

OSUNA TRAIL BRIDGE
SAN DIEGO, CALIFORNIA

VICINITY MAP

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159
PROJECT NO. **G2680 - 22 - 01**
FIGURE **1**
DATE **07-27-2021**



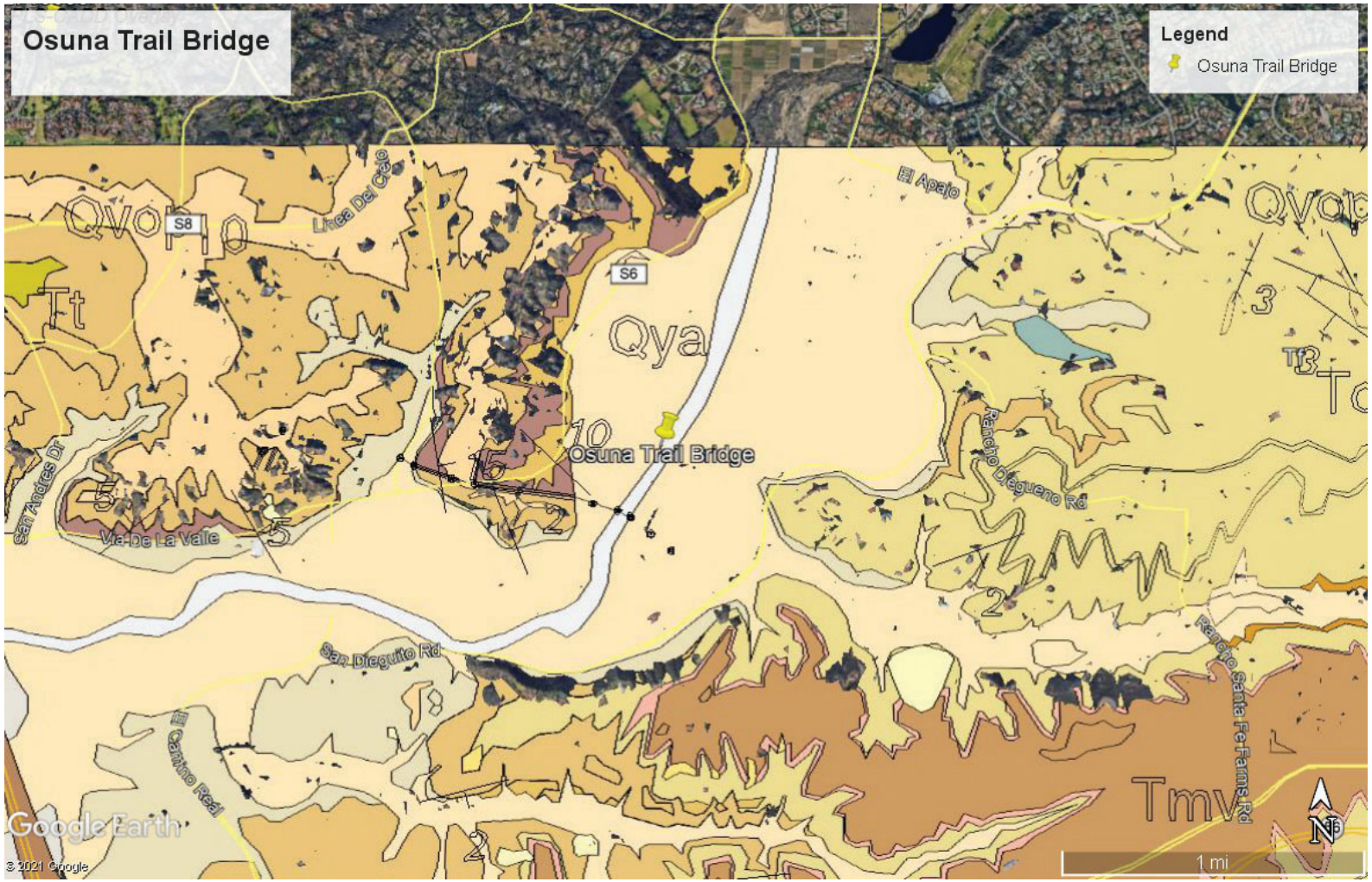
SITE PLAN

OSUNA TRAIL BRIDGE
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
9969 HAVEN AVENUE, SUITE 100, SAN DIEGO, CALIFORNIA 92123-4707
PHONE (858) 558-6900 - FAX (858) 558-6159

SCALE	1" = 50'
DATE	07 - 27 - 2021
PROJECT NO.	G2680 - 22 - 01
FIGURE	2
SHEET	1 OF 1

OSUNA TRAIL BRIDGE
SAN DIEGO, CALIFORNIA



REGIONAL GEOLOGIC MAP

GEOCON
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GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159
PROJECT NO. **G2680 - 22 - 01**
FIGURE **3**
DATE **07-27-2021**

APPENDIX A

APPENDIX A

LOG OF PREVIOUS BORING

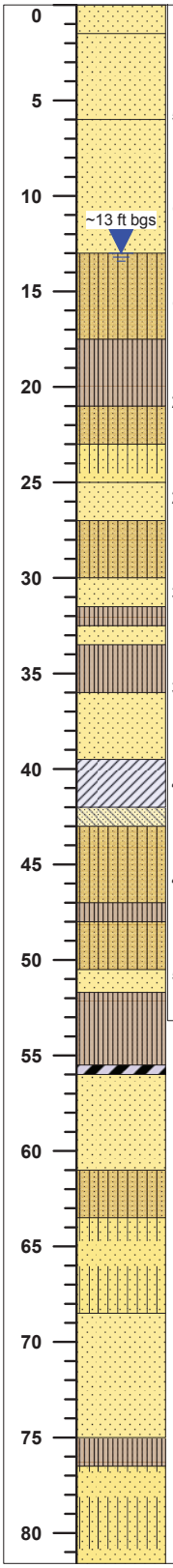
FOR

OSUNA TRAIL BRIDGE
AT SAN DIEGUITO RIVER
OSUNA SEGMENT OF COAST TO
CREST TRAIL PROJECT
SAN DIEGO, CALIFORNIA

PROJECT NO. G2680-22-01

GEOSCIENCE
P.O. Box 220
Claremont, CA 91711
Telephone: (909) 451-6650
Fax: (909) 451-6638
www.gssiwater.com

Exploratory Borehole Lithology
Olivenhain Municipal Water District (OMWD)
San Dieguito Brackish Groundwater Desalination Design Pilot

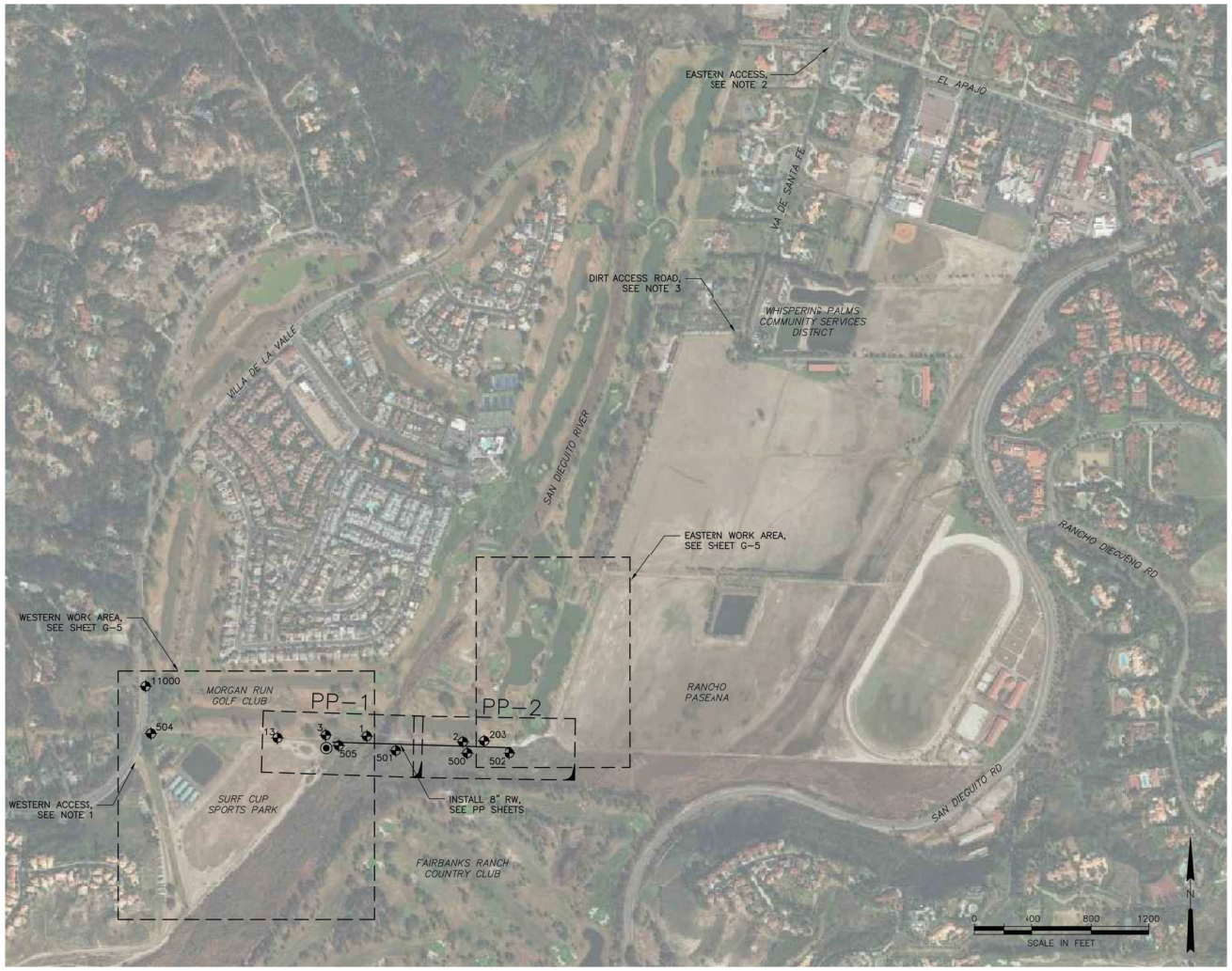


Depth (ft bgs)	Blows (per 6-inches)*	Lithology Descriptions
0		POORLY GRADED SAND WITH GRAVEL (SP): brown (7.5YR 4/3); 75% fine-coarse, subangular-subrounded sand; 25% fine-coarse, subangular-subrounded gravel; trace fines; very loose, dry
5	5ft 10,8,8	POORLY GRADED SAND WITH GRAVEL (SP): brown (7.5YR 4/3); 70% fine-coarse, subangular-subrounded sand; 30% fine-coarse, subangular-subrounded gravel; trace fines; very loose, dry, max gravel 70mm, trace cobbles max 120mm
10	10ft 4,4,6	POORLY GRADED SAND (SP): brown (7.5YR 4/2); 100% fine-medium grained sand; trace fines; loose, moist, mottled, micaceous
15	15ft 2,2,2	SILTY SAND (SM): brown (10YR 4/3); 80% fine-medium grained sand; 20% fines (20% silt); trace fine-coarse, subangular-subrounded gravel; loose, wet, max gravel 20mm, laminated, micaceous
20	20ft 2,1,1	SILT WITH SAND (ML): dark brown (10YR 3/3); 80% fines (75% silt, 5% clay); 20% fine grained sand; soft, saturated, micaceous
		SILTY SAND (SM): very dark grayish brown (2.5Y 3/2); 60% fine-coarse grained sand; 40% fines (40% silt, trace clay); trace fine, subangular-subrounded gravel; loose, saturated, max gravels 5mm, micaceous
25		POORLY GRADED SAND WITH SILT (SP-SM): very dark gray (2.5Y 3/1); 90% fine-medium grained sand; 10% fines (10% silt, trace clay); loose, saturated, laminated, micaceous
	25ft 2,5,7	POORLY GRADED SAND (SP): very dark grayish brown (2.5Y 3/2); 95% fine-coarse, subangular-subrounded sand; 5% fines (5% silt, trace clay); trace fine, subangular-subrounded gravel; loose, saturated, max gravels 5mm, micaceous
30		SILTY SAND (SM): black (2.5Y 2.5/1); 65% fine-medium grained sand; 35% fines (some silt, trace clay); loose, saturated, mottled, micaceous, with pink shell fragments
	30ft 4,6,5	POORLY GRADED SAND (SP): black (2.5Y 2.5/1); 95% fine-medium grained sand; 5% fines (5% silt); loose, saturated, micaceous, with pink shell fragments
		SILT WITH SAND (ML): black (2.5Y 2.5/1); 75% fines (mostly silt, few clay); 25% fine-medium grained sand; soft, saturated, micaceous, laminated, with pink shell fragments
35		POORLY GRADED SAND (SP): black (2.5Y 2.5/1); 95% sand; 5% fines (5% silt, trace clay); loose, saturated, micaceous
	35ft 4,3,3	SANDY SILT (ML): black (2.5Y 2.5/1); 55% fines (little silt, little clay); 45% fine-medium grained sand; soft, saturated, interbedded CLAYS, SILTS, and SANDS ~4-6"; micaceous, (See descriptions above)
		POORLY GRADED SAND (SP): black (2.5Y 2.5/1); 95% fine-medium grained sand; 5% fines (5% silt, trace clay); loose, saturated, micaceous, with smashed and layered cream colored shell fragments
40	40ft 2,2,6	LEAN CLAY (CL): black (2.5Y 2.5/1); 90% fines (50% clay, 40% silt); 10% fine grained sand; soft, saturated, organic material (roots?); iron staining
		CLAYEY SAND (SC): black (2.5Y 2.5/1); 80% fine-medium grained sand; 20% fines (15% clay, 5% silt); loose, saturated, micaceous, with shell fragments
45	45ft 2,2,4	SILTY SAND (SM): black (2.5Y 2.5/1); 85% fine-medium grained sand; 15% fines; loose, saturated, micaceous, with shell fragments increasing downward and coarseness
		SILT WITH SAND (ML): black (2.5Y 2.5/1); 85% fines (65% silt, 20% clay); 15% fine grained sand; soft, saturated, micaceous, with shell fragments
50	50ft 2,3,4	SILTY SAND (SM): black (2.5Y 2.5/1); 75% fine grained sand; 25% fines (20% silt, 5% clay); loose, saturated, laminated clays blueish-green; micaceous, with shell fragments
		POORLY GRADED SAND (SP): black (2.5Y 2.5/1); 95% fine-medium grained sand; 5% fines (5% silt); loose, saturated, micaceous, with shell fragments
55		SILT WITH SAND (ML): black (2.5Y 2.5/1); 85% fines (80% silt, 5% clay); 15% fine-medium grained sand; soft, saturated, laminated; micaceous; with pink and cream shell fragments
		FAT CLAY (CH): black (2.5Y 2.5/1); 100% fines (100% clay, trace silt); trace fine grained sand; soft, saturated, moderately plastic
60		POORLY GRADED SAND (SP): black (2.5Y 2.5/1); 95% fine grained sand; 5% fines (5% silt, trace clay); loose, saturated, micaceous
		SILTY SAND (SM): black (2.5Y 2.5/1); 85% fine-medium grained sand; 15% fines (15% silt, trace clay); loose, saturated, micaceous, with shell fragments
65		POORLY GRADED SAND WITH SILT (SP-SM): black (2.5Y 2.5/1); 90% fine-medium grained sand; 10% fines (10% silt); loose, saturated, micaceous, with little shell fragments
70		POORLY GRADED SAND (SP): black (2.5Y 2.5/1); 95% fine-medium grained sand; 5% fines (few silt, few clay); loose, saturated, micaceous, with few shell fragments
75		SILT WITH SAND (ML): black (2.5Y 2.5/1); 75% fines (70% silt, 5% clay); 25% fine grained sand; soft, saturated, laminated; micaceous, with shell fragments
80		POORLY GRADED SAND WITH SILT (SP-SM): black (2.5Y 2.5/1); 90% fine-medium grained sand; 10% fines (10% silt); trace fine-coarse, subangular-subrounded gravel; loose, saturated, laminated; micaceous; iron stained; max gravel 53mm

***SPT Samples were collected every 5 feet beginning at 5 feet bgs. Samples were driven 18-inches (i.e., from 5ft bgs to 6.5 ft bgs) with a pneumatic hammer. Each 6-inch interval hamer blows were counted and recorded. (i.e., 10, 8, 6)**

Depth (ft bgs)	Blows (per 6-inches)*	Lithology Descriptions
85		POORLY GRADED SAND WITH SILT (SP-SM): very dark grayish brown (2.5Y 3/2); 90% fine-medium grained sand; 10% fines (few silt, trace clay); loose, saturated, micaceous
		POORLY GRADED SAND (SP): very dark grayish brown (2.5Y 3/2); 95% fine-medium grained sand; 5% fines (5% silt); loose, saturated, mottled; laminated; micaceous
		POORLY GRADED SAND WITH GRAVEL (SP): very dark grayish brown (2.5Y 3/2); 65% fine-coarse grained sand; 30% fine-coarse grained gravel; 5% fines (5% silt); loose, saturated
90		POORLY GRADED GRAVEL (GP): olive yellow (2.5Y 6/6); 90% fine-coarse, subangular-subrounded gravel; 5% fine-coarse, subangular-subrounded sand; 5% fines (5% clay, trace silt); loose, saturated, max gravel 63mm
		POORLY GRADED GRAVEL (GP): olive yellow (2.5Y 6/6); 90% fine-coarse, angular-subangular gravel; 5% fine-medium grained sand; 5% fines (5% clay); loose, saturated, max gravel 63mm
95		
100		POORLY GRADED SAND WITH GRAVEL (SP): olive (5Y 4/3); 70% fine-coarse, subangular-subrounded sand; 25% fine-coarse, subangular-subrounded gravel; 5% fines (5% silt, trace clay); loose, saturated, trace cobbles max 90mm; max gravels 72mm
105		
110		POORLY GRADED SAND WITH SILT (SP-SM): dark olive gray (5Y 3/2); 90% fine-coarse, subangular-subrounded sand; 10% fines (few silt, trace clay); loose, saturated, mottled; laminated; with some iron staining
115		
120		POORLY GRADED SAND WITH GRAVEL (SP): olive gray (5Y 4/2); max gravel 72mm
		SANDSTONE (Sst): greenish gray (5GY 5/1); medium grained sand, moderately bedded, decomposed, very soft, saturated, bands of more yellowish SST; highly weathered
125		MUDSTONE (Mdst): greenish gray (5G 5/1); thickly bedded, slightly weathered, very hard, moist, red and yellow laminations of clay
130		
135		SANDSTONE (Sst); greenish gray (5G 5/1); very thickly bedded, moderately weathered, moderately hard, wet, bands of yellowish SST
140		
145		MUDSTONE (Mdst); greenish gray (5G 5/1); massive, slightly weathered, hard, dry
150		**Refusal & Bottom of Borehole 147 ft bgs**
155		
160		

***SPT Samples were collected every 5 feet beginning at 5 feet bgs. Samples were driven 18-inches (i.e., from 5ft bgs to 6.5 ft bgs) with a pneumatic hammer. Each 6-inch interval hamer blows were counted and recorded. (i.e., 10, 8, 6)**



KEY MAP, PROJECT ACCESS, AND CONTROL POINTS
1"=400'

CONTROL POINTS

PT#	NORTHING	EASTING	ELEV.
1	1939740.20	6266785.91	23.47
2	1939694.98	6267452.79	22.45
3	1939710.18	6266480.47	21.86
13	1939696.04	6266117.51	23.54
203	1939661.41	6267575.33	24.07
500	1939638.53	6267491.97	24.90
501	1939658.89	6267002.80	25.26
502	1939624.87	6267819.16	26.07
504	1939736.12	6265150.32	27.15
505	1939676.54	6266586.14	23.05
11000	1939950.05	6265156.17	27.26

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATES SYSTEM (CCS 83), ZONE 6, 1983 DATUM, DEFINED BY SECTIONS 8801 TO 8819 OF THE CALIFORNIA PUBLIC RESOURCES CODE.

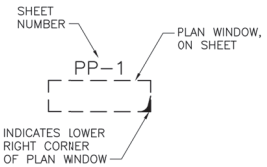
BENCHMARK

ELEVATIONS SHOWN HEREON ARE BASED UPON CITY OF SAN DIEGO BENCHMARK 451, ELEVATION 78.33 (NGVD 29).

NOTES:

1. THE WESTERN ACCESS TO THE PROJECT SITE IS FROM VIA DE LA VALLE.
2. THE EASTERN ACCESS TO THE PROJECT SITE IS FROM VIA DE SANTA FE. THE NORTH END OF VIA DE SANTA FE IS RESTRICTED BY AN ACCESS GATE. FOR ADDITIONAL INFORMATION ABOUT USING THIS GATE SEE SPECIFICATIONS.
3. DIRT ACCESS ROAD CONNECTS TO SOUTHERN END OF VIA DE SANTA FE.

◉ GEOTECHNICAL BORING LOCATION



24422 Avenida De La Carlota, Suite 180
Laguna Hills, California 92653
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COMMITMENT & INTEGRITY DRIVE RESULTS
WOODARD & CURRAN

PROFESSIONAL ENGINEER — MICHAEL E. HERNANDEZ — No. C46559 — Exp. 06-30-19 — CIVIL — STATE OF CALIFORNIA

REV.	DESCRIPTION	DATE
1	RECORD DRAWINGS	8/2019

DESIGNED BY: E. HERNANDEZ | CHECKED BY: M. ELDNER
DRAWN BY: J. ANASTELL | 201GH-G-4.dwg

KEY MAP, PROJECT ACCESS, AND CONTROL POINTS

OLIVENHAIN MUNICIPAL WATER DISTRICT

RECYCLED WATER PIPELINE EXTENSION 153A

JOB NO.: 0011241.00
DATE: OCTOBER 2018
SCALE:
SHEET: 4 OF 9

G-4

APPENDIX B

APPENDIX B

ARS ONLINE V3.0.2

FOR

OSUNA TRAIL BRIDGE
AT SAN DIEGUITO RIVER
OSUNA SEGMENT OF COAST TO
CREST TRAIL PROJECT
SAN DIEGO, CALIFORNIA

PROJECT NO. G2680-22-01

ARS Online V3.0.2

Using the tool: Specify latitude and longitude in decimal degrees in the input boxes below. Alternatively, **Google Maps** can be used to find the site location. Specify the time-averaged shear-wave velocity in the upper 30m (Vs30) in the input box. After submitting the data, the USGS 2014 hazard data for a 975-year return period will be reported along with adjustment factors required by Caltrans Seismic Design Criteria (SDC) V2.0.

Latitude: 32.98536 **Longitude:** -117.21156 **Vs30 (m/s):**
180 Submit

Caltrans Design Spectrum (5% damping)

Period(s)	Sa_{2008}(g)	Sa_{2014}(g)	$Basin_{2008}$	$Basin_{2014}$	Near Fault Amp	Design Sa_{2008}(g)	Design Sa_{2014}(g)
PGA	0.37	0.37	1	1	1	0.37	0.37
0.10	0.58	0.61	1	1	1	0.58	0.61
0.20	0.76	0.87	1	1	1	0.76	0.87
0.30	0.8	1	1	1	1	0.8	1
0.50	0.74	0.99	1	1	1	0.74	0.99
0.75	0.63	0.8	1	1	1	0.63	0.8
1.0	0.54	0.67	1	1	1	0.54	0.67
2.0	0.33	0.38	1	1	1	0.33	0.38
3.0	0.21	0.25	1	1	1	0.21	0.25
4.0	0.15	0.17	1	1	1	0.15	0.17
5.0	0.12	0.13	1	1	1	0.12	0.13

Copy table

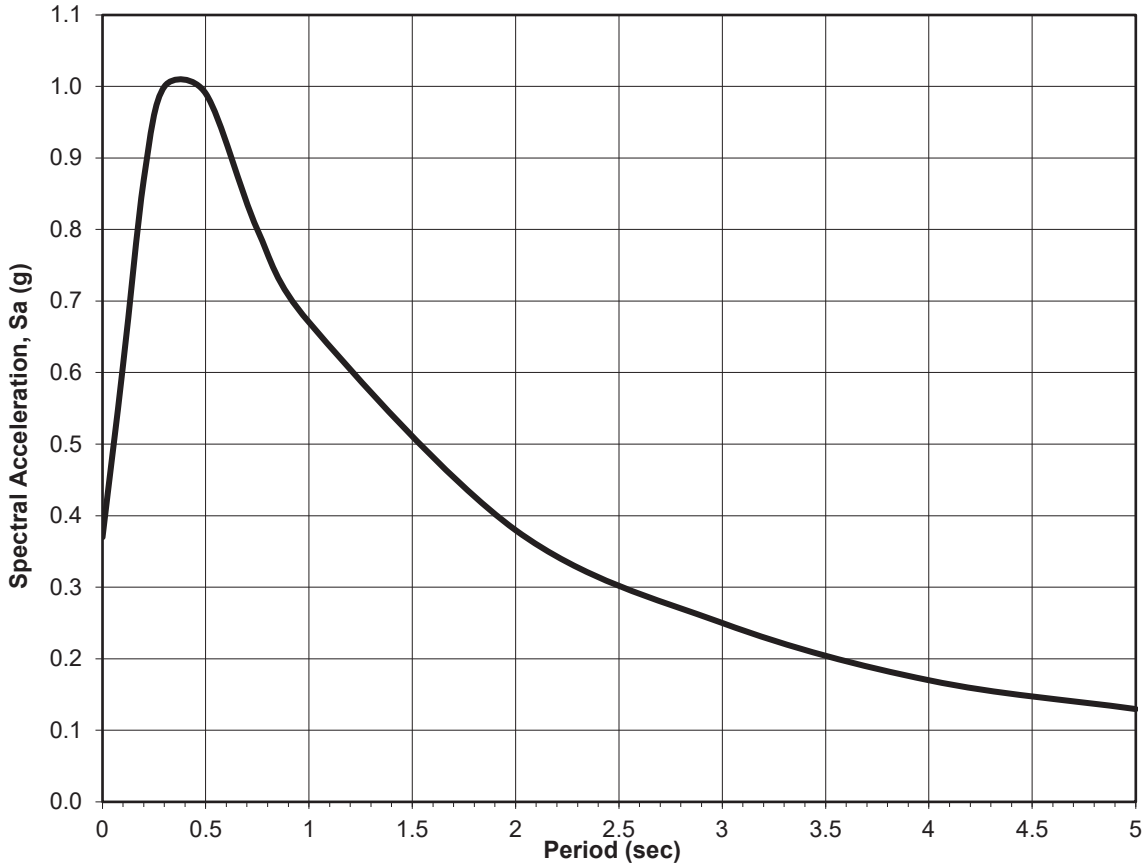
Deaggregation (based on 2014 hazard)

mean magnitude (for PGA)	6.6
mean site-source distance (km, for Sa at 1s)	36.5

Option: recalculate Near Fault amplification with user specified distance

Site-source distance (km): 36.5 Update

Osuna Trail Bridge At San Dieguito River
Design Response Spectrum (5% Damping)



Design Response Spectrum (5% Damping)	
T (sec)	Design Spectrum Sa (2014)
PGA	0.370
0.1	0.610
0.2	0.870
0.3	1.000
0.5	0.990
0.75	0.800
1	0.670
2	0.380
3	0.250
4	0.170
5	0.130

Caltrans ARS Online V.3.0.2		
Latitde	32.9854	°
Longitude	-117.2116	°
Soil Profile Vs30	180	m/s
Magnitude, M	6.6	
PGA	0.37	g
Mean Site-Source Distan	36.5	km

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

YW/YW		

DESIGN RESPONSE SPECTRUM

OSUNA TRAIL BRIDGE
AT SAN DIEGUITO RIVER
SAN DIEGO, CALIFORNIA

DATE 06-29-2021	PROJECT NO. G2680-22-01	FIG.

APPENDIX C

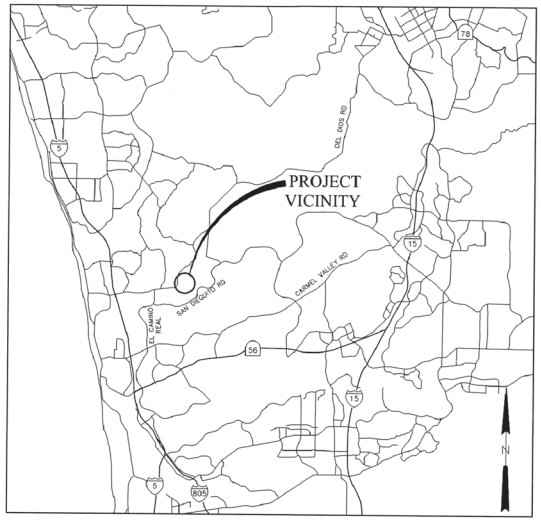
APPENDIX C

PROJECT PLANS OF ADJACENT RECYLED WATER LINE

FOR

OSUNA TRAIL BRIDGE
AT SAN DIEGUITO RIVER
OSUNA SEGMENT OF COAST TO
CREST TRAIL PROJECT
SAN DIEGO, CALIFORNIA

PROJECT NO. G2680-22-01



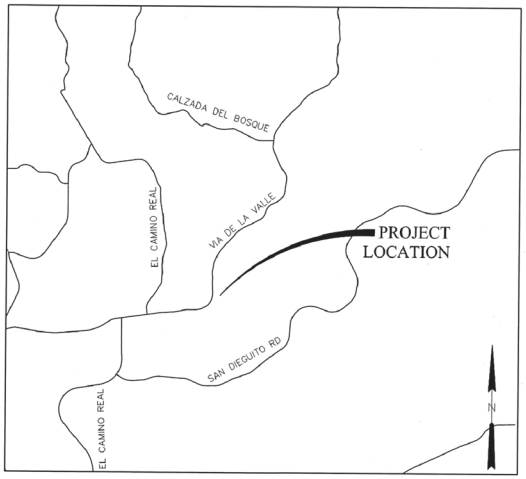
VICINITY MAP
NOT TO SCALE

OLIVENHAIN
Municipal Water District

CONSTRUCTION PLANS FOR RECYCLED WATER PIPELINE EXTENSION 153A

OCTOBER 2018

OMWD PROJECT D800015



LOCATION MAP
NOT TO SCALE

SHEET NO.	DRAWING NO.	TITLE
1	G-1	TITLE SHEET
2	G-2	ABBREVIATIONS AND LEGEND
3	G-3	GENERAL NOTES
4	G-4	KEY MAP, PROJECT ACCESS, AND CONTROL POINTS
5	G-5	WORK AREAS
6	PP-1	PLAN AND PROFILE
7	PP-2	PLAN AND PROFILE
8	C-1	TRENCHLESS DETAILS
9	C-2	CIVIL DETAILS

OLIVENHAIN MUNICIPAL WATER DISTRICT
1966 Olivenhain Road
Encinitas, CA 92024
(760) 753-6466

BOARD OF DIRECTORS

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CHRISTY GUERIN, VICE PRESIDENT
EDMUND K. SPRAGUE, TREASURER
VACANT, SECRETARY
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24422 AVENIDA DE LA CARLOTA, SUITE 180
LAGUNA HILLAS, CA 92653
(949) 420-5300
WWW.WOODARDCURRAN.COM
PROJECT NO. 0011241

10/15/2018
GLENN E. HERMANSON, PE, RCE C046659 DATE
PROJECT MANAGER

DIGALERT
DIAL TOLL FREE
811
AT LEAST TWO DAYS
BEFORE YOU DIG
UNDERGROUND SERVICE ALERT (USA)
OF SOUTHERN CALIFORNIA

10.23.18
GEORGE R. BRIEST, PE, RCE C048853 DATE
ENGINEERING MANAGER

OLIVENHAIN MUNICIPAL WATER DISTRICT
RECORD PLAN

9/16/19
Jason Hubbard, P.E. Date
Engineering Manager

24422 Avenida De La Carlota, Suite 180
Laguna Hills, California 92653
949.420.5300 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS
WOODARD & CURRAN

PROFESSIONAL ENGINEER — GLENN E. HERMANSON — No. C46659 — Exp. 06-30-19 — CIVIL — STATE OF CALIFORNIA

REV	DESCRIPTION	DATE
1	RECORD DRAWINGS	9/2019

DESIGNED BY: G. HERMANSON | CHECKED BY: M. ELDER
DRAWN BY: J. ANKETELL | 001824-G-1.dwg

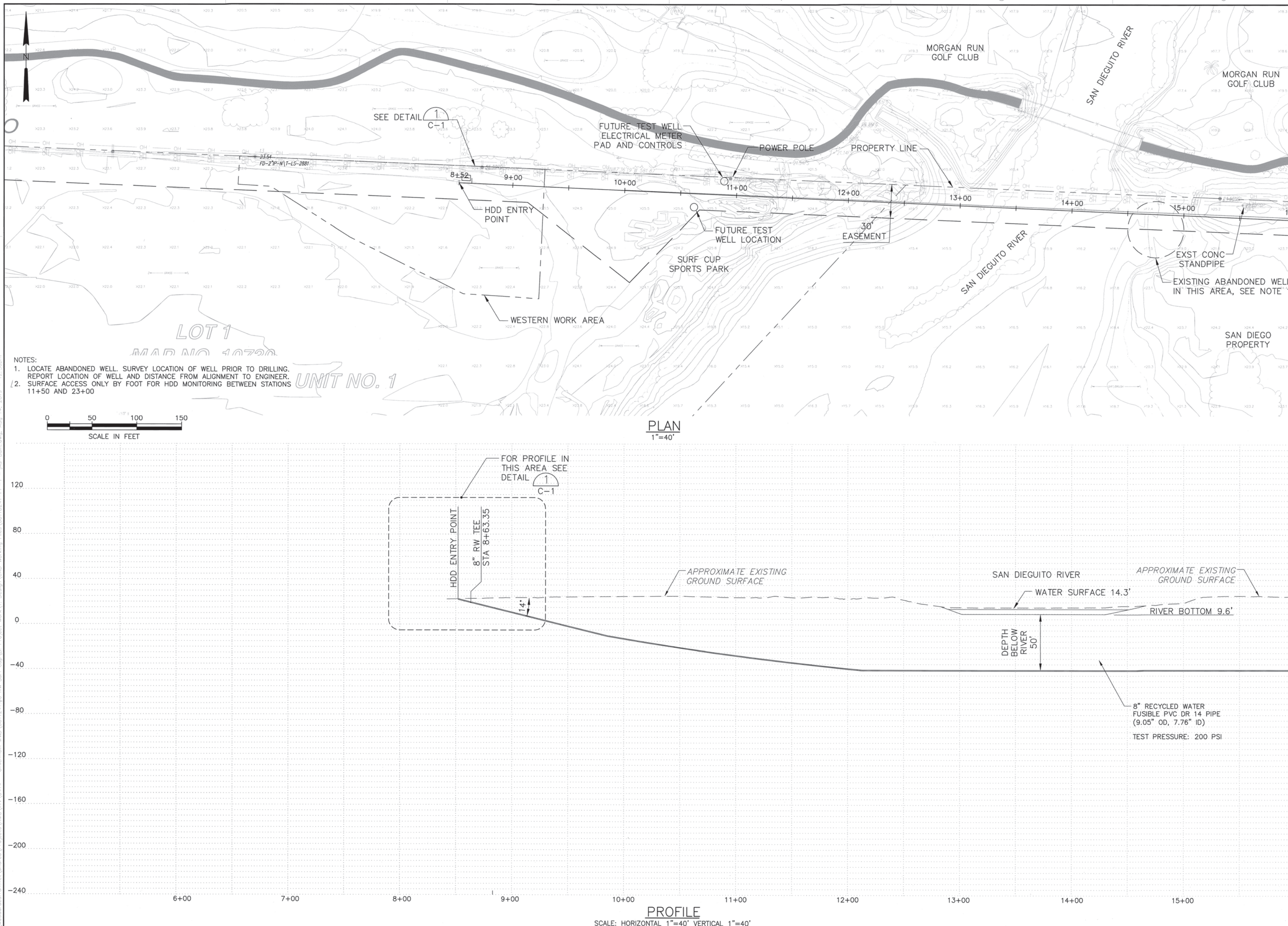
TITLE SHEET

OLIVENHAIN MUNICIPAL WATER DISTRICT

RECYCLED WATER PIPELINE EXTENSION 153A

JOB NO.: 0011241.00
DATE: OCTOBER 2018
SCALE:
SHEET: 1 OF 9

G-1



NOTES:
1. LOCATE ABANDONED WELL. SURVEY LOCATION OF WELL PRIOR TO DRILLING. REPORT LOCATION OF WELL AND DISTANCE FROM ALIGNMENT TO ENGINEER.
2. SURFACE ACCESS ONLY BY FOOT FOR HDD MONITORING BETWEEN STATIONS 11+50 AND 23+00

REV	DESCRIPTION	DATE
1	REVISED TO SHOW AS-BUILT BORE PATH	08/19
1	RECORD DRAWINGS	8/2019

DESIGNED BY: G. HERMANSON | CHECKED BY: M. ELSNER
DRAWN BY: S. JUNG | 00110241-PP-1 - AS-BUILT.dwg

REGISTERED PROFESSIONAL ENGINEER — GLENN E. HERMANSON — No. C46659 — Exp. 06-30-19 — CIVIL — STATE OF CALIFORNIA

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COMMITMENT & INTEGRITY DRIVE RESULTS

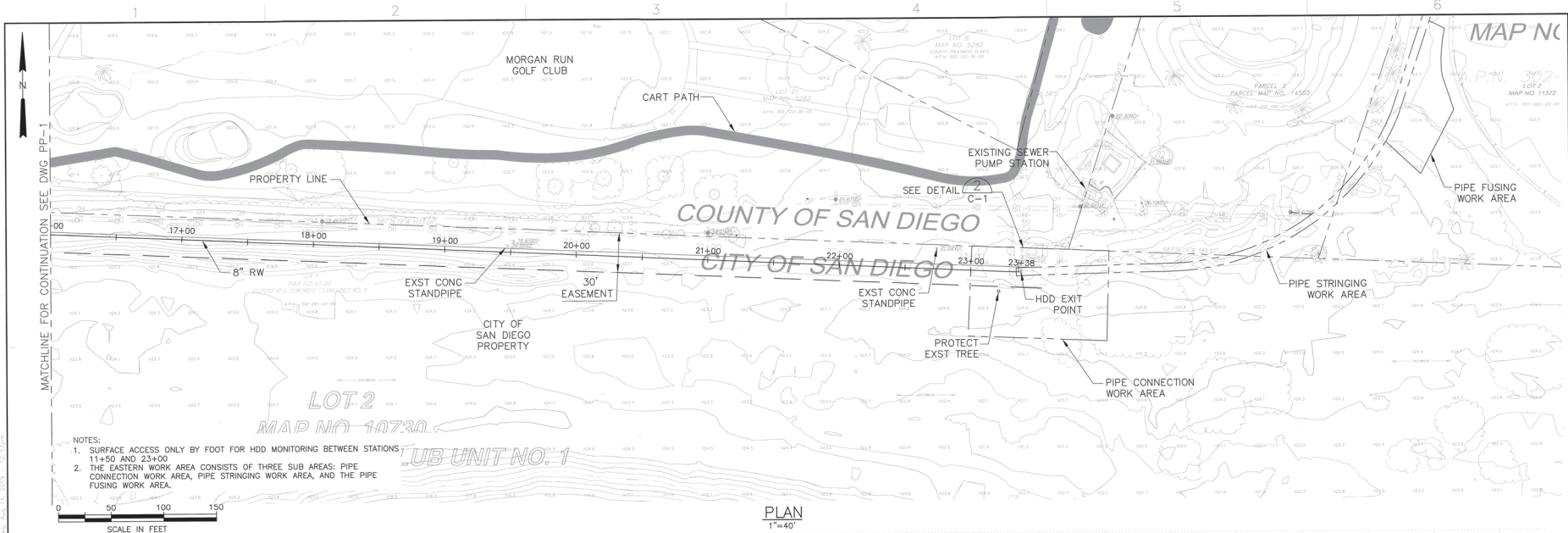
PLAN AND PROFILE
STA 8+52 TO STA 16+00

OLIVENHAIN MUNICIPAL WATER DISTRICT

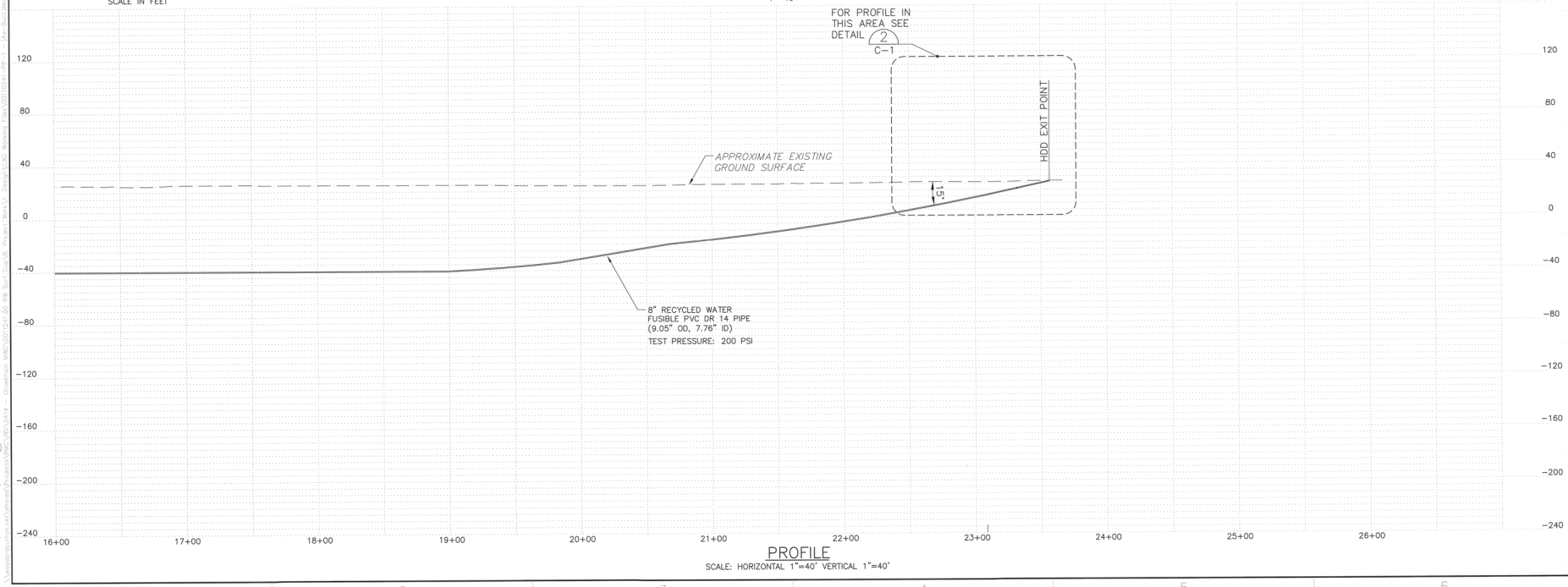
RECYCLED WATER PIPELINE EXTENSION 153A

JOB NO.: 0011241.00
DATE: OCTOBER 2018
SCALE:
SHEET: 6 OF 9

PP-1



PLAN
1"=40'



PROFILE
SCALE: HORIZONTAL 1"=40' VERTICAL 1"=40'

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COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

REGISTERED PROFESSIONAL ENGINEER G. HERMANSON No. C34466 Exp. 06-30-19 CIVIL STATE OF CALIFORNIA

REV	DESCRIPTION	DATE
1	RECORD DRAWINGS	8/2019
-	REVISED TO SHOW AS-BUILT DISC DATA	06/19

DESIGNED BY: G. HERMANSON | CHECKED BY: M. ELDNER
DRAWN BY: S. JUNG | 0011241-PP-1 - AS-BUILT.dwg

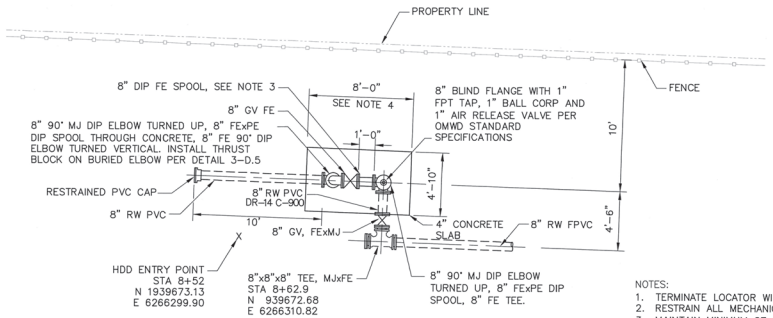
PLAN AND PROFILE
STA 16+00 TO STA 23+57

OLIVENHAIN MUNICIPAL WATER DISTRICT

RECYCLED WATER PIPELINE EXTENSION 153A

JOB NO.: 0011241.00
DATE: OCTOBER 2018
SCALE:
SHEET: 7 OF 9

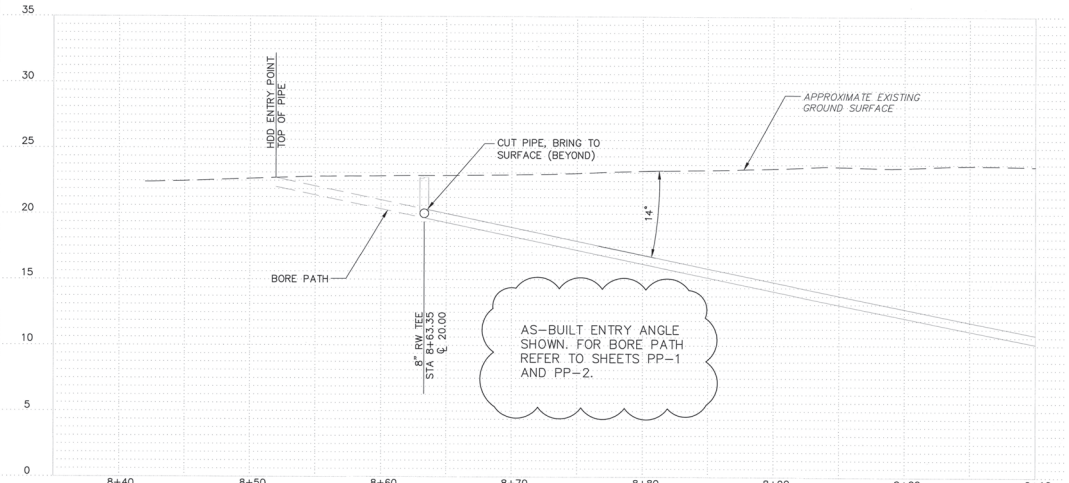
PP-2



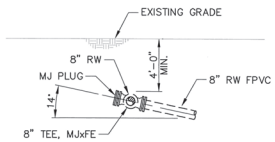
NOTES:
1. TERMINATE LOCATOR WIRES IN GATE VALVE BOX.
2. RESTRAIN ALL MECHANICAL JOINTS.
3. MAINTAIN MINIMUM OF 18" FROM CENTERLINE OF PIPE TO TOP OF CONCRETE PAD (SIMILAR TO STANDARD DETAIL B-1.3 ON SHEET C-2).
4. ADJUST LENGTH OF CONCRETE PAD TO PROVIDE MINIMUM 18" FROM CENTERLINE OF PIPE TO EDGE OF CONCRETE PAD (SIMILAR TO STANDARD DETAIL B-1.3 ON SHEET C-2).

0 5 10 15
SCALE IN FEET

PLAN
1"=5'



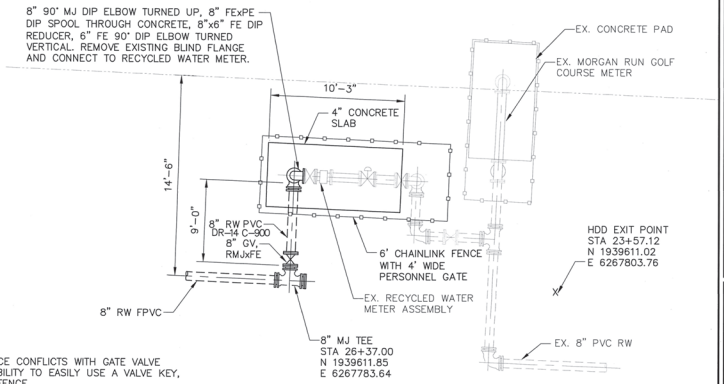
PROFILE
SCALE: HORIZONTAL 1"=5' VERTICAL 1"=5'



NOTES:
1. RESTRAIN ALL MECHANICAL JOINTS.

CONNECTION AT WESTERN SIDE OF PROJECT
SECTION 1
1" = 5'-0"

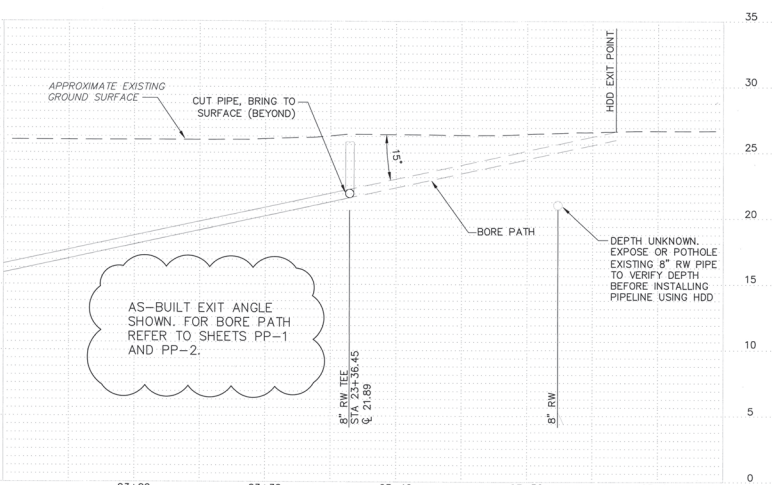
CONNECTION AT WESTERN END OF PROJECT 1
SCALE: AS SHOWN
PP-1



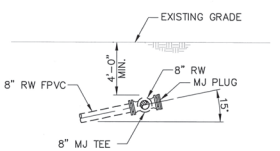
NOTES:
1. IF CHAINLINK FENCE CONFLICTS WITH GATE VALVE COVER OR THE ABILITY TO EASILY USE A VALVE KEY, MOVE CHAINLINK FENCE.
2. TERMINATE LOCATOR WIRES IN GATE VALVE BOX.
3. RESTRAIN ALL MECHANICAL JOINTS.

0 5 10 15
SCALE IN FEET

PLAN
1"=5'



PROFILE
SCALE: HORIZONTAL 1"=5' VERTICAL 1"=5'



NOTES:
1. RESTRAIN ALL MECHANICAL JOINTS.

CONNECTION AT EASTERN SIDE OF PROJECT
SECTION 2
1" = 5'-0"

CONNECTION AT EASTERN END OF PROJECT 2
SCALE: AS SHOWN
PP-1

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COMMITMENT & INTEGRITY DRIVE RESULTS

PROFESSIONAL ENGINEER — ERIC HERMANSON — No. C 58466 — Exp. 06-30-19 — CIVIL — STATE OF CALIFORNIA

REV	DESCRIPTION	DATE
1	REVISED TO SHOW AS-BUILT ENTRY/EXIT ANGLES	09/19
1	RECORD DRAWINGS	8/2019

DESIGNED BY: G. HERMANSON | CHECKED BY: M. ELSNER
DRAWN BY: S. JUNG | 0010241-C-1 - AS-BUILT.dwg

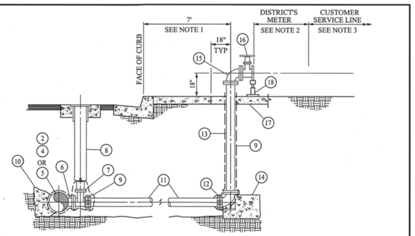
TRENCHLESS DETAIL

OLIVENHAIN MUNICIPAL WATER DISTRICT

RECYCLED WATER PIPELINE EXTENSION 15.3A

JOB NO.: 0011241.00
DATE: OCTOBER 2018
SCALE:
SHEET: 8 OF 9

C-1



NOTES:

1. WHEN SIDEWALK ADJACENT TO CURB EXCEED 5' IN WIDTH, LOCATE ASSEMBLY AS DIRCTED BY THE DISTRICT'S REPRESENTATIVE. ASSEMBLY MAY BE INSTALLED PERPENDICULAR TO FACE OF CURB AS SHOWN OR ROTATED 90° TO BE PARALLEL TO FACE OF CURB.
2. AFTER THE SPECIFIED COMPONENTS HAVE BEEN INSTALLED BY OTHERS, THE DISTRICT WILL FURNISH AND INSTALL A PRESSURE REDUCING VALVE (IF NECESSARY), METER, GATE VALVE, AND PIPE SUPPORT IN THE INDICATED SPACE.
3. AFTER DISTRICT'S METER INSTALLATION, CONNECT CUSTOMER SERVICE LINE TO INSTALLED GATE VALVE. POUR A CONCRETE PAD ON GRADE FOR THE COMPLETED ASSEMBLY.
4. PROVIDE GUARD POSTS WHEN DIRECTED BY THE DISTRICT'S REPRESENTATIVE.

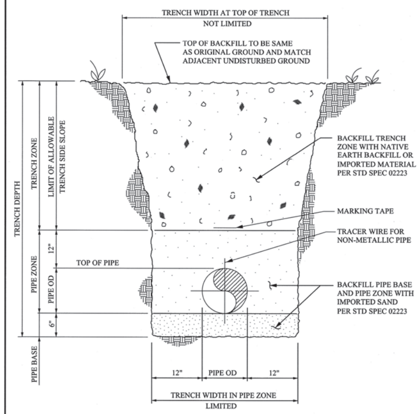
WATER MAINS - 0-200 PSI

ITEM	DESCRIPTION	SPEC/DWG
1	4" THRU 10" WATER SERVICE ASSY FOR 4" THRU 10" WATER METER	15081
2	DUCTILE IRON PIPE AND DI TEE WITH CL 150 FLANGED OUTLET, 0-200 PSI	15240
3		
4	DR14/18 PVC PRESSURE PIPE 12 INCHES AND SMALLER, 0-200 PSI	15292
5	DR14/18 PVC DISTRIBUTION PIPE 14 INCHES AND LARGER, 0-200 PSI	15293
6	DI TEE WITH CL 150 FLANGED OUTLET FOR PVC PIPE INSTALLATION	15292/15293
7	RESILIENT SEATED GATE VALVE WITH CL 125 FLANGE x MECH JT OR P.O., 0-250 PSI, 6" MIN SIZE	15101
8	VALVE BOX INSTALLATION FOR BURIED VALVES	15101/E-1.2/E-1.3
9	WAX TAPE SYSTEM	09954
10	CONCRETE THRUST BLOCK	D-3.3/D-3.4
11	DR14/18 PVC PRESSURE PIPE PER WORKING PRESSURE	15292
12	DI BASE BEND WITH CL 150 FLANGE x MECHANICAL JOINT OR PUSH ON	15240
13	CLASS 53 DUCTILE IRON PIPE WITH CL 150 FLANGES	15240
14	CONCRETE THRUST BLOCK	D-3.5/D-3.6
15	DUCTILE IRON 1/4 BEND WITH CL 150 FLANGES	15240
16	RESILIENT SEATED GATE VALVE WITH CL 125 FLANGES, 0-250 PSI	15101
17	36" WIDE x 4" THICK CONCRETE PAD, LENGTH VARIES PER SIZE	15081
18	ADJUSTABLE PIPE SUPPORT	15081

OLIVENHAIN MUNICIPAL WATER DISTRICT

WATER SERVICE ASSY FOR 4" THRU 10" METER - WORKING PRESSURE 0-200 PSI (PVC/DIP)

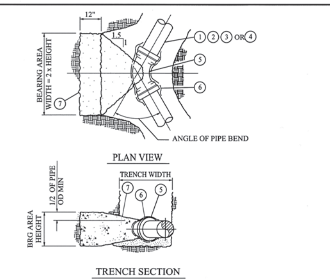
STD DWG NO. B-1.3
FEBRUARY 2017



OLIVENHAIN MUNICIPAL WATER DISTRICT

TYPICAL TRENCH SECTION FOR POTABLE / RECYCLED WATER MAINS

STD DWG NO. E-2.1
FEBRUARY 2017



ANGLE OF PIPE BEND	MINIMUM BEARING AREA OF BLOCK IN SQUARE FEET							
SIZE	4"	6"	8"	10"	12"	14"	16"	18"
11-1/4°	1	2	2	3	5	6	8	9
22-1/2°	2	2	4	6	8	11	14	18
33-3/4°	2	4	6	9	12	17	21	26
45°	2	5	8	11	16	21	28	35
56-1/4°	3	5	10	14	20	26	34	43
67-1/2°	3	7	11	17	23	31	40	50
90°	5	8	14	21	29	39	51	64

$$HEIGHT = \sqrt{\frac{BRG\ AREA}{2}}$$

WIDTH = 2 x HEIGHT

NOTE: BASED ON SOIL BEARING CAPACITY OF 2000 LBS/SF. SPECIAL DESIGN REQUIRED IF SOIL BEARING CAPACITY IS LESS THAN 2000 LBS/SF. PLACE CONCRETE AGAINST UNDISTURBED GROUND IN TRENCH BOTTOM AND SIDE.

4"-18" WATER MAINS - 0-150 PSI

ITEM	DESCRIPTION	SPEC/DWG
1	DUCTILE IRON PIPE WITH NON-RESTRAINED JOINTS	15240
2	STEEL PIPE, CML&C WITH NON-RESTRAINED JOINTS	15061
3	DR18 PVC PRESSURE PIPE, 12 INCHES & SMALLER WITH NON-RESTRAINED JT	15292
4	DR18 PVC DISTRIBUTION PIPE, 14 INCHES & LARGER W/NON-RESTRAINED JT	15293
5	DUCTILE IRON BEND FOR DI OR PVC PIPE - STEEL NOT SHOWN	15240/15292/15293
6	WAX TAPE SYSTEM	09954
7	CONCRETE THRUST BLOCK	02223

OLIVENHAIN MUNICIPAL WATER DISTRICT

THRUST BLOCK FOR PIPE BENDS WORKING PRESSURE 0-150 PSI

STD DWG NO. D-3.5
FEBRUARY 2017

WOODARD & CURRAN
24422 Avenida De La Carlota, Suite 180
Laguna Hills, California 92653
949.420.5300 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

REGISTERED PROFESSIONAL ENGINEER
GLENN E. HERMANSON
No. C46659
Exp. 06-30-19
CIVIL
STATE OF CALIFORNIA

REV	DESCRIPTION	DATE
1	RECORD DRAWINGS	8/2019

DESIGNED BY: G. HERMANSON | CHECKED BY: M. ELSNER
DRAWN BY: J. ANKETELL | 00110241-C-2.dwg

CIVIL DETAILS

OLIVENHAIN MUNICIPAL WATER DISTRCT

RECYCLED WATER PIPELINE EXTENSION 153A

JOB NO.: 0011241.00
DATE: OCTOBER 2018
SCALE:
SHEET: 9 OF 9

C-2

GEOTECHNICAL ENGINEERING
CONSTRUCTION INSPECTION
MATERIALS TESTING
ENVIRONMENTAL

OFFICE LOCATIONS

ORANGE COUNTY
CORPORATE BRANCH
2992 E. La Palma Avenue
Suite A
Anaheim, CA 92806
Tel: 714.632.2999
Fax: 714.632.2974

SAN DIEGO
IMPERIAL COUNTY
6295 Ferris Square
Suite C
San Diego, CA 92121
Tel: 858.537.3999
Fax: 858.537.3990

INLAND EMPIRE
14467 Meridian Parkway
Building 2A
Riverside, CA 92518
Tel: 951.653.4999
Fax: 951.653.4666

OC/LA/INLAND EMPIRE
DISPATCH
800.491.2990

SAN DIEGO DISPATCH
888.844.5060

www.mtglinc.com

September 9, 2022

MTG$_L$ Project No.: 6274A01
MTG$_L$ Log No.: 22-0701
MTG$_L$ Branch: San Diego

Juliana Richards, PE, QSD
Kimley-Horn & Associates
401 B Street, Suite 600
San Diego, CA 92101

Subject: **GEOTECHNICAL MEMORANDUM – RESPONSE TO CITY COMMENTS**
City of San Diego Project Issues Report PRJ-1049410
Osuna Trail Segment and Pedestrian Bridge
San Dieguito River Park, San Diego County

Dear Ms. Richards,

In accordance with your request, we have prepared this geotechnical memorandum for the subject project to address the City of San Diego's (City) DSD-Geology review comments regarding the referenced Project Issues Report, from Kenneth Mills, dated June 1, 2022.

To prepare this addendum, the current project design documents applicable to the geotechnical scope of work were reviewed, including the project's preliminary foundation report (Geocon, 2022), the site plan and grading plans (Kimley-Horn, 2022), and the preliminary hydrological report (Kimley-Horn, 2020).

The scope of work performed for the preliminary geotechnical report was generally appropriate for the type and size of project in a discretionary phase, and we generally agree with the report's findings, conclusions, and recommendations.

Comment 00005: *The project's geotechnical consultant must submit an addendum geotechnical report or update letter for the purpose of an environmental review that specifically addresses the proposed development plans and the following:*
Response: This geotechnical memorandum is provided for the subject project for the purpose of an environmental review that specifically addresses the preliminary development plans and the City's review comments.

Comment 00006:
The geotechnical investigation report must contain a geologic/geotechnical map that shows the distribution of fill and geologic units, location of exploratory excavations, and proposed development. The map should be on a current topographic base that

shows the proposed development; the overall site plan or preliminary grading plan could provide a suitable base map.

Response: Figure 1A attached presents a preliminary geologic/geotechnical map showing the mapped regional geology, the location of a nearby geotechnical boring by others, and the project's proposed development by overlaying the current overall site plan. Figure 1B attached present a preliminary geologic/geotechnical map showing the estimated existing distribution of fill and geologic units, the location of the referenced geotechnical report's exploratory boring by others, and the project's proposed development using a portion of the preliminary grading plan as a base map.

Comment 00007: *Circumscribe the limits of anticipated remedial grading on the geologic/geotechnical map to delineate the proposed footprint of the project.*
Response: Figure 1B, attached, present a geologic/geotechnical map delineating the estimated anticipated remedial grading based on the current proposed footprint of the project.

Comment 00008: *The geotechnical investigation report must contain representative geologic/geotechnical cross-sections that show the existing and proposed grades, distribution of fill and geologic units, groundwater conditions, and the proposed development.*
Response: Figure 2, attached, presents a preliminary geologic cross-section at the pedestrian bridge, based on the referenced boring, showing the existing and proposed grades, estimated distribution of fill and geologic units, groundwater conditions, and the proposed development.

Based on the preliminary scour analysis performed (Kimley-Horn, 2020), a 10-year flood event is estimated to scour soils to depth of about 13.7-feet, and so the foundations are anticipated to be at a depth of about 14 to 20 feet to mitigate scour. Figure 2 presents the conservative approximate anticipated depth of grading based on the preliminary scour analysis and the proposed development. These estimates are subject to change based on actual subsurface data at the bridge abutments.

Comment 00009: *The project's geotechnical consultant is relying on subsurface information from an adjacent boring drilled in 2018 by another consultant. Show the location of the adjacent boring on the site-specific geologic/geotechnical map.*
Response: Figures 1A, 1B and 2, attached, present geologic/geotechnical maps showing the location of the referenced exploratory boring.

Comment 00010: *The geotechnical consultant must indicate if the site is suitable for the proposed development as designed or provide recommendations to mitigate any possible geologic hazards to an acceptable level.*
Response: The site is suitable geotechnically for the proposed development with the understanding that some earthwork will be required; however, design development is anticipated if a discretionary permit is issued.

Figure 3 attached presents the site on the City of San Diego Seismic Safety Study Map. The site is located in Category 32, a liquefaction zone described as "Low Potential for Liquefaction with fluctuating groundwater and minor drainage" (City of San Diego, 2008). However, the project's geotechnical report indicates that liquefaction-induced settlement of the ground surface is expected on the order of 30 inches. Although liquefaction can be mitigated with ground improvement and/or deep foundations, the extent of those mitigation methods would be great and are expected to be cost prohibitive, as well as more disturbing to the natural environment. Both the significant depth of the bridge abutments foundations and the remedial grading anticipated at the abutments is expected to mitigate the liquefaction-induced settlement, however it is assumed the bridge design will accommodate the settlement to an acceptable level of risk.

Comment 00011: *Please note, geotechnical reports that address geologic hazards must also be signed and sealed (stamped) by a professional geologist.*
Response: This requirement is noted, and this geotechnical memorandum is signed accordingly.

Comment 00012: *Please note, the requested addendum geotechnical report or update letter must be submitted digitally and uploaded with the "Geotechnical Investigation Report Addendum" PDF file option only. Geotechnical documents that are uploaded incorrectly are unacceptable as record documents.*
Response: Noted; this geotechnical memorandum is provided digitally for upload accordingly.

PRELIMINARY RECOMMENDATION

If a discretionary permit is issued, we recommend a geotechnical subsurface investigation be performed, with a minimum scope to include drilling geotechnical borings at each of the pedestrian bridge's abutments to a depth of 20-feet, or refusal, using either a tripod or track-mounted drill-rig, and excavating to a depth of 3-feet, or refusal, in at least 2 other areas along the trail with planned improvements.

CLOSURE

The findings, conclusions, and recommendations contained in this report are based on the referenced geotechnical report and other readily available information. This report further assumes that the subsurface conditions estimated are representative of conditions throughout the site. However, we strongly recommend a geotechnical subsurface investigation be performed to evaluate conclusions, and to provide final design recommendations.

We appreciate this opportunity to be of service to you on this project. Should you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully Submitted,
MTGL, Inc.

Daniel Richardson, P.E. C 89379
Senior Engineer

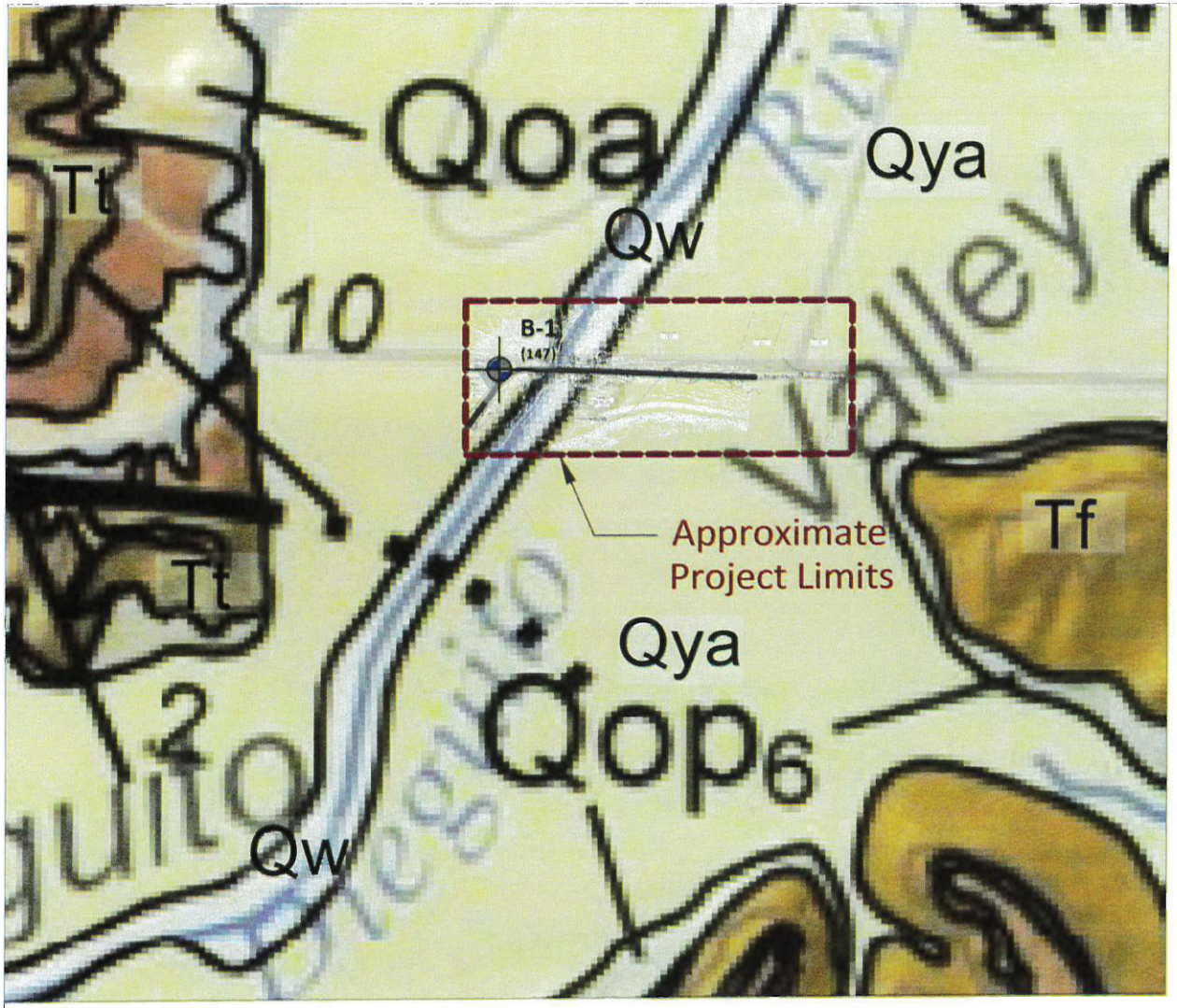
Jonathan Goodmacher, C.E.G. 2136
Certified Engineering Geologist

Attachments:

Figure 1A - Preliminary Geologic/Geotechnical Map: Site Plan
Figure 1B - Preliminary Geologic/Geotechnical Map: Pedestrian Bridge
Figure 2 - Preliminary Geologic Cross-Section
Figure 3 - City of San Diego Seismic Safety Study Map

Appendix A - References

cc: Addressee - juliana.richards@kimley-horn.com



EXPLANATION:

Qw — **Wash deposits (late Holocene)** – Unconsolidated bouldery to sandy alluvium of active and recently active washes.

Qya — **Young alluvial flood-plain deposits (Holocene and late Pleistocene)** – Poorly consolidated, poorly sorted, permeable flood-plain deposits of sandy, silty or clay-bearing alluvium.

Qoa — **Old alluvial flood-plain deposits, undivided (late to middle Pleistocene)** – Fluvial sediments deposited on canyon floors. Consists of moderately well consolidated, poorly sorted, permeable, commonly slightly dissected gravel, sand, silt, and clay-bearing alluvium.

Tf — **Friars Formation (middle Eocene)** – Yellowish-gray, medium-grained, massive, poorly indurated nonmarine and lagoonal sandstone and claystone with tongues of cobble conglomerate.

Tt — **Torrey Sandstone (middle Eocene)** – White to light-brown, medium- to coarse-grained, moderately well indurated, massive and broadly cross-bedded, arkosic sandstone.

Reference:
Kennedy, M.P. and Tan, S.S. (2008), Geologic Map of the San Diego 30' x 60' Quadrangle, California, California Geological Survey, Regional Geologic Map No. 3, scale 1:100,000.

0 1000' 2000'

SCALE (Feet)

Note: All locations are approximate.

N

LEGEND

B-1 (147) — **Approximate Location of Previous Boring - Geoscience, 2018** (Depth in Feet)

PRELIMINARY GEOLOGIC/GEOTECHNICAL MAP- SITE PLAN

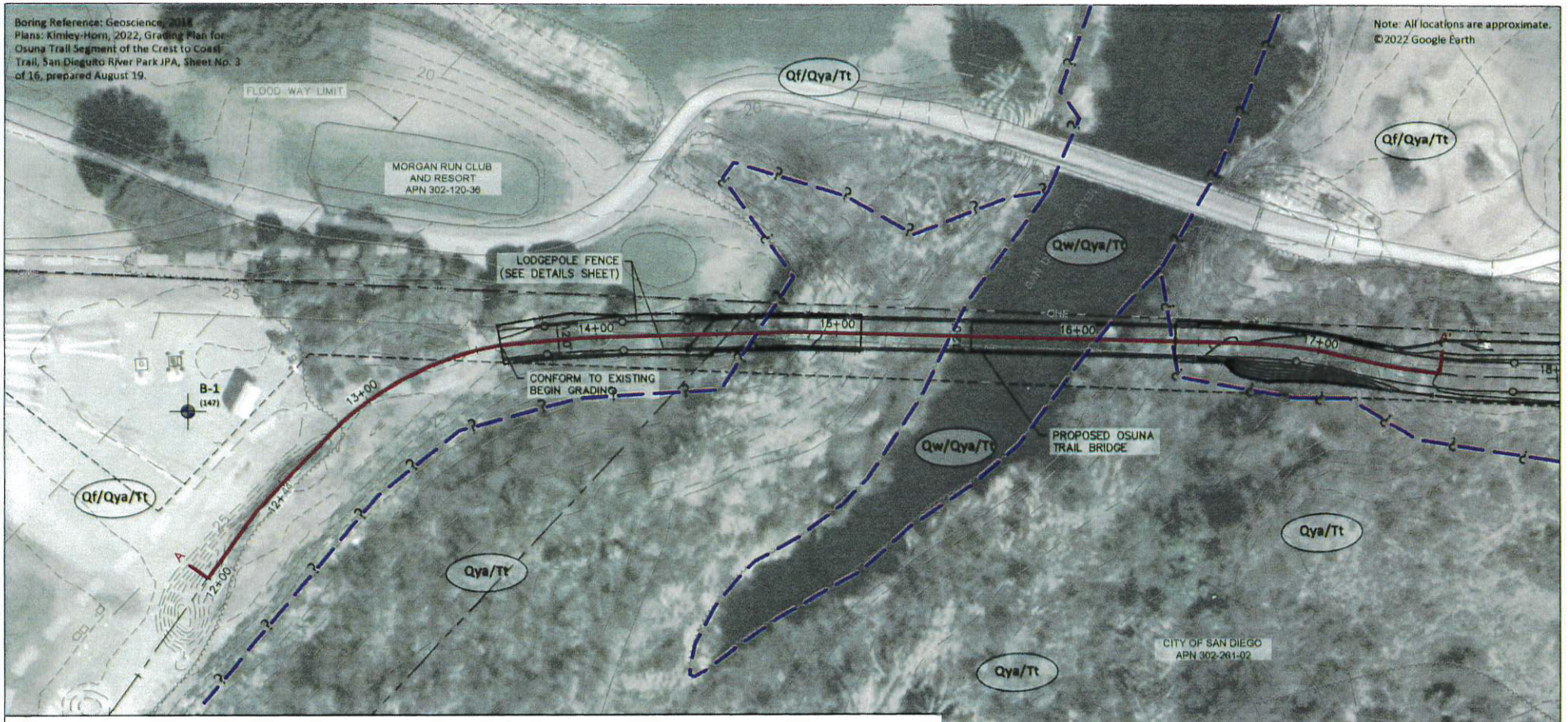
Osuna Trail Segment and Pedestrian Bridge
San Dieguito River Park, San Diego County

MTGL Project No.:	Date:	Author:
6274A01	September, 2022	TC

Geotechnical Engineering
Construction Inspection
Materials Testing
Environmental
MTGL

Figure No.

1A



LEGEND

- **B-1 (147)** – Approximate Location of Previous Boring Geoscience, 2018 (Depth in Feet)
- **A A'** – Geologic Cross Section
- Estimated Geologic Limits (Queried where uncertian)
- Limits of Proposed Grading

Qw/Qya/Tt – Wash deposits overlying Young alluvial flood-plain deposits, overlying Torrey Sandstone (or other regional bedrock unit at depth)

Qf/Qya/Tt – Undocumented or proposed fill overlying Young alluvial flood-plain deposits, overlying Torrey Sandstone (or other regional bedrock unit at depth)

Qya/Tt – Young alluvial flood-plain deposits, overlying Torrey Sandstone (or other regional bedrock unit at depth)

PRELIMINARY GEOLOGIC/GEOTECHNICAL MAP- SITE PLAN
Osuna Trail Segment and Pedestrian Bridge
San Dieguito River Park, San Diego County

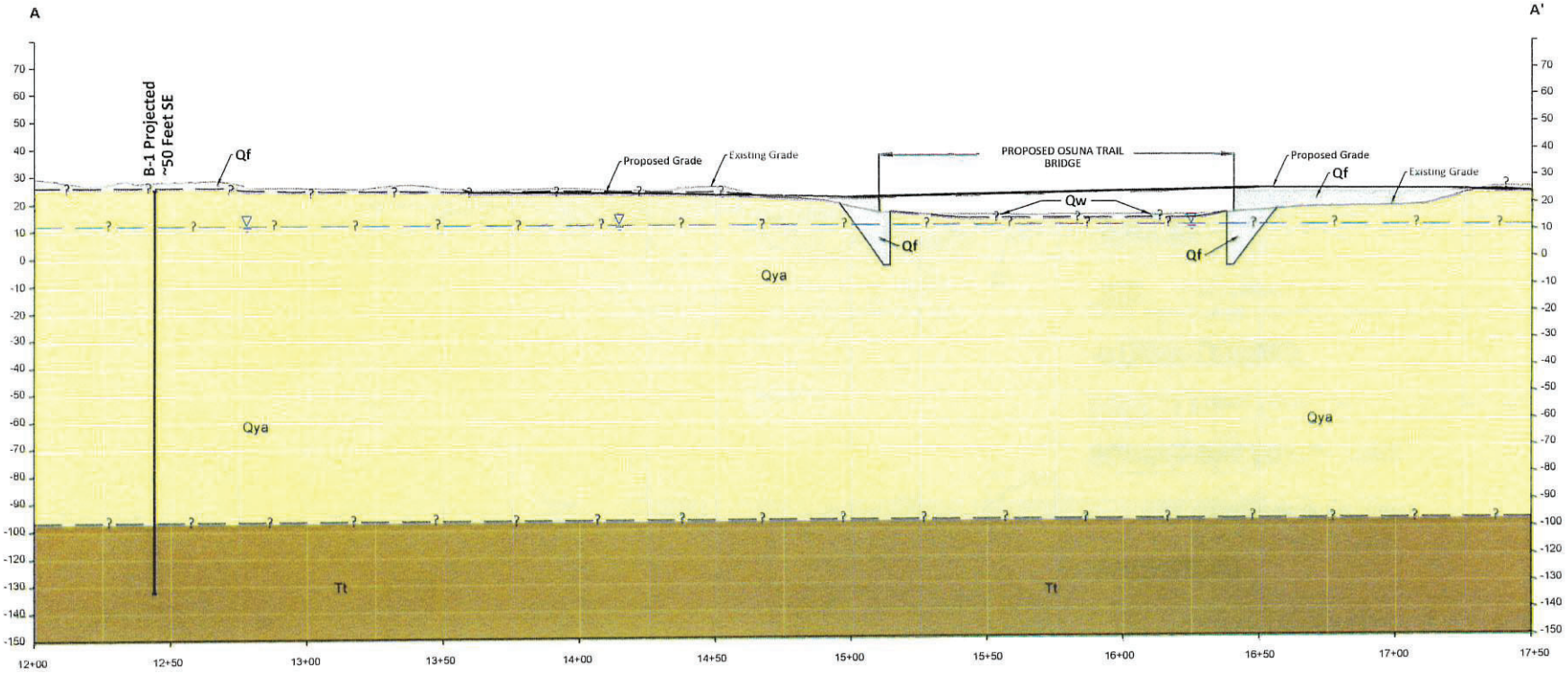
MTGL Project No.:	Date:	Author:
6274A01	September, 2022	THC

MTGL Geotechnical Engineering Construction Inspection Materials Testing Environmental

Figure No. 1B

Boring Reference: Geoscience, 2018
Plans: Kimley-Horn, 2022, Grading Plan for Osuna Trail Segment of the Crest to Coast Trail, San Dieguito River Park JPA, Sheet No. 3 of 16, prepared August 19.

Note: All locations and elevations are approximate.



0' 40' 80'
SCALE (feet)

LEGEND

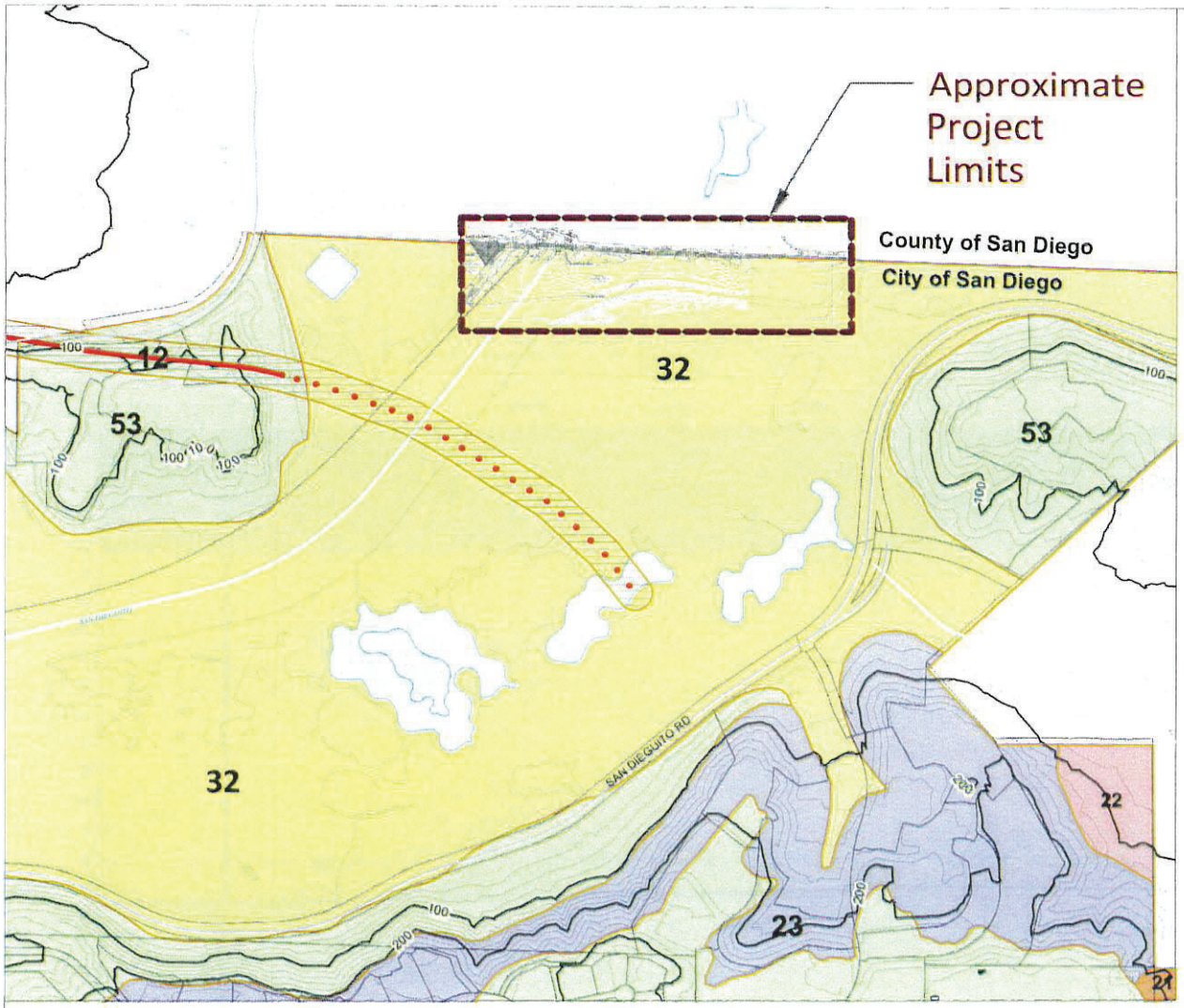
- B-1 — Previous Boring Geoscience, 2018
- Groundwater as Encountered in Previous Boring, Queried Where Uncertain or Inferred
- —?— Geologic Contact, Queried Where Uncertain or Inferred
- Qf — Undocumented / Proposed Fill
- Qw — Wash Deposits
- Qya — Young alluvial flood-plain deposits
- Tt — Infered Torrey Sandstone, or other regional bedrock unit.

PRELIMINARY GEOLOGIC/GEOTECHNICAL MAP- SITE PLAN
Osuna Trail Segment and Pedestrian Bridge
San Dieguito River Park, San Diego County

MTGL Project No.:	Date:	Author:
6274A01	September, 2022	THC

Geotechnical Engineering Construction Inspection Materials Testing Environmental
MTGL

Figure No. 2



EXPLANATION:

LIQUEFACTION

- 31 High Potential -- shallow groundwater major drainages, hydraulic fills
- 32 Low Potential -- fluctuating groundwater minor drainages

FAULT ZONES

- 11 Active, Alquist-Priolo Earthquake Fault Zone
- 12 Potentially Active, Inactive, Presumed Inactive, or Activity Unknown

LANDSLIDES

- 22 Possible or conjectured

SLIDE-PRONE FORMATIONS

- 23 Friars: neutral or favorable geologic structure

OTHER TERRAIN

- 53 Level or sloping terrain, unfavorable geologic structure, Low to moderate risk

FAULTS

- Fault
- Inferred Fault
- Concealed Fault

Reference:
City of San Diego (2008), Seismic Safety Study, Geologic Hazards and Faults, Grid Tile: 42 Development Services Department, April 3, Scale 1:800.

0' 1000' 2000'

SCALE (Feet)

Note: All locations are approximate.

N

PRELIMINARY GEOLOGIC/GEOTECHNICAL MAP- SITE PLAN

Osuna Trail Segment and Pedestrian Bridge
San Dieguito River Park, San Diego County

MTGL Project No.:	Date:	Author:
6274A01	September, 2022	TC

Geotechnical Engineering
Construction Inspection
Materials Testing
Environmental
MTGL

Figure No.
3

REFERENCES

City of San Diego Development Services Department, 2022, *Project Issues Report,* PRJ-1049410, dated June 1.

City of San Diego (2008), *Seismic Safety Study, Geologic Hazards and Faults*, Grid Tile: 42 Development Services Department, April 3, Scale 1:800.

Geocon Incorporated, 2021, *Preliminary Foundation Report, Osuna Trail Bridge at San Dieguito River, Osuna Segment of Coast to Crest Trail Project, San Diego, California*, Project No. G2680-22-01, dated July 27.

Kennedy, M.P. and Tan, S.S., 2005, Geologic Map of the San Diego 30' x 60' Quadrangle, California, California Geological Survey, Regional Geologic Map Series, No. 2, Scale 1:100,000.

Kimley-Horn and Associates, Inc., 2022, *Grading Plan for Osuna Trail Segment of the Crest to Coast Trail, San Dieguito River Park JPA*, Sheet No. 3 of 16, prepared August 19.

Kimley-Horn and Associates, Inc., 202O, *Osuna Trail Segment of the Crest to Coast Trail, Draft Hydrology and Hydraulic Analysis for the San Dieguito River Southernly Adjacent to Morgan Run*, dated March 30.