GEOTECHNICAL ENGINEERING INVESTIGATION REPORT
RCSD WWTP REHABILITATION PROJECT
ROSAMOND, CALIFORNIA

BSK PROJECT G18-169-11B

PREPARED FOR:
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August 31, 2018

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1. INTRODUCTION

This report presents the results of a Geotechnical Engineering Investigation Report conducted by BSK Associates (BSK), for the Rosamond Community Service District Waste Water Treatment Plant (RCSD WWTP) Rehabilitation Project in Rosamond, California (Site). The Site is located at the intersection of Patterson Road and 10th Street West in Rosamond, California, as shown on the Site Vicinity Map, Figure A-1. The geotechnical engineering investigation was conducted in accordance with K/J Project No. 1844514*01 dated June 20, 2018.

This report provides a description of the geotechnical conditions at the Site and provides specific recommendations for earthwork with respect to the planned berm removal. In the event that changes occur in the design of the project, this report's conclusions and recommendations will not be considered valid unless the changes are reviewed with BSK and the conclusions and recommendations are modified or verified in writing.

1.1. Planned Construction

BSK understands that the proposed site is located at the existing RCSD WWTP in Rosamond, California in Kern County. BSK understands that the proposed site improvements consist of six sludge beds, an aeration basin, a clarifier, and grading for slopes and berms. The bottom and side slope of the sludge beds will be constructed with soil cement. The aeration basin will be lined with HDPE Liner. Also, Pond 17 will be converted into an infiltration pond with multiple cells. The plan is to conduct a full-scale infiltration test by constructing 250 feet by 250 feet small pond inside Pond 17.

In the event that significant changes occur in the design of the proposed improvements, this report's conclusions and recommendations will not be considered valid unless the changes are reviewed with BSK and the conclusions and recommendations are modified or verified in writing.

1.2. Purpose and Scope of Services

The objective of this geotechnical investigation was to characterize the subsurface conditions in the areas of the planned berm removal and provide geotechnical engineering recommendations for the preparation of plans for site preparation and earthwork. The scope of the investigation included a field exploration, laboratory testing, engineering analyses, and preparation of this report.

2. FIELD INVESTIGATION AND LABORATORY TESTING

2.1. Field Exploration

The field exploration for this investigation was conducted under the oversight of a BSK staff member. Ten (10) borings were drilled at the Site on June 29, 2018 using a 6625 Track Rig provided by Choice Drilling. Nine (9) borings were drilled at the Site on July 10, 2018 and July 11, 2018 using a Mobile B-61 Drill Rig provided by Dave's Drilling. The borings were drilled to a maximum depth of 51.5 feet beneath the existing ground surface (bgs).

The soil materials encountered in the Borings were visually classified in the field, and the logs were recorded during the drilling and sampling operations. Visual classifications of the materials encountered in the borings were made in general accordance with the Unified Soil Classification System (ASTM D 2488). A soil classification chart is presented in Appendix A.

Boring logs are presented in Appendix A and should be consulted for more details concerning subsurface conditions. Stratification lines were approximated by the field staff based on observations made at the time of drilling, while the actual boundaries between soil types may be gradual and soil conditions may vary at other locations.

2.2 Laboratory Testing

Laboratory tests were performed on selected soil samples to evaluate moisture content, dry density, collapse potential, moisture-density relationship, soil cement compressive strength, and corrosion characteristics. A description of the laboratory test methods and results are presented in Appendix B.

3. SITE CONDITIONS

The following sections address the Site descriptions and surface conditions, subsurface conditions, and groundwater conditions at the Site. This information is based on BSK's field exploration and published maps and reports.

3.1 Site Description and Surface Conditions

The Site currently exists at an existing wastewater treatment plant located at Rosamond Community Services District in Rosamond, California. The Site is located in the north quarter of the northwest quarter of Section 34, Township 9 North, and Range 12 West of the San Bernardino Meridian. The NAD 83 GPS coordinates for the center of the Site are 34.8337 degrees North latitude and 118.1446 degrees West longitude.

3.2 Regional Geology and Seismic Hazards Assessment

Our Scope of services included a review of published maps and reports to assess the regional geology and potential for seismic hazards.

3.2.1 Regional Geology

The site is located in the Mojave Desert. The Mojave is a broad interior region of isolated mountain ranges separated by expanses of desert plains. It has an interior enclosed drainage and many playas. There are two important fault trends that control topography – a prominent NW-SE trend and a secondary east-west trend. The Mojave province is wedged in a sharp angle between the Garlock Fault (southern boundary Sierra Nevada) and the San Andreas Fault, where it bends east from its northwest trend. The northern boundary of the Mojave is separated from the prominent Basin and Range by the eastern extension of the Garlock fault.

3.2.2 Seismic Hazards Assessment

The types of geologic and seismic hazards assessed include surface ground fault rupture, liquefaction, and slope failure.

The purpose of the Alquist-Priolo Geologic Hazards Zones Act, as summarized in CDMG Special Publication 42 (SP 42), is to "prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture." As indicated by SP 42, "the State Geologist is required to delineate "earthquake fault zones" (EFZs) along known active faults in California. Cities and counties affected by the zones must regulate certain development 'projects' within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting.

The Site is not located in a Alquist-Priolo (A-P) Fault Hazard Zone. The closest A-P Hazard Zone fault is the San Andreas fault zone located approximately 16.5 miles southwest of the site.

Zones of Required Investigation referred to as "Seismic Hazard Zones" in CCR Article 10, Section 3722, are areas shown on Seismic Hazard Zone Maps where Site investigations are required to determine the need for mitigation of potential liquefaction and/or earthquake-induced landslide ground displacements. There are no mapped areas that have Seismic Hazard Zones in the project area.

3.3 Subsurface Conditions

The surface of the site generally consisted of fine to coarse grained silty sand. The subsurface material generally consisted of clays, silts, and sands to depths of approximately 5 feet. Below 5 feet bgs, the soil varied with layers of clays, silts, fine to coarse sands, and fine gravel throughout the end of the borehole.

The boring logs in Appendix A provide a more detailed description of the materials encountered, including the applicable Unified Soil Classification System symbols.

3.4 Groundwater Conditions

Groundwater was encountered at the time of drilling on July 10, 2017 at 35 feet below the ground surface at Boring B-7. Based on the groundwater elevation data from the California Department of Water Resources (DWR), the historic high groundwater depth in the vicinity was recorded to be 9 feet bgs on March 29, 1951 from State Well 09N12W27J001S located approximately 0.85-mile northeast from the site.

Please note that the groundwater level may fluctuate both seasonally and from year to year due to variations in rainfall, temperature, pumping from wells and possibly as the result of other factors such as irrigation, that were not evident at the time of our investigation.

4. CONCLUSIONS AND RECOMMENDATIONS

Based upon the data collected during this investigation, and from a geotechnical engineering standpoint, it is our opinion that the soil conditions would not preclude the berm removal. Oversize material

encountered in the berm however, may require special handling since oversize material will not be conducive to thin fill lift placement.

4.1 Seismic Design Criteria

Based on Section 1613.3.2 of the 2016 California Building Code (CBC), the Site shall be classified as Site Class A, B, C, D, E or F based on the Site soil properties and in accordance with Chapter 20 of ASCE 7-10. Based on the "N" values from our soil Borings, as per Table 20.3-1 of ASCE 7-10, the Site is Class D ($15 \leq N \leq 50$).

The 2016 California Building Code (CBC) utilizes ground motion based on the Risk-Targeted Maximum Considered Earthquake (MCER) that is defined in the 2016 CBC as the most severe earthquake effects considered by this code, determined for the orientation that results in the largest maximum response to horizontal ground motions and with adjustment for targeted risk. Ground motion parameters in the 2016 CBC are based on ASCE 7-10, Chapter 11.

The United States Geologic Survey (USGS) has prepared maps presenting the Risk-Targeted MCE spectral acceleration (5 percent damping) for periods of 0.2 seconds (S_S) and 1.0 seconds (S_1). The values of S_S and S_1 can be obtained from the USGS Ground Motion Parameter Application available at: http://earthquake.usgs.gov/designmaps/us/application.php.

The USGS Ground Motion Parameter Application and Chapter 16 of the 2016 CBC based on ASCE 7-10 produced the spectral acceleration parameters risk targeted maximum considered earthquake values in Table 1 based on Site Class D conditions.

As per Section 1803.5.12 of the CBC, peak ground acceleration (PGA) utilized for dynamic lateral earth pressures and liquefaction, shall be based on a site-specific study (ASCE 7-10, Section 21.5) or ASCE 7-10, Section 11.8.3. The USGS Ground Motion Parameter Application and based on ASCE 7-10, Section 11.8.3 produced the Geometric Mean PGA value in Table 1 based on Site Class D conditions.

Table 1: Seismic Design Parameters

Seismic Design Parameter	2016 CBC Value		Reference
MCE Mapped Spectral Acceleration (g)	$S_S = 1.246$	$S_1 = 0.535$	USGS Mapped Value
Amplification Factors (Site Class D)	$F_a = 1.002$	$F_v = 1.500$	Table 1613.3.3
Site Adjusted MCE Spectral Acceleration (g)	$S_{MS} = 1.248$	$S_{M1} = 0.802$	Equations 16-37, 38
Design Spectral Acceleration (g)	$S_{DS} = 0.832$	$S_{D1} = 0.535$	Equations 16-39, 40
Geometric Mean PGA (g)	$PGA_M = 0.485$		ASCE Equations 11.8-1

As shown above, the short period design spectral response acceleration coefficient, S_{DS}, is greater than 0.50, therefore the Site lies in Seismic Design Category D as specified in Section 1613.3.5 of the 2016

CBC. The long period design spectral response acceleration coefficient, S_{D1}, is greater than 0.2, therefore the Site lies in Seismic Design Category D as specified in Section 1613.3.5 of the 2016 CBC. In accordance with the 2016 CBC, each structure shall be assigned to the more severe seismic design category in accordance with Table 1613.3.5(1) or 1613.3.5(2), irrespective of the fundamental period of vibration of the structure.

4.2 Soil Corrosivity

A surface soil sample obtained from the Site was tested to provide a preliminary screening of the potential for concrete deterioration or steel corrosion due to attack by soil-borne soluble salts. The test results are presented in Appendix B.

The corrosivity evaluation was performed by BSK on soil samples obtained at the time of drilling. The soils were evaluated for minimum resistivity (ASTM G57), pH (ASTM D4972), and soluble sulfate and chlorides (CT 417 and CT 422). At Boring B-2, the minimum resistivity was 180 ohm-cm, pH was 9.45, sulfate was detected at 25 parts per million (ppm) and chloride was detected at 50 ppm. At Boring B-4, the minimum resistivity was 130 ohm-cm, pH was 9.14, sulfate was detected at 25 parts per million (ppm) and chloride was detected at 50 ppm. At Boring B-7, the minimum resistivity was 210 ohm-cm, pH was 9.42, sulfate was detected at 25 parts per million (ppm) and chloride was detected at 25 ppm.

The water-soluble sulfate content severity class is considered negligible to concrete (Exposure Category S0 per Table 19.3.1.1 of ACI 318-14). Representative samples of the Site soil have a minimum resistivity ranging from 130 to 210 ohm-cm which is considered very severely corrosive to buried metal conduit. Therefore, buried metal conduits, ferrous metal pipes, and exposed steel should have a protective coating in accordance with the manufacturer's specification.

4.3 Site Preparation Recommendations

The following procedures must be implemented during Site preparation for the proposed Site improvements. References to maximum dry density, optimum moisture content, and relative compaction are based on ASTM D 1557 (latest test revision) laboratory test procedures.

1. The areas of proposed improvements must be cleared of surface vegetation and debris. Materials resulting from the clearing and stripping operations must be removed and properly disposed of off-site. In addition, all undocumented fills should be removed where encountered and where fills or structural improvements will be placed. Following stripping and removal operations, BSK recommends overexcavation and replacement with non-expansive soils (EI less than 35) within the upper 2 feet of the bottom of the foundations. The existing on-site soils with an expansion index greater than 35 are suitable for reuse as fill below a depth of 2 feet below the bottom of the pads.
2. Structures and Embankments: All structures including embankment of the storage ponds must be over excavated to a depth of 2 feet below existing grade or two feet below footings, whichever is deeper. Structures greater than 5 feet below existing grade do not require additional overexcavation. The overexcavation should extend at least 5 feet from edge of

foundation or toe of embankment. BSK recommends a minimum dry time of 30 days prior to sludge bed grading followed by test pits to check moisture content. Additional depth overexcavation may be necessary. Therefore, BSK recommends overexcavation grading costs be quoted by contractors on a per unit cost for this line item.

3. Sludge Beds: BSK recommends a soil to cement mix of 6% for the bottom and side slopes of the sludge beds. The upper 12 inches of the side slopes and bottom should be compacted to 95% of ASTM D698.
4. Interior Drives: For interior drive areas, BSK recommends overexcavation and recompaction of the upper 12 inches in the drive areas prior to fill placement. The bottom eight inches of soil in the excavations should be scarified, worked until free from large clods, moisture conditioned as necessary, and recompacted to a minimum 90 percent of maximum dry density prior to fill placement.
5. After overexcavation, the bottom of the exposed soil should be scarified 8 inches, moisturized to optimum moisture content, and compacted to 90% of ASTM D1557.
6. Following the required stripping and overexcavation, the exposed ground surface must be inspected by the Geotechnical Engineer to evaluate if loose or soft zones are present that will require over excavation.
7. Imported soil or native excavated soils, free of organic materials or deleterious substances, may be placed as compacted engineered fill. The material must be free of oversized fragments greater than 3-inches in greatest dimension. Engineered fill must be placed in uniform layers not exceeding 8-inches in loose thickness, moisture conditioned to within 2 to 4 percent above optimum moisture content, and compacted to at least 90 percent relative compaction.
8. BSK must be called to the site to verify the import material properties through laboratory testing.
9. If possible, earthwork operations should be scheduled during a dry, warm period of the year. Should these operations be performed during or shortly following periods of inclement weather, unstable soil conditions may result in the soils exhibiting a “pumping” condition. This condition is caused by excess moisture in combination with moving construction equipment, resulting in saturation and zero air voids in the soils. If this condition occurs, the adverse soils will need to be over-excavated to the depth at which stable soils are encountered, and replaced with suitable soils compacted as engineered fill. Alternatively, the Contractor may proceed with grading operations after utilizing a method to stabilize the soil subgrade, which should be subject to review and approval by BSK prior to implementation.
10. Import fill materials must be free from organic materials or deleterious substances. The project specifications must require the contractor to contact BSK to review the proposed import fill materials for conformance with these recommendations at least one week prior to importing to the Site, whether from on-site or off-site borrow areas. Imported fill soils must be non-hazardous and derived from a single, consistent soil type source conforming to the following criteria:

Plasticity Index:	< 12
Expansion Index:	< 35 (Very Low Expansion Potential)
Maximum Particle Size:	3 inches

Percent Passing #4 Sieve:	65 - 100
Percent Passing #200 Sieve:	20 - 45
Low Corrosion Potential:	Soluble Sulfates < 1,500 ppm
	Soluble Chlorides < 150 ppm
	Minimum Resistivity > 3,000 ohm-cm

4.4 Foundations

Provided the recommendations contained in this report are implemented during design and construction, it is our opinion that the structures can be supported on shallow foundations or mat foundations.

4.4.1 Shallow Foundations for Miscellaneous Structures

Continuous and isolated spread footings must have a minimum width of 12 inches and 24 inches, respectively. Continuous and isolated spread footing foundations may be designed using a net allowable bearing pressure of 3,000 pounds per square foot (psf). A net allowable increase of 1,000 psf for each additional foot of depth (D) and 500 psf for each additional foot of width (B); to a maximum of 4,500 psf. The net allowable bearing pressure applies to the dead load plus live load (DL + LL) condition; it may be increased by 1/3 for wind or seismic loads. Total foundation settlements are expected to be less than 0.5 and differential settlements between similarly loaded (DL + LL) and sized footings are anticipated to be less than 0.25. Differential settlement of continuous footings, expressed in terms of angular distortion, is estimated to be approximately 1/600.

4.4.2 Mat Foundations

We understand that the structure may be supported on a concrete mat foundation. The mat foundation may be designed to impose a maximum allowable pressure of 3,000 pounds per square foot (psf) due to dead plus live loads. This value may be increased by one-third for transient loads such as seismic or wind. The concrete mat foundation should be embedded at least 8 inches below the lowest adjacent grade. Structural concrete slabs-on-grade may be designed using an unadjusted long-term Modulus of Subgrade Reaction (Ks) of 150 pounds per cubic inch (pci).

Settlements: Based on the results of our laboratory tests and analyses, total static settlements of the mat foundation under the allowable bearing pressure are expected to be approximately 1-inch, and maximum differential settlements are expected to be about 1/2-inch.

4.5 Lateral Earth Pressures and Frictional Resistance

Provided the Site is prepared as recommended above, the following earth pressure parameters for footings may be used for design purposes. The parameters shown in the table below are for drained conditions of select engineered fill or undisturbed native soil.

Table 2: Recommended Static Lateral Earth Pressures for Footings	
Lateral Pressure Condition	Equivalent Fluid Density (pcf) Drained Condition
Active Pressure	40
At Rest Pressure	50
Passive Pressure	500

The lateral earth pressures listed herein are obtained by the conventional equation for active, at rest, and passive conditions assuming level backfill and a bulk unit weight of 125 pcf for the Site soils. A coefficient of friction of 0.30 may be used between soil sub-grade and the bottom of footings.

The coefficient of friction and passive earth pressure values given above represent ultimate soil strength values. BSK recommends that a safety factor consistent with the design conditions be included in their usage in accordance with Sections 1806.3.1 through 1806.3.3 of the 2016 CBC. For stability against lateral sliding that is resisted solely by the passive earth pressure against footings or friction along the bottom of footings, a minimum safety factor of 1.5 is recommended. For stability against lateral sliding that is resisted by combined passive pressure and frictional resistance, a minimum safety factor of 2.0 is recommended. For lateral stability against seismic loading conditions, a minimum safety factor of 1.2 is recommended.

4.6 Excavation Stability

Soils encountered within the depth explored are generally classified as Type C soils in accordance with OSHA (Occupational Safety and Health Administration). The slopes surrounding or along temporary excavations may be vertical for excavations that are less than five feet deep and exhibit no indication of potential caving, but should be no steeper than 1.5H:1V for excavations that are deeper than five feet, up to a maximum depth of 15 feet. Certified trench shields or boxes may also be used to protect workers during construction in excavations that have vertical sidewalls and are greater than 5 feet deep. Temporary excavations for the project construction should be left open for as short a time as possible and should be protected from water runoff. In addition, equipment and/or soil stockpiles must be maintained at least 10 feet away from the top of the excavations. Because of variability in soils, BSK must be afforded the opportunity to observe and document sloping and shoring conditions at the time of construction. Slope height, slope inclination, and excavation depths (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations, (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

4.7 Drainage Considerations

The control surface drainage in the project areas is an important design consideration. BSK recommends that final grading around shallow foundations must provide for positive and enduring drainage away from the structures, and ponding of water must not be allowed around, or near the shallow foundations. Ground surface profiles next to the shallow foundations must have at least a 2 percent gradient away from the structures.

4.8 Pond Embankment

Due to the high wind in the Mojave area, the interior slope will be subject to erosion from wind-wave action. The interior slope should be protected with concrete rip-rap.

5. PLANS AND SPECIFICATIONS REVIEW

BSK recommends that it be retained to review the draft plans and specifications for the project, with regard to foundations and earthwork prior to their being finalized.

6. CONSTRUCTION TESTING AND OBSERVATIONS

Geotechnical testing and observation during construction is a vital extension of this geotechnical investigation. BSK recommends that it be retained for those services. Field review during Site preparation and grading allows for evaluation of the exposed soil conditions and confirmation or revision of the assumptions and extrapolations made in formulating the design parameters and recommendations. BSK's observations must be supplemented with periodic compaction tests to establish substantial conformance with these recommendations.

If a firm other than BSK is retained for these services during construction, then that firm must notify the owner, project designers, governmental building officials, and BSK that the firm has assumed the responsibility for all phases (i.e., both design and construction) of the project within the purview of the geotechnical engineer. Notification must indicate that the firm has reviewed this report and any subsequent addenda, and that it either agrees with BSK's conclusions and recommendations, or that it will provide independent recommendations.

7. LIMITATIONS

The analyses and recommendations submitted in this report are based upon the data obtained from the Borings performed at the locations shown on the Boring Location Map, Figure A-2. The report does not reflect variations which may occur between or beyond the Borings. The nature and extent of such variations may not become evident until construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-Site observations during the excavation period and noting the characteristics of the variations.

The validity of the recommendations contained in this report is also dependent upon an adequate testing and observation program during the construction phase. BSK assumes no responsibility for construction compliance with the design concepts or recommendations unless it has been retained to perform the testing and observation services during construction as described above.

The findings of this report are valid as of the present. However, changes in the conditions of the Site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK has prepared this report for the exclusive use of the Client and members of the project design team. The report has been prepared in accordance with generally accepted geotechnical engineering practices which existed in Kern County at the time the report was written. No other warranties either expressed or implied are made as to the professional advice provided under the terms of BSK's agreement with Client and included in this report.

8. REFERENCES

Department of Water Resources. http://www.water.ca.gov/waterdatalibrary/, Water Data Library, August 2018.

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Lee, Norman. California Geomorphic Provinces (2012): n. pag. California Department of Conservation. California Geological Survey.<http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/note_36/Documents/note_36.pdf>. August 2018.

United States Geological Survey. http://earthquake.usgs.gov/designmaps/us/application.php, United States Design Maps, June 2018.

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

The field exploration for this investigation was conducted under the oversight of a BSK staff member. Ten (10) borings were drilled at the Site on June 29, 2018 using a 6625 Track Rig provided by Choice Drilling. Nine (9) borings were drilled at the Site on July 10, 2018 and July 11, 2018 using a Mobile B-61 Drill Rig provided by Dave's Drilling. The borings were drilled to a maximum depth of 51.5 feet beneath the existing ground surface (bgs).

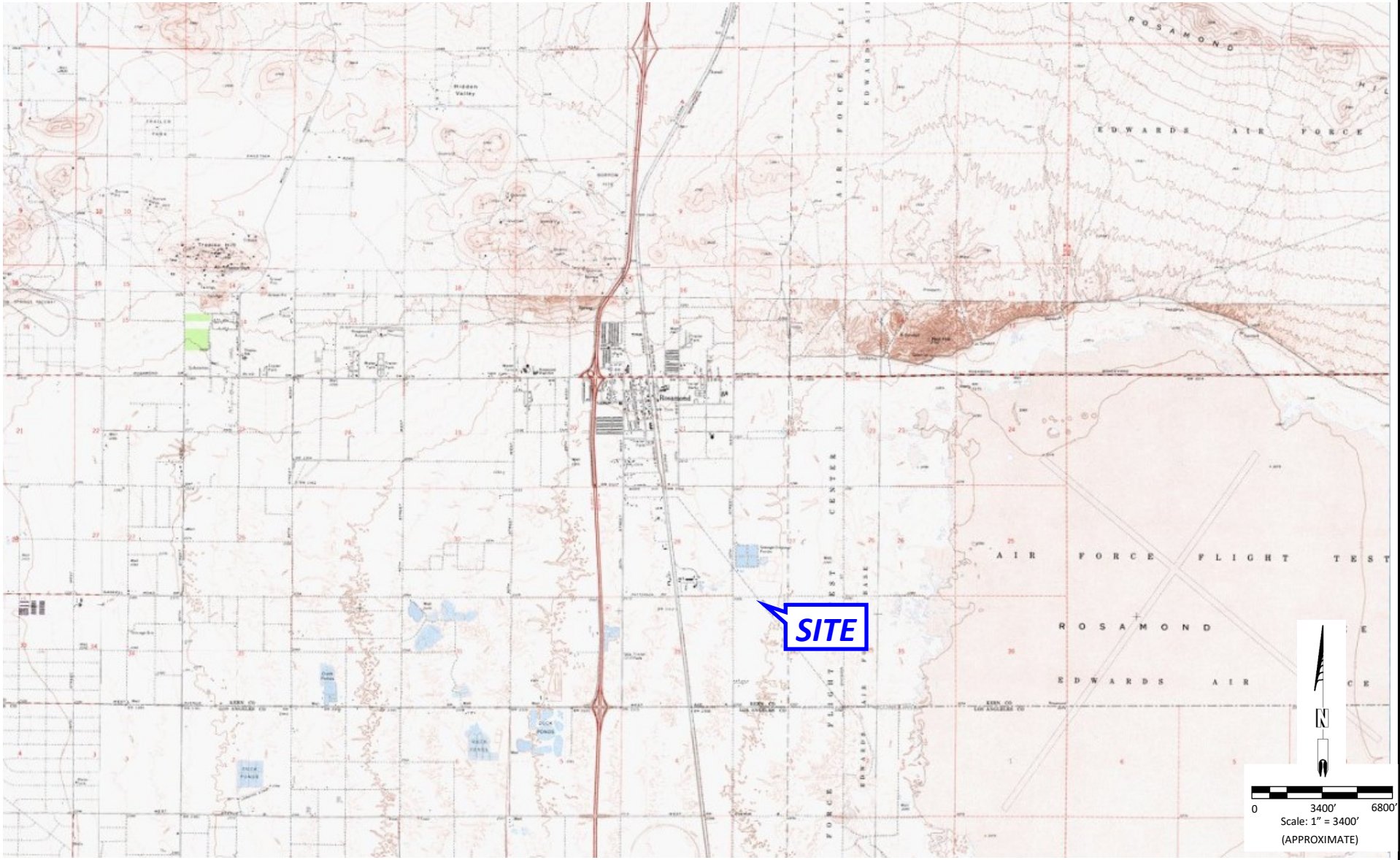
The soil materials encountered in the test borings were visually classified in the field, and the logs were recorded during the drilling and sampling operations. Visual classification of the materials encountered in the test borings was made in general accordance with the Unified Soil Classification System (ASTM D 2488). A soil classification chart is presented herein. Boring logs are presented herein and should be consulted for more details concerning subsurface conditions. Stratification lines were approximated by the field staff based on observations made at the time of drilling, while the actual boundaries between soil types may be gradual and soil conditions may vary at other locations.

Subsurface samples were obtained at the successive depths shown on the boring logs by driving samplers which consisted of a 2.5-inch inside diameter (I.D.) California Sampler and a 1.4-inch I.D. Standard Penetration Test (SPT) Sampler. The samplers were driven 18 inches using a 140-pound hammer dropped from a height of 30 inches by means of either an automatic hammer or a down-hole safety hammer. The number of blows required to drive the last 12 inches was recorded as the blow count (blows/foot) on the boring logs. The relatively undisturbed soil core samples were capped at both ends to preserve the samples at their natural moisture content. Soil samples were also obtained using the SPT Sampler lined with metal tubes or unlined in which case the samples were placed and sealed in polyethylene bags. At the completion of the field exploration, the test borings were backfilled with the excavated soil cuttings.

It should be noted that the use of terms such as "loose", "medium dense", "dense" or "very dense" to describe the consistency of a soil is based on sampler blow count and is not necessarily reflective of the in-place density or unit weight of the soils being sampled. The relationship between sampler blow count and consistency is provided in the following Tables A-1 and A-2 for coarse-grained (sandy and gravelly) soils and fine grained (silty and clayey) soils, respectively.

Table A-1: Consistency of Coarse-Grained Soil by Sampler Blow Count		
Consistency Descriptor	**SPT Blow Count (#Blows / Foot)**	**2.5" I.D. California Sampler Blow Count (#Blows / Foot)**
Very Loose	<4	<6
Loose	4 – 10	6 – 15
Medium Dense	10 – 30	15 – 45
Dense	30 – 50	45 – 80
Very Dense	>50	>80

Table A-2: Consistency of Fine-Grained Soil by Sampler Blow Count		
Consistency Descriptor	**SPT Blow Count (#Blows / Foot)**	**2.5" I.D. California Sampler Blow Count (#Blows / Foot)**
Very Soft	<2	<3
Soft	2 – 4	3 – 6
Medium Stiff	4 – 8	6 – 12
Stiff	8 – 15	12 – 24
Very Stiff	15 – 30	24 – 45
Hard	>30	>45



REFERENCE IMAGE: USGS

BSK ASSOCIATES
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SITE VICINITY MAP

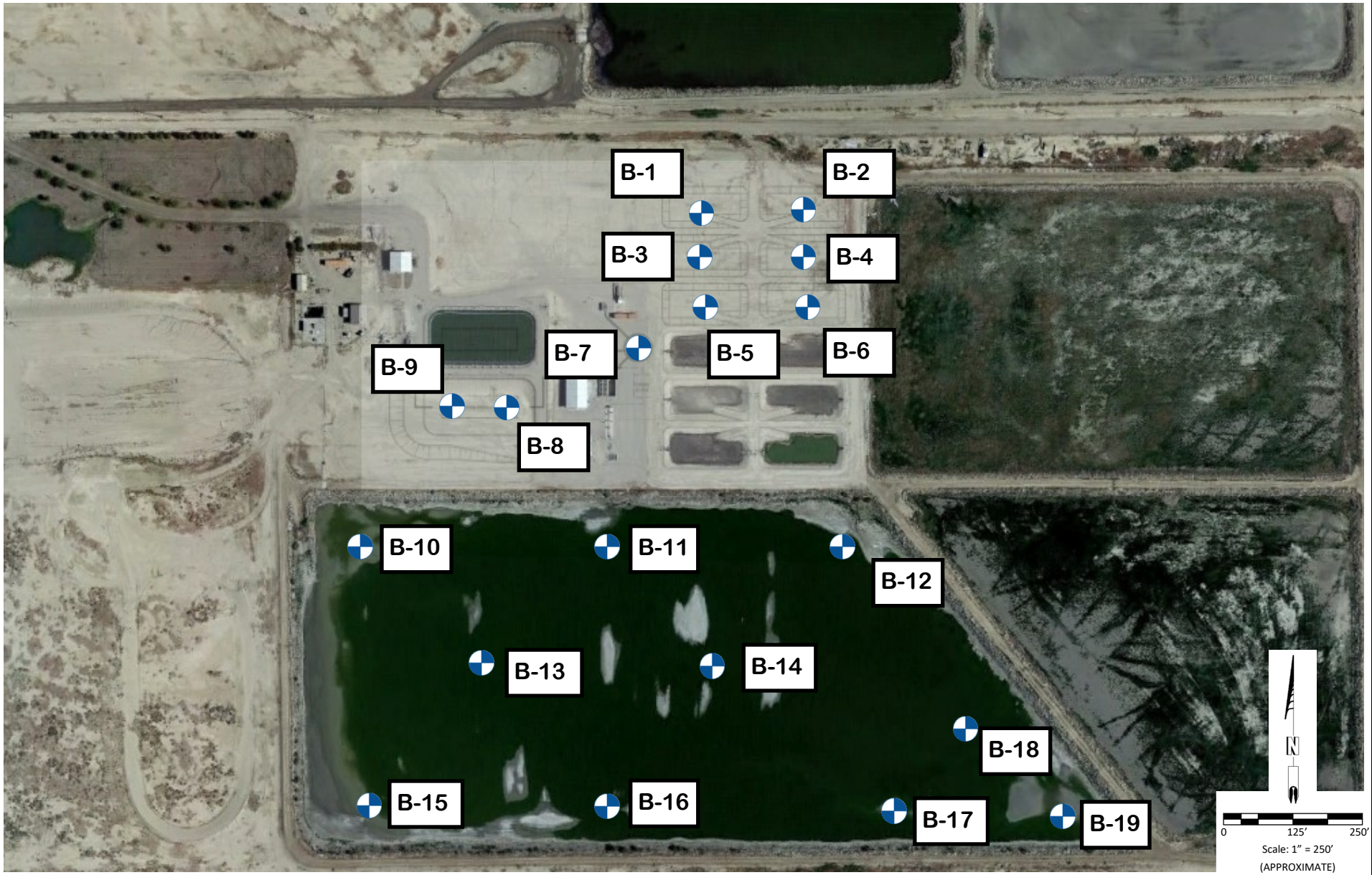
RCSD WWTP Rehabilitation Project
Rosamond, California

FIGURE A-1

JOB NO. G18-169-11B
DATE August 2018

DR. BY VS
CH. BY AXT
SCALE AS SHOWN

SHEET NO. 1
OF 1 SHEETS



REFERENCE IMAGE: Site Map

LEGEND:

APPROXIMATE BORING LOCATION B-1

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BORING LOCATION MAP

RCSD WWTP Rehabilitation Project
Rosamond, California

FIGURE A-2

JOB NO. G18-169-11B
DATE August 2018

DR. BY VS
CH. BY AXT
SCALE AS SHOWN

SHEET NO. 1 OF 1 SHEETS

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS More than Half >#200	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES
		GRAVELS WITH OVER 15% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 15% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half <#200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS , MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

Note: Dual symbols are used to indicate borderline soil classifications.

	Pushed Shelby Tube	RV	R-Value
	Standard Penetration Test	SA	Sieve Analysis
	Modified California	SW	Swell Test
	Auger Cuttings	TC	Cyclic Triaxial
	Grab Sample	TX	Unconsolidated Undrained Triaxial
	Sample Attempt with No Recovery	TV	Torvane Shear
CA	Chemical Analysis	UC	Unconfined Compression
CN	Consolidation	(1.2)	(Shear Strength, ksf)
CP	Compaction	WA	Wash Analysis
DS	Direct Shear	(20)	(with % Passing No. 200 Sieve)
PM	Permeability		Water Level at Time of Drilling
PP	Pocket Penetrometer		Water Level after Drilling (with date measured)

SOIL CLASSIFICATION CHART AND KEY TO TEST DATA
Unified Soil Classification System

BSK ASSOCIATES

PLATE: Figure A-3

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LOG OF BORING NO. B-01

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse desert vegetation, mud cracks, silty sand, yellowish brown, dry, fine to coarse grained, trace fine gravel, sub-angular.										
		ML: SANDY SILT: light olive brown, dry. ...fine grained.			28			106	11			
		...very stiff, fine to coarse grained, well-graded, sub-angular, trace calcium. **ML: VERY STIFF SILT WITH SAND:** light olive brown, dry, fine to medium grained, poorly-graded, sub-angular, trace calcium.			38			114	3			
5		**SM: MEDIUM DENSE SILTY SAND WITH FINE GRAVEL AND GRAVEL:** olive, slightly moist, fine to coarse grained, well-graded, sub-angular.										
10		**SM: MEDIUM DENSE SILTY SAND:** olive gray, moist, fine to coarse grained, well-graded, sub-angular, trace oxidation, trace fine gravel, sub-angular. ...no trace fine gravel.			28							
15		**SM: MEDIUM DENSE SILTY SAND:** olive, moist, fine to medium grained, poorly-graded, sub-angular. ...increased amount of silt, trace coarse sand, sub-angular.			11							
20		End of boring.										
25												

Completion Depth: 16.5
Date Started: 7/11/18
Date Completed: 7/11/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-02

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse desert vegetation, mud cracks, silty sand, yellowish brown, dry, fine to coarse grained, trace fine gravel, sub-angular.										
		ML: SANDY SILT: light yellowish brown, dry. ...fine to medium grained.										
		ML: HARD SILT WITH SAND: light yellowish brown, dry, fine to coarse grained, well-graded, sub-angular, with spotted calcium. ...hard sandy silt.			53			117	7			
5					22			111	6			
		SM: MEDIUM DENSE SILTY SAND: olive, dry, fine to coarse grained, well-graded, sub-angular sand, trace fine gravel, sub-angular.										
		ML: STIFF SILT WITH SAND: dark grayish brown, dry, fine grained, trace clay.										
10					21							
		SM: MEDIUM DENSE SILTY SAND: dark grayish brown, dry, fine to coarse grained, well-graded, sub-angular.										
15					9							
		SP: LOOSE SAND WITH SILT: olive brown, slightly moist, fine to coarse grained, poorly-graded, sub-angular.										
		LOOSE SILTY SAND: olive brown, moist, fine to medium grained, poorly-graded, sub-angular.										
		ML: STIFF SILT WITH CLAY: dark grayish brown, moist.										
		End of boring.										
20												
25												

Completion Depth: 16.5
Date Started: 7/11/18
Date Completed: 7/11/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-03

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse desert vegetation, mud cracks, silty sand, yellowish brown, dry, fine to coarse grained, trace fine gravel, sub-angular.										
		ML: SANDY SILT: yellowish brown, dry. ...fine to medium grained.			23			98	17			
		ML: STIFF SANDY SILT: light olive brown, dry, fine to medium grained, poorly-graded, sub-angular, trace coarse sand, trace calcium.										
5					28			100	18			
		ML: VERY STIFF SILT: olive brown, slightly moist, trace fine to medium grained sand, poorly-graded, sub-angular, trace clay, trace calcium.										
10					11			118	13			
		SM: LOOSE SILTY SAND: dark grayish brown, moist, fine to coarse grained, well-graded, sub-angular sand, trace fine gravel, sub-angular.										
		ML: MEDIUM STIFF SILT: dark grayish brown, moist, trace fine to medium grained sand, poorly-graded, sub-angular, trace clay.										
15		**SP: MEDIUM DENSE SAND WITH SILT:** olive, slightly moist, fine to coarse grained, well-graded, sub-angular sand, trace fine gravel, sub-angular.			12							
		End of boring.										
20												
25												

Completion Depth: 16.5
Date Started: 7/11/18
Date Completed: 7/11/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-04

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse desert vegetation, mud cracks, silty sand, yellowish brown, dry, fine to coarse grained, trace fine gravel, sub-angular.										
		ML: SILT WITH SAND: light olive brown, dry. ...fine to coarse grained sand, trace fine gravel, sub-angular.			25			113	9			
5		**ML: VERY STIFF SILT:** light olive brown, dry, fine to coarse grained, well-graded, sub-angular, with clay, trace calcium.			24			103	10			
10		**SM: MEDIUM DENSE SILTY SAND:** dark grayish brown, dry, fine to coarse grained, well-graded, sub-angular, trace fine gravel, sub-angular.			43							
		SP: MEDIUM DENSE SAND WITH SILT: olive, dry, fine to coarse grained, well-graded, sub-angular, trace fine gravel, sub-angular.										
15		**SP: MEDIUM DENSE SAND:** olive brown, slightly moist, fine to coarse grained, well-graded, sub-angular, trace fine gravel, trace gravel, sub-angular, trace silt.			18							
		SM: MEDIUM DENSE SILTY SAND: olive, moist, fine to medium grained, poorly-graded, sub-angular.										
20		End of boring.										
25												

Completion Depth: 16.5
Date Started: 7/11/18
Date Completed: 7/11/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-05

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse desert vegetation, mud cracks, silty sand, yellowish brown, dry, fine to coarse grained, trace fine gravel, sub-angular.										
		ML: SANDY SILT: olive brown, dry. ...fine to medium grained sand, poorly-graded, sub-angular.										
					41			127	8			
		SM: MEDIUM DENSE SILTY SAND: olive, slightly moist, fine to coarse grained, well-graded, sub-angular, trace fine gravel, sub-angular, trace calcium.										
5					35			114	14			
		ML: VERY STIFF SILT WITH SAND: light olive brown, slightly moist, fine grained sand, trace clay, trace calcium.										
10					23			119	9			
		SM: MEDIUM DENSE SILTY SAND: olive brown, moist, fine to coarse grained, well-graded, sub-angular, trace fine gravel, angular and sub-angular. ...fine to medium grained, poorly-graded, sub-angular, trace calcium, no trace fine gravel.										
15		**SM: MEDIUM DENSE SILTY SAND:** grayish brown, moist, fine to medium grained, poorly-graded, sub-angular, trace clay.			15							
		SM: MEDIUM DENSE SILTY SAND: grayish brown, moist, fine to coarse grained, well-graded, sub-angular.										
		End of boring.										
20												
25												

Completion Depth: 16.5
Date Started: 7/11/18
Date Completed: 7/11/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-06

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse desert vegetation, mud cracks, silty sand, yellowish brown, dry, fine to coarse grained, trace fine gravel, sub-angular.										
		ML: SANDY SILT: olive brown, slightly moist. ...fine to medium grained sand, poorly-graded, sub-angular.			58			127	9			
		SM: DENSE SILTY SAND: olive, slightly moist, fine to coarse grained, poorly-graded, sub-angular, trace calcium.										
		ML: HARD SANDY SILT: light olive brown, slightly moist, fine to medium grained sand, poorly-graded, sub-angular.										
5		...hard, trace calcium, trace clay.			58			125	12			
10		**SM: MEDIUM DENSE SILTY SAND:** olive, slightly moist, fine grained, trace calcium. ...trace oxidation, no trace calcium.			28							
15		**SM: SILTY SAND:** olive gray, slightly moist, fine to coarse grained, well-graded, sub-angular, with silt clumps.										
		End of boring.										
20												
25												

Completion Depth: 16.5
Date Started: 7/11/18
Date Completed: 7/11/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-07

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silty sand with gravel and fine gravel, yellowish brown, dry, fine to coarse grained, well-graded, sub-angular.										
		SM: SILTY SAND: yellowish brown, dry. ...fine to medium grained, poorly-graded, sub-angular sand, trace fine gravel, sub-angular.			35			118	15			
		SM: MEDIUM DENSE SILTY SAND: yellowish brown, dry, fine to medium grained, poorly-graded, sub-angular, trace calcium.										
5					34			125	11			
		...medium dense, increased amount of silt.										
10					27			109	3			
		ML: VERY STIFF SILT WITH SAND: yellowish brown, dry, fine grained sand, trace calcium.										
		SP: MEDIUM DENSE SAND: yellowish brown, dry, fine to coarse grained, well-graded, sub-angular, trace silt.										
15		**SM: MEDIUM DENSE SILTY SAND:** olive, slightly moist, fine to medium grained, poorly-graded, sub-angular.			11							
		ML: STIFF SILT: grayish brown, slightly moist, trace oxidation, trace clay.										
20					44			109	2			
		SP: MEDIUM DENSE SAND: yellowish brown, dry, fine to coarse grained, poorly-graded, sub-angular. ...trace silt, trace fine gravel, sub-angular.										
25												

Completion Depth: 51.5
Date Started: 7/10/18
Date Completed: 7/10/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-07

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SP: LOOSE SAND WITH SILT: olive brown, dry, fine to coarse grained, well-graded, sub-angular.			9							
		SM: LOOSE SILTY SAND: light olive brown, moist, fine to medium grained, poorly-graded, sub-angular, trace clay.										
30					15							
		ML: STIFF SILT: olive gray, moist, trace clay. ...pale olive.										
35		▽ **SP: MEDIUM DENSE SAND WITH SILT:** olive, wet, fine to coarse grained, well-graded, sub-angular.			24							
40					16							
		ML: STIFF SILT: olive, moist, trace fine to medium grained sand, poorly-graded, sub-angular, trace clay.										
45		**ML: MEDIUM STIFF SILT:** olive, moist, trace calcium, trace clay.			7							
		SM: LOOSE SILTY SAND: olive, moist, fine to coarse grained, well-graded, sub-angular.										
50												

Completion Depth: 51.5
Date Started: 7/10/18
Date Completed: 7/10/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS 1-9.GPJ GEOTECHNICAL 08.GDT 8/17/18

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LOG OF BORING NO. B-07

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SM: LOOSE SILTY SAND: olive, moist, fine to coarse grained, well-graded, sub-angular.*(continued)*			42							
		...fine grained.										
		End of boring.										
55												
60												
65												
70												
75												

Completion Depth: 51.5
Date Started: 7/10/18
Date Completed: 7/10/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS 1-9.GPJ GEOTECHNICAL 08.GDT 8/17/18

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LOG OF BORING NO. B-08

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse vegetation, mud cracks, silty with loose silty sand and trace fine gravel on surface, sub-angular, yellowish brown, dry, fine to coarse grained, well-graded, sub-angular.										
		SM: SILTY SAND:oliive brown, dry.			66			131	8			
		...dense, fine to coarse grained, well-graded, sub-angular sand, trace fine gravel, sub-angular.										
5					54			121	10			
		CL: HARD SILTY CLAY WITH SAND: olive brown, dry, fine grained sand, trace calcium.										
10		...very stiff, no trace calcium.			26			113	5			
		SM: MEDIUM DENSE SILTY SAND: olive brown, dry, fine to coarse grained, well-graded, sub-angular.										
15		...medium dense, fine to medium grained, poorly-graded, sub-angular.			25							
20		**SP: MEDIUM DENSE SAND:** olive brown, slightly moist, fine to coarse grained, well-graded, sub-angular, trace silt. ...trace fine gravel, sub-angular.			38							
25												

Completion Depth: 31.5
Date Started: 7/10/18
Date Completed: 7/10/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-08

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
30		**SP: MEDIUM DENSE SAND:** olive brown, slightly moist, fine to coarse grained, well-graded, sub-angular, trace silt.*(continued)*										
		...medium dense, no fine gravel.	X		26							
		SM: MEDIUM DENSE SILTY SAND: olive, moist, fine to medium grained, poorly-graded, sub-angular.										
35												
40												
45												
50												

Completion Depth: 31.5
Date Started: 7/10/18
Date Completed: 7/10/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-09

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sparse vegetation, mud cracks, silty with loose silty sand and trace fine gravel on surface, sub-angular, yellowish brown, dry, fine to coarse grained, well-graded, sub-angular.										
		ML: SILT WITH SAND: light oliive brown, dry. ...fine to medium grained sand, poorly-graded, sub-angular, trace fine gravel, sub-angular.			44			115	11			
		CL: VERY STIFF SILTY CLAY WITH SAND: light oliive brown, moist, fine grained sand, trace calcium.										
5		...very stiff, slightly moist.			25			112	6			
		SM: MEDIUM DENSE SILTY SAND: light olive brown, slightly moist, fine to coarse grained, well-graded, sub-angular, trace calcium.										
10		**SP: MEDIUM DENSE SAND:** olive brown, slightly moist, fine to coarse grained, well-graded, sub-angular sand, trace fine gravel, sub-angular, trace silt.			29			110	2			
15		**SM: MEDIUM DENSE SILTY SAND:** olive, moist, fine grained.			26							
		SP: MEDIUM DENSE SAND WITH SILT: olive, moist, fine to coarse grained, well-graded, sub-angular.										
20		**SM: MEDIUM DENSE SILTY SAND:** olive brown, moist, fine grained. ...fine to medium grained, poorly-graded, sub-angular, trace fine gravel, sub-angular.			17							
25												

Completion Depth: 31.5
Date Started: 7/10/18
Date Completed: 7/10/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS 1-9.GPJ GEOTECHNICAL 08.GDT 8/17/18

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LOG OF BORING NO. B-09

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **Y. Xu**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SM: LOOSE DENSE SILTY SAND: olive brown, moist, fine to medium grained, poorly-graded, sub-angular.			5							
		ML: MEDIUM STIFF SILT WITH SAND: olive brown, dry, fine grained sand, trace calcium.										
30					20							
		SP: MEDIUM DENSE SAND: olive brown, slightly moist, fine to coarse grained, well-graded, sub-angular, trace fine gravel, sub-angular, trace oxidation, trace silt.										
		SM: MEDIUM DENSE SILTY SAND: olive, wet, fine to medium grained, poorly-graded, sub-angular, trace oxidation.										
		End of boring.										
35												
40												
45												
50												

Completion Depth: 31.5
Date Started: 7/10/18
Date Completed: 7/10/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: B-61 Drill Rig with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-10

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silty sand, dark yellowish brown, fine to coarse grained, dry.										
		SM: SILTY SAND: ...olive, fine to medium grained, dry to slight moist.										
		ML: SANDY SILT:olive, fine to medium grained, moist.										
		SM: SILTY SAND:olive, fine to medium grained, moist.										
5		**ML: SILT:**olive, fine grained, moist.										
		SM: SILTY SAND:olive, fine to medium grained, moist, trace of mica. ...dark gray brown, fine to coarse grained. ...olive brown, fine to medium grained.										
		SP: SAND WITH SILT:olive, fine to coarse grained, moist, trace of fine gravel.										
10		**SM: SILTY SAND:**olive, fine to medium grained, moist.										
		SP: SAND WITH SILT:olive, fine to coarse grained, moist.										
		SM: SILTY SAND:olive, fine to medium grained, moist.										
		ML: SILT:olive, fine grained, moist, trace sand.										
		SM: SILTY SAND:olive, fine to coarse grained, moist.										
		ML: SANDY SILT:olive, fine to medium grained, moist.										
		SM: SILTY SAND:olive, fine to medium grained, moist.										
		SP: SAND WITH SILT:olive, fine to medium grained, moist.										
15		**ML: SILT:**dark gray brown, fine to coarse grained, moist, trace sand. **ML: SANDY SILT:**olive brown, fine to medium grained, moist.										
		ML: SILT WITH SAND:olive, fine to medium grained, moist/ slightly wet.										
		SM: SILTY SAND:olive, fine to coarse grained, moist, more silty with depth.										
20		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-11

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silty sand and gravel, fine to coarse grained, dry.										
		SM: SILTY SAND:										
		...light olive brown, fine to medium grained, dry, increased moisture at lower depths.										
		...olive brown, fine to coarse grained, moist.										
		SP: SAND:light olive brown, fine to coarse grained, well graded, moist.										
5		...1" thick layer of silty sand, olive, fine to medium grained, moist.										
		SM: SILTY SAND:olive, fine to medium grained, moist, trace of mica.										
		SP: SAND:light olive brown, fine to coarse grained, well graded, moist.										
10		**SM: SILTY SAND:**olive brown, fine to coarse grained, moist.										
		...fine to medium grained.										
		...light olive brown, fine to coarse grained, dry, trace of fine gravel.										
		SP: SAND:olive brown, fine to coarse grained, well graded, moist, trace of fine gravel and silt clumps.										
		...sand with trace silt.										
		...sand trace of fine gravel.										
15		**SM: SILTY SAND:**olive brown, fine to medium grained, moist.										
		...increased silt content.										
		...decreased silt content.										
		...increased silt content.										
		ML: SANDY SILT:olive brown, fine to medium grained, moist.										
		...silt with trace of sand.										
20		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-12

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: clayey silt, orange/reddish brown, dry, mudcracks.										
		ML: SILT:gray, moist.										
		SP: SAND WITH SILT: gray, fine to coarse grained, slightly moist. ...dark grayish brown.										
		ML: SILT: dark grayish brown, moist.										
		SP: SAND: gray, fine to medium grained, slightly moist, trace silt.										
		ML: SILT: dark grayish brown, moist.										
5		**SP: SAND:** dark grayish brown, fine to coarse grained, moist, trace silt, trace fine gravel.										
		SM: SILTY SAND: very dark grayish brown, fine to medium grained, slightly moist. ...dark grayish brown, moist.										
		SP: SAND: olive brown, fine to coarse grained, moist.										
		ML: SILT: olive brown, moist.										
10		**SM: SILTY SAND:** dark grayish brown, fine to medium grained, moist.										
		SP: SAND: olive brown, fine to coarse grained, moist, trace fine gravel.										
		...trace oxidation.										
		ML: SILT: very dark grayish brown, moist.										
15		**SM: SILTY SAND:** dark grayish brown, fine grained, moist.										
		ML: SILT: very dark grayish brown, moist, trace fine to medium grained sand.										
		SP: SAND: very dark grayish brown, fine to medium grained, moist.										
		SM: SILTY SAND: very dark grayish brown, fine to medium grained, moist. ...dark grayish brown, fine to coarse grained.										
		ML: SANDY SILT: dark grayish brown, fine to coarse grained, moist.										
20		**SM: SILTY SAND:** very dark grayish brown, fine to coarse grained, moist.										
		SM: SILTY SAND: olive, fine to medium grained, moist.										
		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-13

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION
		SURFACE: silty sand, fine to coarse grained, dry, trace fine to coarse grained gravel.
		SM: SILTY SAND:
		ML: SANDY SILT: olive brown, dry, fine to coarse grained sand.
		...increase in moisture content.
		SP: SAND: olive brown, fine to coarse grained, moist, trace silt.
5		**SM: SILTY SAND:** olive brown, fine to coarse grained, moist.
		ML: SANDY SILT: olive brown, moist, fine to coarse grained sand.
		SM: SILTY SAND: olive brown, fine to medium grained, moist.
		...fine to coarse grained sand.
10		**SP: SAND:** olive brown, fine to coarse grained, moist, trace silt, trace fine gravel.
		ML: SILT: olive brown, moist, trace fine to medium grained sand.
		SP: SAND: olive brown, fine to coarse grained, moist, trace silt, trace fine gravel.
15		**SM: SILTY SAND:** dark grayish brown, fine to coarse grained, moist.
		...grayish brown, fine to medium grained, moist.
		...olive brown, fine to coarse grained, moist, decrease in silt.
		...very dark grayish brown, fine to medium grained, moist.
		SP: SAND: olive brown, fine to medium grained, moist, trace silt.
20		**ML: SILT:** olive brown, moist, trace fine to medium grained sand.
		SM: SILTY SAND: olive brown, fine to medium grained, moist.
		SP: SAND: olive brown, fine to medium grained, moist, trace silt.
		End of boring.
25		

Samples	Sample Number	Penetration Blows / Foot	Pocket Penetro-meter, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-14

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silty sand, fine to coarse grained, dry, trace fine to coarse grained gravel.										
		CL: SILTY CLAY: olive, moist.										
		SM: SILTY SAND: yellowish brown, fine to coarse grained, moist. ...dark grayish brown, fine to medium grained, dry, ...slightly moist ...fine to coarse grained, moist.										
		ML: SILT WITH SAND: dark grayish brown, fine grained, moist.										
5		**SP: SAND:** grayish brown, fine to coarse grained, moist, trace silt. **SP: SAND WITH SILT:** grayish brown, fine grained, moist. **SP: SAND:** grayish brown, fine to coarse medium, moist, trace silt. ...grayish brown, fine to coarse grained, moist, trace fine gravel.										
10		**ML: SILT:** olive brown, moist.										
		SM: SILTY SAND: olive brown, fine to medium grained, moist.										
		SP: SAND WITH SILT: olive brown, fine to medium grained, moist.										
15		**SM: SILTY SAND:** olive brown, fine to medium grained, moist.										
		SP: SAND: olive brown, fine to coarse grained, moist, trace silt. ...trace oxidation. **SP: SAND WITH SILT:** olive brown, fine to coarse grained, moist.										
		SM: SILTY SAND: olive brown, fine to medium grained, moist. ...fine to coarse grained.										
		SP: SAND WITH SILT: olive brown, fine to coarse grained, moist, trace fine gravel.										
20		**ML: SANDY SILT:** olive brown, fine to medium grained, moist. ...silt, olive brown, moist, trace fine to medium grained sand. End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-15

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silt, yellowish brown, dry, trace fine to coarse grained sand, mudcracks.										
		ML: SILT:yellowish brown, moist.										
		SM: SILTY SAND: yellowish brown, fine to coarse grained, moist. subangular. ...dark grayish brown, fine to medium grained, dry. ...moist.										
		ML: SANDY SILT: dark grayish brown, moist, fine to medium grained. ...silt, dark grayish brown, moist.										
5		**SM: SILTY SAND:** dark grayish brown, fine to medium grained, moist.										
		SP: SAND: dark grayish brown, fine to coarse grained, moist, trace silt, trace fine grained gravel.										
10		...olive brown, fine to medium grained, moist, trace silt.										
		SM: SILTY SAND: dark grayish brown, fine to medium grained, moist. ...very dark grayish brown, increase in silt.										
15		**ML: SILT:** dark grayish brown, moist, trace fine to medium grained sand, trace fine gravel. ...grayish brown, moist, trace fine to medium grained sand.										
		...sandy silt, grayish brown, fine to medium grained, moist.										
20		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-16

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silty sand with fine to coarse gravel, yellowish brown, fine to coarse grained sand, dry.										
		SM: SILTY SAND:										
		...light olive brown, fine to medium grained, dry.										
		...moist.										
		...increase in sand.										
5		...decrease in sand, increase in silt.										
		...olive brown, fine to coarse grained, moist.										
		SP: SAND WITH SILT: olive brown, fine to coarse grained, moist.										
		SM: SILTY SAND: olive brown, fine to coarse grained, moist.										
		SP: SAND WITH SILT: olive brown, fine to medium grained, moist.										
		...fine to coarse grained, trace of oxidation at this depth.										
10		...fine to medium grained, trace of oxidation at this depth.										
		SM: SILTY SAND: olive, fine to medium grained, moist.										
		SP: SAND WITH SILT: olive brown, fine to medium grained, moist, trace of oxidation.										
		...dark grayish brown, fine to coarse grained.										
		SM: SILTY SAND: olive brown, fine to medium grained, moist.										
		ML: SANDY SILT: dark grayish brown, fine to medium grained, moist.										
15		...grayish brown.										
		SM: SILTY SAND: dark grayish brown, fine to medium grained, moist.										
		ML: SANDY SILT: grayish brown, fine to medium grained, moist.										
		...silt with sand.										
20		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-17

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silt with trace of fine to coarse gravel, dark yellowish brown, dry, recently cut.										
		ML: SILT: trace gravel.										
		SM: SILTY SAND: olive, fine to coarse grained, dry.										
		...moist.										
		SP: SAND WITH SILT: olive brown, fine to coarse grained, moist, trace of fine gravel, sub-angular.										
		...decrease in silt with depth.										
		...1.5" thick layer of silt.										
5		**SM: SILTY SAND:** olive, fine to medium grained, moist.										
		...fine to coarse grained.										
		SP: SAND WITH SILT: olive, fine to coarse grained, moist, trace of fine gravel, sub-angular.										
		ML: SILT: olive, fine to medium grained, moist, trace sand.										
10		**SM: SILTY SAND:** olive, fine to coarse grained, moist.										
		SP: SAND WITH SILT: olive, fine to coarse grained, moist, trace of fine gravel, sub-angular.										
		SM: SILTY SAND: olive, fine to coarse grained, moist.										
		SP: SAND WITH SILT: olive, fine to coarse grained, moist.										
		SM: SILTY SAND: olive, fine grained, moist.										
		SP: SAND WITH SILT: olive, fine to coarse grained, moist, trace of fine gravel, sub-angular.										
		...1" thick layer of silt.										
15		...sand with silt, light olive brown, no trace fine gravel.										
		...dark grayish brown, trace of fine gravel, sub-angular.										
		ML: SANDY SILT: olive, fine to coarse grained, moist.										
		SM: SILTY SAND: dark grayish brown, fine to coarse grained, moist.										
20		...1" thick layer of silt.										
		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-18

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: sandy clayey silt, dark yellowish brown, fine to coarse grained, dry, recently cut.										
		...moist										
		SP: SAND: olive, fine to coarse grained, slightly moist, trace silt.										
		SM: SILTY SAND: olive, fine to coarse grained, dry, trace of fine gravel, sub-anglular.										
		...slightly moist.										
		SP: SAND WITH SILT: olive, fine to coarse grained, moist, trace of fine gravel, sub-angular.										
5		...with trace silt, light olive brown.										
		SM: SILTY SAND: olive, fine to medium grained, moist.										
		...1" thick layer of silt.										
		SP: SAND WITH SILT: olive, fine to coarse grained, moist, trace of fine gravel, sub-angular.										
		ML: SILT: olive, fine grained, moist.										
		SM: SILTY SAND: olive, fine to medium grained, moist.										
10		**SP: SAND WITH SILT:** olive, fine to medium grained, moist.										
		...fine to coarse grained, trace of fine gravel, sub-angular.										
		...1" thick layer of silty sand, olive fine to medium grained, moist.										
		SM: SILTY SAND: olive, fine grained, moist.										
		...pocket of silt.										
		...1" thick layer of silt.										
		SP: SAND WITH SILT: olive, fine to medium grained, moist.										
		SM: SILTY SAND: olive, fine grained, moist.										
15		**SP: SAND WITH SILT:** olive, fine to coarse grained, moist, trace of fine gravel, sub-angular.										
		...trace of silt.										
		SM: SILTY SAND: olive, fine to medium grained, moist.										
		...fine to coarse grained, less silt.										
		...1" thick layer of silt with trace of sand.										
20		...fine to medium grained silty sand										
		...2" thick layer of silt with trace of sand.										
		...silty sand with pockets of silt.										
		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

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LOG OF BORING NO. B-19

Project Name: **RCSD WWTP Rehab Project**
Project Number: **G18-169-11B**
Project Location: **Rosamond, California**
Logged by: **V. Simental**
Checked by: **O. Lau**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: silty sand with trace of coarse gravel, sub-angular, brown, fine to coarse grained, dry, recently cut.										
		SM: SILTY SAND:										
		ML: SANDY SILT: olive, fine to coarse grained, slightly moist.										
		SM: SILTY SAND: olive, fine to coarse grained, moist.										
		SP: SAND: olive brown, fine to coarse grained, slightly moist, trace silt.										
5		**SM: SILTY SAND:** olive, fine to medium grained, moist.										
		ML: SILT: olive, fine to coarse grained, moist, trace sand.										
		SP: SAND WITH SILT: olive, fine to coarse grained, moist.										
		ML: SILT: olive, fine grained, moist.										
		SP: SAND: light olive brown, fine to coarse grained, moist. ...trace of silt, olive.										
		SM: SILTY SAND: olive, fine to medium grained, moist.										
10		**SP: SAND:** olive brown, fine to coarse grained, moist.										
		SM: SILTY SAND: olive, fine to medium grained, moist.										
		...dark grayish brown, fine grained.										
		SP: SAND: light olive brown, fine to coarse grained, moist. ...with fine gravel, sub-angular. ...olive brown, no fine gravel, trace of silt.										
15		...light olive brown, trace of fine gravel, sub-angular.										
		...dark grayish brown, with fine gravel, sub-angular. ...light olive brown.										
		...olive brown, with silt clumps, with trace of fine gravel, sub-angular.										
		SM: SILTY SAND: dark grayish brown, fine to coarse grained, moist.										
20		**SP: SAND WITH SILT:** olive brown, fine to medium grained, moist.										
		End of boring.										
25												

Completion Depth: 20.0
Date Started: 6/29/18
Date Completed: 6/29/18
California Sampler: -
SPT Sampler: -

Drilling Equipment: 6625 Track Rig
Drilling Method: Direct Push
Drive Weight: -
Hole Diameter: -
Drop: -
Remarks: Borings backfilled with bentonite.

APPENDIX B

LABORATORY TESTING RESULTS

APPENDIX B
LABORATORY TESTING

Moisture-Density Tests

The field moisture content, as a percentage of dry weight of the soils, was determined by weighing the samples before and after oven drying in accordance with ASTM D 2216 test procedures. Dry densities, in pounds per cubic foot, were also determined for undisturbed core samples in general accordance with ASTM D 2937 test procedures. Test results are presented on the boring logs in Appendix A.

Collapse Potential Test

Three (3) Collapse Potential Tests were performed on relatively undisturbed soil samples to evaluate collapse potential characteristics. The test was performed in general accordance with ASTM D 5333. The sample was initially loaded under as-received moisture content to a selected stress level, loaded up to a maximum load of 1300 psf and was then saturated. The test results are presented on Figures B-1 through B-3.

Moisture-Density Relationship Test

One (1) Moisture-Density Relationship Test was performed on a bulk soil sample obtained at the time of drilling in the area of planned construction. The soil sample was tested for optimum moisture content and maximum dry density per ASTM Test Method D698. The test result is presented on Figure B-4.

Soil Cement – Compressive Strength Test

BSK performed a soil cement mix design test using 6%, 8%, and 10% cement added to the combined samples obtained at the time of drilling in the area of planned construction and remolded to 95% maximum dry density per the respective moisture-density relationship test (ASTM D698). The soil was evaluated in accordance with ASTM Test Method D1632 and D1633. The test results are presented on Figure B-5.

Soil Corrosivity

Three (3) Corrosivity Evaluations were performed on bulk soil samples obtained at the time of drilling in the area of planned construction. The soil was evaluated for minimum resistivity (ASTM G57), sulfate ion concentration (CT 417), chloride ion concentration (CT 422), and pH of soil (ASTM D4972). The test result is presented in Table B-1.

Table B-1: Summary of Corrosion Test Results

Sample Location	pH	Sulfate, ppm	Chloride, ppm	Minimum Resistivity, ohm-cm
B-2 @ 0-5 feet bgs	9.45	25	50	180
B-4 @ 0-5 feet bgs	9.14	25	50	130
B-7 @ 0-5 feet bgs	9.42	25	25	210

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Collapse Potential Test

ASTM D 2435, One-Dimensional Analysis

Project Name:	RCSD WWTP Rehabilitation Project	**Sample Date:**	7/10/2018
Project Number:	G18-169-10B	**Test Date:**	7/13/2018
Sample Location:	B-7 @ 21.0-21.5 feet bgs	**Sampled By:**	Y. Xu
Sample Description:	SP: SAND: yellowish brown, fine to coarse grained sand, dry, subangular.	**Tested By:**	I.L.T.Remotigue
Collapse Potential:	0.88 percent collapse at 1300 psf	**Dry Density (pcf):**	109
Peak Load (psf):	1300	**Initial Moisture Content (%):**	2

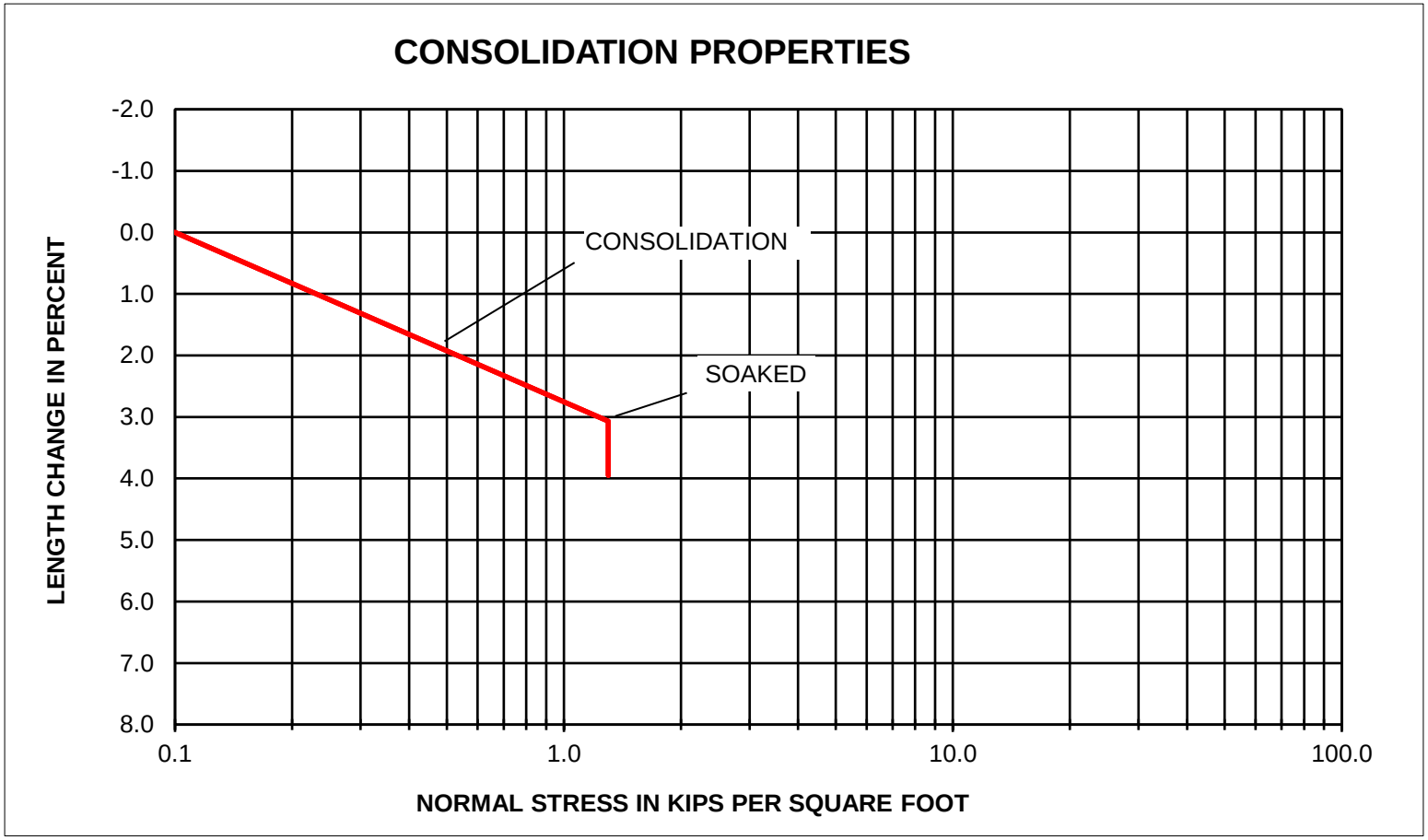

Figure B-1

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Collapse Potential Test

ASTM D 2435, One-Dimensional Analysis

Project Name:	RCSD WWTP Rehabilitation Project	**Sample Date:**	7/10/2018
Project Number:	G18-169-10B	**Test Date:**	7/13/2018
Sample Location:	B-8 @ 11.0-11.5 feet bgs	**Sampled By:**	Y. Xu
Sample Description:	CL: SILTY CLAY: olive brown, dry, trace fine sand.	**Tested By:**	I.L.T.Remotigue
Collapse Potential:	0 percent collapse at 1300 psf	**Dry Density (pcf):**	113
Peak Load (psf):	1300	**Initial Moisture Content (%):**	5

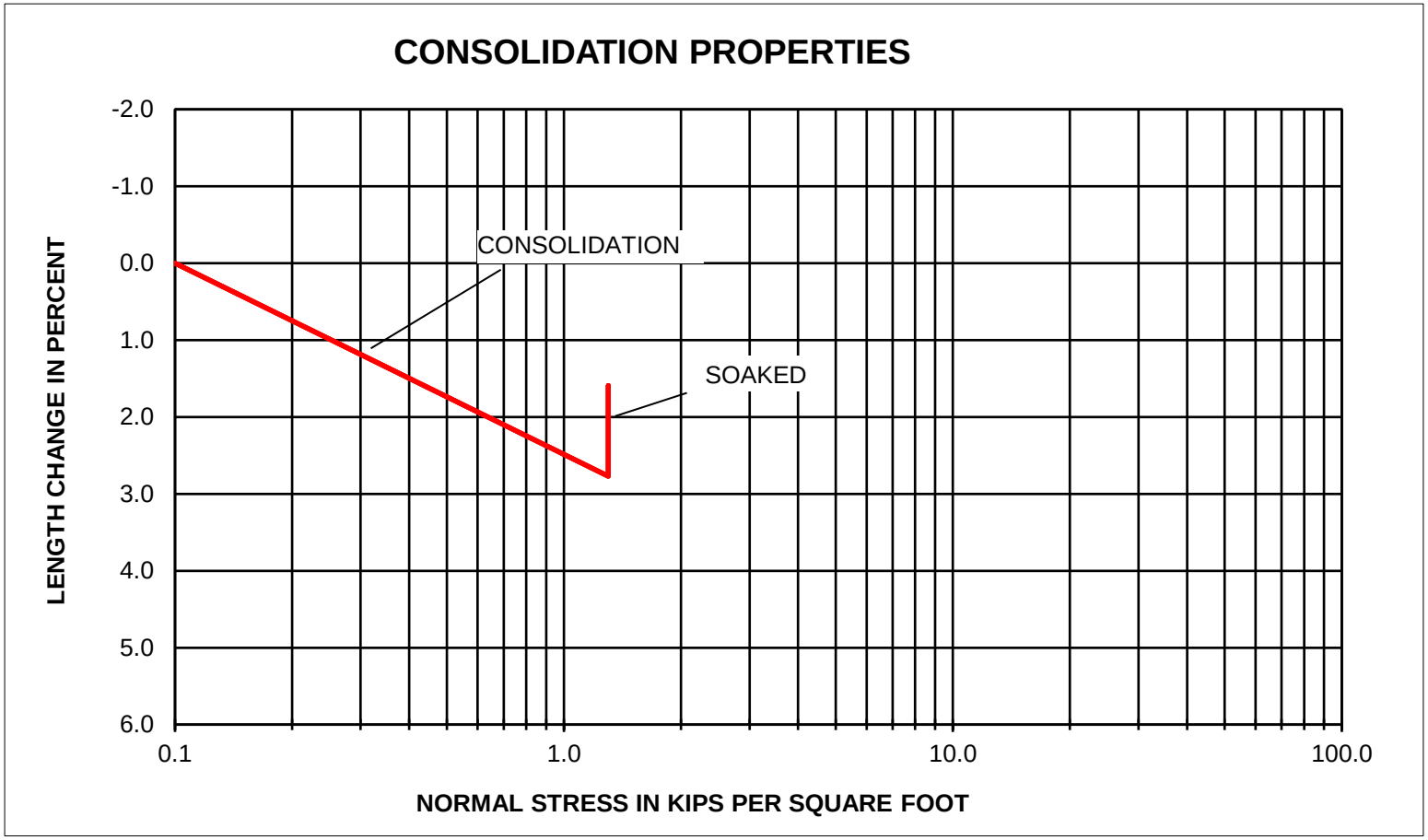

Figure B-2

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Collapse Potential Test

ASTM D 2435, One-Dimensional Analysis

Project Name:	RCSD WWTP Rehabilitation Project	**Sample Date:**	7/10/2018
Project Number:	G18-169-10B	**Test Date:**	7/13/2018
Sample Location:	B-9 @ 6.0-6.5 feet bgs	**Sampled By:**	Y. Xu
Sample Description:	CL: SILTY CLAY WITH SAND: light olive brown, fine to coarse grained sand, moist.	**Tested By:**	I.L.T.Remotigue
Collapse Potential:	0 percent collapse at 1300 psf	**Dry Density (pcf):**	112
Peak Load (psf):	1300	**Initial Moisture Content (%):**	6

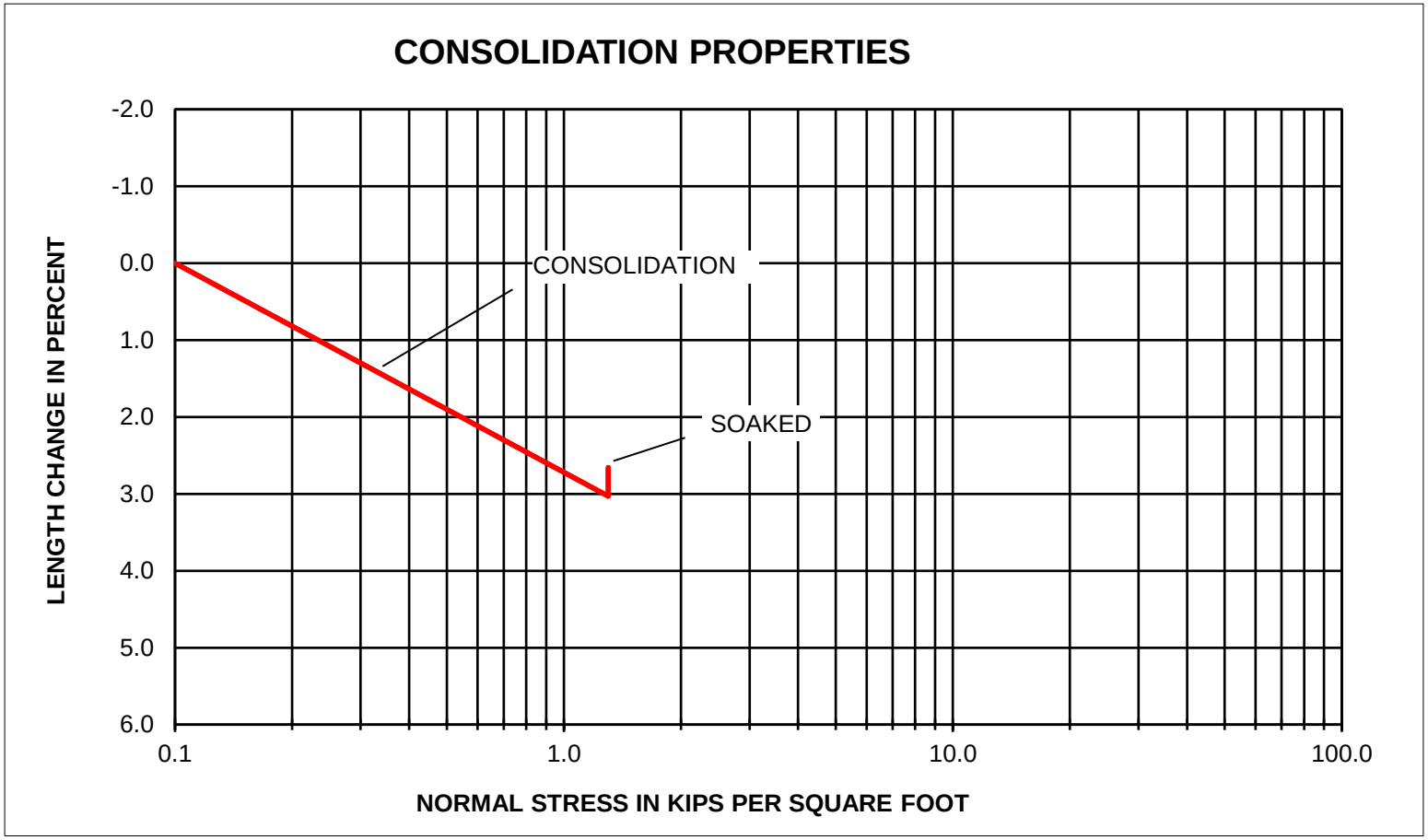

Figure B-3

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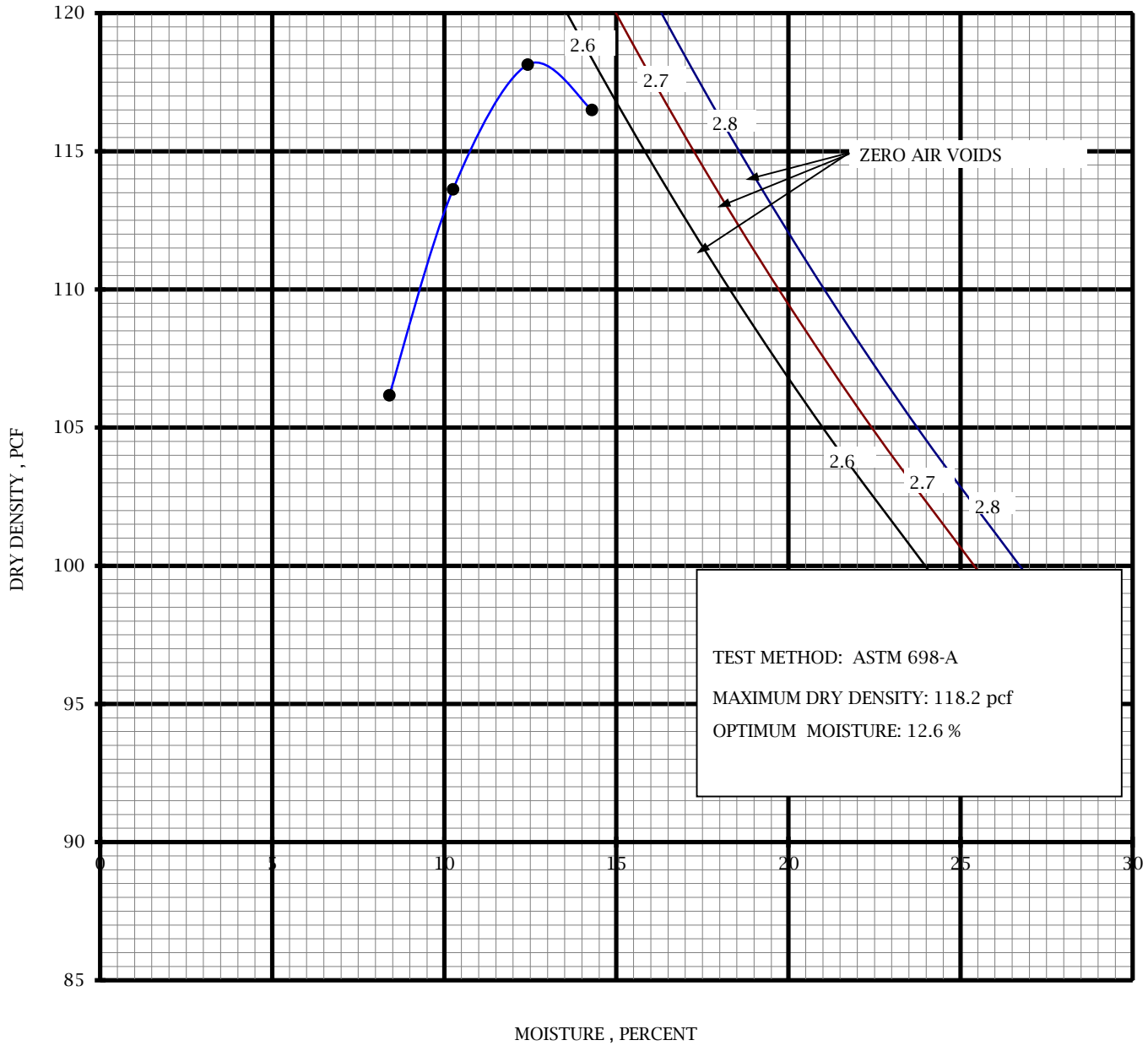
MOISTURE DENSITY RELATIONSHIP
ASTM D698-A

Project Name:	RCSD WWTP Rehabilitation Project	**Project Number:**	G18-169-10B
Project Manager:	On Man Lau	**Lab Number:**	B18-268
Sample Location:	B1, B3, and B6 combined	**Sample Date:**	7/11/2018
Sample Description:	SM: SILTY SAND: brown, fine to coarse grained sand, trace of clay		
Tested By:	R. Suleiman **Tested Date:** 7/20/2018	**Sample By:**	Y. Xu



Reviewed by: D. Elizondo

Figure B-4

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COMPRESSIVE STRENGTH TEST RESULTS
Soil-Cement Mix

Project Name:	RCSD WWTP Rehabilitation Project	**Sample By:**	Y. Xu
Project Number:	G18-169-10B	**Sample Date:**	7/11/2018
Lab Tracking ID:	B18-268	**Tested By:**	I. Remotigue
Sample Location:	B1, B3, and B6 @ 0-5 feet bgs combined	**Test Date:**	7/23/2018
Sample Description:	SM: SILTY SAND: brown: fine to coarse grained, trace of clay.		

Report of Test Results

% Cement added to Sample	Load (lbs.)	7-Day Strength (psi)	Average Strength (psi)
6%	7579	603	**690**
	9798	780	
8%	6959	554	**600**
	8264	658	
10%	8240	648	**690**
	9314	742	

Remarks: Soil samples were remolded to 95% of ASTM D-698A. Samples were mix with 2% above the optimum moisture content

Reviewed By: D. Elizondo

Figure B-5