

**GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
ESCONDIDO
SWC CENTRE CITY PARKWAY & MISSION AVENUE
ESCONDIDO, CALIFORNIA**

PROJECT NO. 112-24075
JULY 1, 2024

PREPARED FOR:

503 WEST MISSION LLC
503 MISSION AVENUE
ESCONDIDO, CALIFORNIA 92025

ATTENTION: **MR. PATRICK COX**

PREPARED BY:

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July 1, 2024

KA Project No. 112-24075

Mr. Patrick Cox
503 West Mission LLC
503 Mission Avenue
Escondido, California 92025
jpcvalueadd@gmail.com

RE: GEOTECHNICAL ENGINEERING INVESTIGATION
Proposed Commercial Development Escondido
SWC Centre City Parkway & Mission Avenue
Escondido, California

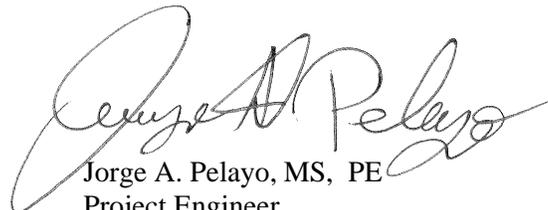
Dear Mr. Cox:

In accordance with your request and authorization, we have completed our Geotechnical Engineering Investigation for the above-referenced site. This report summarizes the results of our field investigation, laboratory testing and engineering analyses. Based on the data obtained, our understanding of the proposed project and our engineering analyses, it is our opinion that it is feasible to develop the site as planned.

As noted in our report, Krazan & Associates should be retained to review project plans and specifications prior to the start of construction, and to observe and test earthwork and foundation construction. Observation and testing services should also be performed by our field staff during construction activities will allow us to compare conditions exposed during construction with those encountered during our investigation and to present supplemental recommendations if warranted by different site conditions.

If you have any questions regarding the information or recommendations presented in our report, or if we may be of further assistance, please contact our Ontario, California office at (951) 273-1011.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.



Jorge A. Pelayo, MS, PE
Project Engineer
RCE No. 91269

cc: Addressee (2)

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 PROPOSED COMMERCIAL DEVELOPMENT ESCONDIDO
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July 1, 2024

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ESCONDIDO, CALIFORNIA**

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed development that will include construction of a commercial development consisting of 3 pads with drive-thru lanes. It is anticipated that the proposed construction will include patio areas, trash enclosures, associated parking and drive areas, and localized landscaped areas. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, grading, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior concrete flatwork, retaining walls, soil corrosivity, and pavement design.

A Vicinity Map showing the location of the site is presented on Figure 1. A Site Plan showing the approximate boring locations is presented on Figure 2. Descriptions of the field and laboratory investigations, boring log legend, and boring logs are presented in Appendix A. Appendix A contains a description of the laboratory-testing phase of this study, along with the laboratory test results. Appendices B and C contain guide specifications for earthwork and flexible pavements, respectively. If conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

PURPOSE AND SCOPE OF SERVICES

This geotechnical investigation was conducted to evaluate subsurface soil and groundwater conditions at the project site. Engineering analysis of the field and laboratory data was performed for the purpose of developing and providing geotechnical recommendations for use in the design and construction of the earthwork, foundation and pavement aspects of the project.

Our scope of services was outlined in our proposal dated April 15, 2024 (KA Proposal No. G24061CAC) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- Review of selected published geologic maps, reports and literature pertinent to the site and surrounding area.

- A field investigation from previous drilling consisting of a total of nine (9) borings to depths ranging from approximately ten (10) to fifty (40) feet below the existing ground surface or auger refusal, for evaluation of the subsurface conditions at the project site.
- Performance of two (2) infiltration tests at the subject site in order to determine an estimated infiltration rate for the near surface soil conditions.
- Performance of laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.
- Evaluation of the data obtained from the investigation and engineering analyses of the data with respect to the geotechnical aspects of structural design, site grading and paving.
- Preparation of this report summarizing the findings, results, conclusions and recommendations of our investigation.

Environmental services, such as a chemical analysis of soil and groundwater for possible environmental contaminants, were not in our scope of services.

PROPOSED CONSTRUCTION

Based on our review of the site plan and our discussions with the project representative, we understand that the proposed development will include construction of three single-story building pads. Pad A will be approximately 1,750 square feet, Pad B will be approximately 2,300 square feet, and Pad V will be approximately 2,350 square feet. The proposed buildings are anticipated to be of wood frame/stucco construction with a slab-on-grade floor. The proposed development will include drive-thru lanes, patio areas, trash enclosures, associated parking and drive area, and localized landscaped areas. It is anticipated that the proposed structures will be supported on shallow foundation systems.

In the event these structural or grading details are inconsistent with the final design criteria, we should be notified so that we can evaluate the potential impacts of the changes on the recommendations presented in this report and provide an updated report as necessary.

SITE LOCATION AND SITE DESCRIPTION

The site is roughly a rectangular shaped parcel associated with the existing development. The site is located at the southwest corner of Centre City Parkway and Mission Avenue in the city of Escondido, California. The overall site occupies an area of approximately 3.3 acres. The site is bound to the north by West Mission Avenue and commercial buildings beyond, to the west by an auto repair shop and a hotel and a water channel beyond, to the south by an apartment complex and commercial developments and a hotel beyond, and to the east by Centre City Parkway and commercial developments beyond.

The site is currently occupied by an active restaurant, a dirt lot in the southeastern section of the site, localized asphaltic concrete pavement, and localized landscaped areas. The site topography is relatively flat and level with an approximate elevation of 650 feet above mean sea level. The latitude and longitude of the site is 33.127817° and -117.091774°.

GEOLOGIC SETTING

The subject site is located within the Peninsular Ranges Geomorphic Province (CGS Note 36). The Peninsular Ranges are a series of ranges that are separated by northwest trending valleys, subparallel to faults branching from the San Andreas Fault. The trend of topography is similar to the Coast Ranges, but the geology is more like the Sierra Nevada, with granitic rock intruding the older metamorphic rocks. The Peninsular Ranges extend in to lower California and are bound on the east by the Colorado Desert. The Los Angeles Basin and the island group (Santa Catalina, Santa Barbara, and the distinctly terraced San Clemente and San Nicolas islands), together with the surrounding continental shelf (cut by deep submarine fault troughs), are included in this province.

Locally, the site is near the Escondido Creek; 15.5 miles southwest of the subject site is the Rose Canyon Fault Zone and the Pacific Ocean beyond. Approximately 15.5 miles northeast of the subject site is the Elsinore Fault zone and the Palomar Mountain beyond.

The near-surface deposits in the vicinity of the subject site generally consist of soil deposits that are fine to medium grained, silty sands and gravelly sands up to the explored depth of 35 feet below the ground surface. The bedrock underlying the near surface deposits is comprised of Mesozoic-age plutonic rocks (Map Symbol grMz) consisting of Mesozoic granite, quartz monzonite, granodiorite, and quartz diorite, see the attached Geologic Map (Figure 4) and Boring Logs (Appendix A) for a description of the earth materials encountered during our investigation.

Numerous moderate to large earthquakes have affected the area of the subject site within historic time. Based on the proximity of several dominant active faults and seismogenic structures, as well as the historic seismic record, the area of the subject site is considered subject to relatively high seismicity. The area in consideration shows no mapped faults on-site according to maps prepared by the California Geologic Survey and published by the International Conference of Building Officials (ICBO). No evidence of surface faulting was observed on the property during our reconnaissance.

FAULT RUPTURE HAZARD ZONES

The Alquist-Priolo Geologic Hazards Zones Act went into effect in March, 1973. Since that time, the Act has been amended 11 times (Hart, 2007). The purpose of the Act, as provided in California Geologic Survey (CGS) 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". The Act was renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994, and at that time, the originally designated "Special Studies Zones" was renamed the "Earthquake Fault Zones."

The area of the subject site is not included on an Earthquake Fault Zones Map prepared by the CGS. The nearest fault is a portion of the Elsinore Fault Zone located approximately 15.5 miles away from the project site. The site is not located in an Earthquake Fault Zone.

SEISMIC HAZARDS ZONES

In 1990, the California State Legislature passed the Seismic Hazard Mapping Act to protect public safety from the effects of strong shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes. The Act requires that the State Geologist delineate various seismic hazards zones on Seismic Hazards Zones Maps. Specifically, the maps identify areas where soil liquefaction and earthquake-induced landslides are most likely to occur. A site-specific geotechnical evaluation is required prior to permitting most urban developments within the mapped zones. The Act also requires sellers of real property within the zones to disclose this fact to potential buyers.

A State of California, Special Studies Zone Map has not been prepared for the subject site. Furthermore, based on the County of San Diego Hazard Mitigation Planning Map the subject site is located in an area designated as having liquefaction layers.

OTHER HAZARDS

Rockfall, Landslide, Slope Instability, Debris Flow: Both levels of the subject site are relatively flat and level. It is our understanding that there are no significant slopes proposed as part of the proposed development. Provided the recommendations presented in this report are implemented into the design and construction of the anticipated development, rockfalls, landslides, slope instability, and debris flows are not anticipated to pose a hazard to the subject site.

Seiches: Seiches are large waves generated within enclosed bodies of water. The site is not located in close proximity to any lakes or reservoirs. As such, seiches are not anticipated to pose a hazard to the subject site.

Hydroconsolidation: The near surface soils encountered at the subject site were found to be very medium dense to dense. Provided remedial grading recommendations presented in this report are incorporated in the design and construction, hydroconsolidation is not anticipated to be a significant concern for the subject site.

SITE COEFFICIENT

The site class, per Table 1613.5.2, 2022 CBC, is based upon the site soil conditions. It is our opinion that a Site Class D is appropriate for building design at this site. For seismic design of the structures, in accordance with the seismic provisions of the 2022 CBC, we recommend the following parameters:

2022 CALIFORNIA BUILDING CODE		
Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.2.2
F _a	1.136	Table 1613.2.3 (1)
S _S	0.909	Section 1613.2.1
S _{MS}	1.033	Section 1613.2.3
S _{DS}	0.689	Section 1613.2.4
F _v	1.968	Table 1613.2.3 (2)
S _I	0.332	Section 1613.2.1
S _{M1}	0.653	Section 1613.2.3
S _{D1}	0.436	Section 1613.2.4
T _S	0.632	Section 1613.2
Peak Horizontal Acceleration	0.474	Figure 22.7

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling a total of nine (9) borings using a truck-mounted drill rig to depths ranging from approximately ten (10) to fifty (50) feet below existing site grades or auger refusal, whichever happens first. The borings were drilled using hollow stem augering equipment. In addition, bulk subgrade soil samples were also obtained for laboratory testing. The approximate boring and bulk sample locations are shown on the Site Plan, Figure 2. These approximate boring and sample locations were estimated in the field based on pacing and measuring from the limits of existing site features. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsurface soils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory-testing program was formulated with emphasis on the evaluation of natural in-situ moisture and density, gradation, R-Value, maximum dry density, resistivity, pH value, sulfate and chloride contents of the materials encountered. Details of the laboratory-testing program are discussed in Appendix A. The results of the laboratory tests are presented on the boring logs or on the test reports, which are also included in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. Groundcover at the subject site consisted of approximately two (2) to three

(3) inches of asphalt underlain by approximately one (1) to four (4) inches of discernable base material. In general, the subsurface soils encountered consisted of medium dense to dense silty sands up to a depth of approximately 14 feet below existing grades. Below the silty sand material, very dense gravelly sand was encountered from a depth of approximately 14 feet below site grades to a depth of approximately 34 feet below current site grades. Below the gravelly sand, a very dense layer of silty sand was encountered at a depth of approximately 34 feet below site grades up to the maximum depth explored, 37 feet below site grades. Auger refusal was encountered at a depth of approximately 37 feet below site grades on weathered bedrock. Verification of any fill material (if any) should be determined during site grading.

Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance, measured by the number of blows required to drive a Modified California sampler or a Standard Penetration Test (SPT) sampler, ranged from approximately 21 blows per foot to over 50 blows per foot. Dry densities ranged from approximately 101 to 120 pcf. A representative sample of the near surface soil was tested and found to have an angle of internal friction of 30 degrees with a cohesion value of 100 psf. Representative soil samples consolidated approximately 2.7 to 0.7 percent under a 2 ksf load when saturated.

The above is a general description of soil conditions encountered at the site in the borings drilled for this investigation. For a more detailed description of the soil conditions encountered, please refer to the boring logs in Appendix A.

EXPANSION POTENTIAL

The near-surface silty sand soils encountered at the site have been identified through laboratory testing and field observation as having a low expansion potential. Expansive soils have the potential to undergo volume change, or shrinkage and swelling, with changes in soil moisture. As expansive soils dry, the soil shrinks; when moisture is reintroduced into the soil, the soil swells.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was encountered during our field visit investigation at a depth of approximately 23 feet below site grades.

It should be recognized that water table elevation might fluctuate with time. The depth to groundwater can be expected to fluctuate both seasonally and from year to year. Fluctuations in the groundwater level may occur due to variations in precipitation, irrigation practices at the site and in the surrounding areas, climatic conditions, flow in adjacent or nearby canals, pumping from wells and possibly as the result of other factors that were not evident at the time of our investigation. Therefore, water level observations at the time of our field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report. Long-term monitoring in observation wells, sealed from the influence of surface water, is often required to more accurately define the potential range of groundwater conditions on a site.

INFILTRATION TESTING

Estimated infiltration rates were determined using the results of open borehole percolation testing performed at the subject site. The percolation testing indicated that the near surface soils were found to have infiltration rates of approximately 0.15 and 0.20 inch per hour.

In order to perform the infiltration tests, two borings were drilled to approximately five feet below existing site grades. Infiltration testing was performed at each boring location. Prior to infiltration testing, approximately four inches of gravel was placed at the bottom of each borehole. The boreholes were pre-soaked prior to testing using clean water. The depth of each borehole was measured at each reading to verify the overall depth. The depth of water in the borehole was measured using a water level indicator or well sounder. Infiltration rates have been calculated using the Inverse Borehole procedures.

Based on the very low infiltration rates, the subsurface conditions encountered at the subject site are not considered conducive to infiltration. Detailed results of the infiltration testing are included in Appendix A in tabular format.

SOIL CORROSIVITY

Corrosion tests were performed to evaluate the soil corrosivity to the buried structures. The tests results consisted of qualified corrosive soil with minimum sulfate and chloride contents. A qualified corrosion engineer should review the results. The results are provided below:

Parameter	Results	Test Method
pH Value	7.5	EPA 9045C
Resistivity	3,200 ohm-cm	CA 643
Sulfate	185 ppm	CA 417
Chloride	89 ppm	CA 422

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

ADMINISTRATIVE SUMMARY

In brief, the subject site and soil conditions, with the exception of the current development, appear to be conducive to the development of the project. Based on the data collected during this investigation and from a geotechnical engineering standpoint, it is our opinion that the proposed improvements may be

made as anticipated provided that the recommendations presented in this report are considered in the design and construction of the project.

To reduce post-construction soil movement, provide uniform support for the proposed building, and address anticipated disturbed material resulting from demolition activities, overexcavation and recompaction within the proposed building footprint area should be performed to a minimum depth of five (5) feet below existing grades or three (3) feet below the bottom of the proposed footings, whichever is deeper. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The overexcavation and recompaction should also extend laterally five (5) feet beyond edges of the proposed footings or building limits. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

Within the proposed exterior flatwork and pavement areas, the overexcavation and recompaction should be performed to a depth of at least one (1) foot below existing grade or finish subgrade, whichever is deeper. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

Fill material should be compacted to a minimum of 95 percent of the maximum dry density based on ASTM Test Method D1557. All fill material should be moisture-conditioned to at least 2 percent above optimum moisture-content.

It is recommended that interior slabs-on-grade be designed at least five inches (5") in thickness. It is recommended that the slabs should be reinforced with a minimum of number three (#3) bars, eighteen inches (18") on center in both directions. It is recommended that exterior slabs-on-grade be designed at least five inches (5") in thickness. It is recommended that the slabs should be reinforced with a minimum of number three (#3) bars, eighteen inches (18") on center in both directions.

The proposed structures, including walls and other foundation elements may be supported on a shallow foundation system after the bottom of the footings have been moisture-conditioned to at least 2 percent above optimum moisture-content, and recompacted to a minimum of 95 percent of the maximum dry density based on ASTM Test Method D1557. Spread and continuous footings can be designed for a maximum allowable soil bearing pressure, dead plus live load, of 2,600 psf.

Infiltration rates were determined using the results of open borehole infiltration testing performed at the subject site. Infiltration testing performed on the near surface sandy clay soil indicate infiltration rates of approximately 0.15 and 0.20 inch per hour. Based on the very low infiltration rates, the subsurface conditions encountered at the site and not considered conducive to infiltration.

GROUNDWATER INFLUENCE ON STRUCTURES/CONSTRUCTION

Based on our findings and historical records, it is not anticipated that groundwater will rise within the zone of structural influence or affect the construction of foundations and pavements for the project. However, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing

and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

SEISMIC CONSIDERATIONS

Ground Shaking

Although ground rupture is not considered to be a major concern at the subject site, the site will likely be subject to at least one moderate to severe earthquake and associated seismic shaking during its lifetime, as well as periodic slight to moderate earthquakes. Some degree of structural damage due to stronger seismic shaking should be expected at the site, but the risk can be reduced through adherence to seismic design codes.

Soil Liquefaction

Soil liquefaction is a state of soil particle suspension caused by a complete loss of strength when the effective stress drops to zero. Liquefaction normally occurs under saturated conditions in soils such as sand in which the strength is purely frictional. However, liquefaction has occurred in soils other than clean sand. Liquefaction usually occurs under vibratory conditions such as those induced by seismic events. To evaluate the liquefaction potential of the site, the following items were evaluated:

- 1) Soil type
- 2) Groundwater depth
- 3) Relative density
- 4) Initial confining pressure
- 5) Intensity and duration of ground shaking

The site is located in a liquefaction layer zone as defined by the County of San Diego. The subsurface conditions encountered at the site consisted of medium dense to very dense soils. In addition, groundwater was encountered at a depth of approximately 23 feet below the existing site grades.

The potential for soil liquefaction during a seismic event was evaluated using the LiquefyPro computer program (version 5.8h) developed by CivilTech Software. For the analysis, a maximum earthquake magnitude of 6.5 M_w and a peak horizontal ground surface acceleration of 0.47g were considered appropriate for the liquefaction analysis. A groundwater depth of 23 feet was used for the analysis. The computer analysis indicates that the subsurface soil conditions encountered at the subject site are not conducive to liquefaction induced settlement.

Based on our findings, it is our opinion that the potential for seismic-induced soil liquefaction within the project site is low. Therefore, measures to mitigate liquefaction potential are not considered necessary.

Seismic Induced Settlement

One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Based on site subsurface conditions and the moderate to high seismicity of the region, any loose fill materials at the site could be vulnerable to this potential hazard. However, this hazard can be mitigated by following the design and construction recommendations of our Geotechnical Engineering Investigation (over-excavation and rework of the loose soils and/or fill). Based on the moderate penetration resistance measured, the native deposits underlying the surface materials do not appear to be subject to significant seismic settlement.

EARTHWORK

Site Preparation – Clearing and Stripping

General site clearing should include removal of vegetation and existing utilities, structures (footings and slabs); trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for reuse as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Any excavations that result from clearing operations should be backfilled with Engineered Fill. Krazan & Associates' field staff should be present during site clearing operations to enable us to locate areas where depressions or disturbed soils are present and to allow our staff to observe and test the backfill as it is placed. If site clearing and backfilling operations occur without appropriate observation and testing by a qualified geotechnical consultant, there may be the need to over-excavate the building area to identify uncontrolled fills prior to mass grading of the building pad.

As with site clearing operations, any buried structures encountered during construction should be properly removed and backfilled. The resulting excavations should be backfilled with Engineered Fill.

Overexcavation and Recomaction

To reduce post-construction soil movement and provide uniform support for the proposed buildings, overexcavation and recompaction within the proposed building footprint area and any other shallow foundation bearing areas should be performed to a minimum depth of five (5) feet below existing grades or three (3) feet below the bottom of any proposed foundation bearing grades, whichever is deeper. Overexcavation should be performed to remove and re-compact the existing fill soils, if present, in the building area. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction. The exposed subgrade at the base of the overexcavation should then be scarified, moisture-conditioned as necessary, and compacted. The overexcavation and recompaction should also extend laterally five feet (5') beyond edges of the proposed footings or building limits. Any undocumented fill encountered during grading should be removed and replaced with Engineered Fill.

Within the proposed exterior flatwork and pavement areas, the overexcavation and recompaction should be performed to a depth of at least 12 inches below existing grade or finished subgrade, whichever is deeper. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

Fill Placement

Prior to placement of fill soils, the upper 8 inches of native subgrade soils should be scarified, moisture-conditioned to slightly above optimum moisture-content, and recompacted to a minimum of 95 percent of the maximum dry density based on ASTM D1557 Test Method. Fill material should be compacted to a minimum of 95 percent of the maximum dry density based on ASTM D1557 Test Method.

The upper soils, during wet winter months, may become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

ENGINEERED FILL

The organic-free, on-site, soils are predominately silty sands. These soils will be suitable for reuse as Engineered Fill, provided they are cleansed of excessive organics and debris.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the contractor, since he has complete control of the project site at that time.

Imported Fill material should be predominately non-expansive granular material. This material should be approved by the Geotechnical Engineer prior to use and should typically possess the following characteristics:

NON-EXPANSIVE FILL PROPERTIES	
Percent Passing No. 200 Sieve	10 to 50
Plasticity Index (PI)	12 maximum
Liquid Limit	35 maximum
UBC Standard 29-2 Expansion Index	20 maximum

Imported Fill should be free from rocks and clods greater than 4 inches in diameter. All Imported Fill material should be submitted to the Soils Engineer for approval at least 48 hours prior to delivery at the site. Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned to near optimum moisture-content, and compacted to achieve at least 95 percent of maximum dry density as determined by ASTM D1557 Test Method. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

FOUNDATION

The proposed structures may be supported on a shallow foundation system bearing on a minimum of three (3) feet of newly placed Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	1,950 psf
Dead-Plus-Live Load	2,600 psf
Total Load, including wind or seismic loads	3,450 psf

The footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is deeper. Minimum footing widths should be 15 inches for continuous footings and 24 inches for isolated footings. The footing excavations should not be allowed to dry out any time prior to placement of concrete.

It is recommended that the foundation for the proposed structure be placed entirely within compacted fill materials or entirely within alluvium or bedrock. Footings shall not transition from one bearing material to another. It is recommended that all foundations contain steel reinforcement of at least two (2) number four (#4) bars, one (1) top and one (1) bottom. Final foundations designs should be determined by the project structural engineer.

Settlement

Seismic Induced Settlement

One of the most common phenomena during seismic shaking accompanying any earthquake is the induced settlement of loose unconsolidated soils. Based on site subsurface conditions and the moderate to high seismicity of the region, any loose or soft materials at the site could be vulnerable to this potential hazard. Although the soil conditions encountered are not considered subject to liquefaction induced settlement, seismic settlement due to seismic shaking is not expected to exceed 0.04 inch. The differential seismic settlement is anticipated to be less than 0.03 inch in 100 feet.

Static Settlement

Provided the site is prepared as recommended and that the foundations are designed and constructed in accordance with our recommendations, the static settlement due to foundation loads is not expected to exceed 1 inch. The differential settlement is anticipated to be less than ½ inch in 30 feet. Most of the settlement is expected to occur during construction as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated.

Lateral Load Resistance

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.25 acting between the base of foundations and the supporting subgrade. Where a vapor barrier material is used below concrete slabs-on-grade, a coefficient of friction should be provided by the vapor barrier

manufacturer. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 200 pounds per cubic foot acting against the appropriate vertical footing faces. Where equivalent fluid pressure against the sides of the footings or embedded slab edge are to be used, the footing or slab edge must be cast directly against undisturbed soils or the soils surrounding the structure must be recomacted to the requirements for Engineered Fill presented above. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A one-third increase in the value above may be used for short duration, wind, or seismic loads.

FLOOR SLABS AND EXTERIOR FLATWORK

The interior slabs on grade should be designed at least five inches (5") in thickness. It is recommended that the slabs be reinforced with at least number three (#3) bars, eighteen inches (18") on center in both directions.

Exterior slabs-on-grade should be designed at least five inches (5") in thickness. It is recommended that the slabs should be reinforced with at least number three (#3) bars, eighteen inches (18") on center in both directions. Exterior floors should be poured separately in order to act independently of the walls and foundation system. All fills required to bring the building pads to grade should be Engineered Fills.

It is recommended that the slabs be underlain by two to four inches (2-4") of clean sand with a minimum 15 mil polyolefin membrane vapor barrier (i.e. Stego Wrap or equivalent) placed with two inches (2") of clean sand on top of the vapor barrier.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To minimize moisture vapor intrusion, it is recommended that a vapor retarder be installed in accordance with ASTM guidelines. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to minimize the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure (i.e. ventilation fans) is recommended to reduce the accumulation of interior moisture.

RETAINING WALLS

For retaining walls with level ground surface behind the walls, we recommend that retaining walls capable of deflecting a minimum of 0.1 percent of its height at the top be designed using an equivalent fluid active pressure of 40 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 60 pounds per square foot per foot of depth. A passive lateral pressure of 200 pounds per square foot may be used to calculate sliding resistance. If walls are to be constructed above descending

slopes, our office should be contacted to discuss further reduction in allowable passive pressures for resistance of lateral forces, and for overall retaining wall foundation design.

The surcharge effect from loads adjacent to the walls should be included in the wall design. The surcharge load for walls capable of deflecting (cantilever walls), we recommend applying a uniform surcharge pressure equal to one-third of the applied load over the full height of the wall. Where walls are restrained the surcharge load should be based on one-half of the applied load above the wall, also distributed over the full height of the wall. For other surcharges, such as from adjacent foundations, point loads or line loads, Krazan & Associates should be consulted.

Expansive soils should not be used for backfill against walls. The zone of non-expansive backfill material should extend from the bottom of each retaining wall laterally back a distance equal to the height of the wall, to a maximum of five (5) feet.

The active and at-rest earth pressures do not include hydrostatic pressures. To reduce the build-up of hydrostatic pressures, drainage should be provided behind the retaining walls. Wall drains should consist of a minimum 12-inch wide zone of drainage material, such as ¾-inch by ½-inch drain rock wrapped in a non-woven polypropylene geotextile filter fabric such as Mirafi 140N or equivalent. Alternatively, drainage may be provided by the placement of a commercially produced composite drainage blanket, such as Miradrain, extending continuously up from the base of the wall. The drainage material should extend from the base of the wall to finished subgrade in paved areas and to within about 12 inches below the top of the wall in landscape areas. In landscape areas the top 12 inches should be backfilled with compacted native soil. A 4-inch minimum diameter, perforated, Schedule 40 PVC drain pipe should be placed with holes facing down in the lower portion of the wall drainage material, surrounded with drain rock wrapped in filter fabric. A solid drainpipe leading to a suitable discharge point should provide drainage outlet. As an alternative, weep holes may be used to provide drainage. If weep holes are used, the weep holes should be 3 inches in diameter and spaced about 8 feet on centers. The backside of the weep holes should be covered with a corrosion-resistant mesh to prevent loss of backfill and/or drainage material.

TEMPORARY EXCAVATION STABILITY

All excavations should comply with the current requirements of Occupational Safety and Health Administration (OSHA). All cuts greater than 5 feet in depth should be sloped or shored. Temporary excavations should be sloped at 1:1 (horizontal to vertical) or flatter, up to a maximum depth of 10 feet, and at 2:1 (horizontal to vertical) for temporary slopes greater than 10 feet in height. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within five feet of the top (edge) of the excavation. Where sloped excavations are not feasible due to site constraints, the excavations may require shoring. The design of the shoring system is normally the responsibility of the contractor or shoring designer, and therefore, is outside the scope of this report. The design of the temporary shoring should take into account lateral pressures exerted by the adjacent soil, and, where anticipated, surcharge loads due to adjacent buildings and any construction equipment or traffic expected to operate alongside the excavation. Since the Contractor has the ultimate responsibility for excavation stability, he may design a different shoring system for the excavation.

The excavation/shoring recommendations provided herein are based on soil characteristics derived from our test borings within the area. Variations in soil conditions will likely be encountered during the excavations. Krazan & Associates, Inc. should be afforded the opportunity to provide field review to evaluate the actual conditions and account for field condition variations, not otherwise anticipated in the preparation of this recommendation.

UTILITY TRENCH LOCATION, CONSTRUCTION AND BACKFILL

To maintain the desired support for existing or new foundations, new utility trenches should be located such that the base of the trench excavation is located above an imaginary plane having an inclination of 1.0 horizontal to 1.0 vertical, extending downward from the bottom edge of the adjacent footing.

Utility trenches should be excavated according to accepted engineering practices following OSHA standards by a contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the contractor. Traffic and vibration adjacent to trench walls should be kept to a minimum; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation. For purposes of this section of the report, backfill is defined as material placed in a trench starting one foot above the pipe; bedding and shading (also referred to as initial backfill) is all material placed in a trench below the backfill. With the exception of specific requirements of the local utility companies or building department, pipe bedding and shading should consist of clean medium-grained sand. The sand should be placed in a damp state and should be compacted by mechanical means prior to the placement of backfill soils. Above the pipe zone, underground utility trenches may be backfilled with either free-draining sand, on-site soil or imported soil. The trench backfill should be compacted to at least 95 percent relative compaction.

COMPACTED MATERIAL ACCEPTANCE

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be solely used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent upon the moisture-content and the stability of that material. The Geotechnical Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be too dry or excessively wet, unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with in-situ moisture-content significantly less than optimum moisture. Where expansive soils are present, heaving of the soils may occur with the introduction of water. Where the material is a lean clay or silt, this type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

SURFACE DRAINAGE AND LANDSCAPING

The ground surface should slope away from building and pavement areas toward appropriate drop inlets or other surface drainage devices. We recommended that adjacent paved exterior grades be sloped a minimum of 2 percent for a minimum distance of 10 feet away from structures. Ideally, asphalt concrete

pavement areas should be sloped at a minimum of 2 percent. These grades should be maintained for the life of the project. Roof drains should be designed to avoid discharging into landscape areas adjacent to the building. Downspouts should be directed to discharge directly onto paved surfaces to allow for surface drainage into the on-site infiltration system or should be dispersed in a landscape area for percolation into the subgrade. However, any drainage dispersed into the landscape areas should be a minimum of ten feet from the building pad limits.

PAVEMENT DESIGN

One bulk soil sample was obtained from the project site for R-Value testing at the location shown on the attached site plan. The sample was tested in accordance with the State of California Materials Manual Test Designation 301. Results of the test are as follows:

Sample	Depth	Description	R-Value at Equilibrium
1	0-36"	Silty Sand (SM)	45

The test results are moderate and indicate great subgrade support characteristics under dynamic traffic loads. The following table shows the recommended pavement sections for various traffic indices.

Traffic Index	Asphaltic Concrete	Class II Aggregate Base*	Compacted Subgrade**
4.0	2.0"	4.0"	12.0"
4.5	2.5"	4.0"	12.0"
5.0	2.5"	4.0"	12.0"
5.5	3.0"	4.0"	12.0"
6.0	3.0"	5.0"	12.0"
6.5	3.5"	5.0"	12.0"
7.0	4.0"	5.5"	12.0"
7.5	4.0"	6.5"	12.0"

* 95% compaction based on ASTM Test Method D1557 or CAL 216

** 95% compaction based on ASTM Test Method D1557 or CAL 216

If traffic indices are not available, an estimated (typical value) index of 4.5 may be used for light automobile traffic and an index of 7.0 may be used for light truck traffic. Following grading operations, it is recommended additional R-Value testing be performed to verify the design R-Value.

The following recommendations are for light-duty and heavy-duty Portland Cement Concrete pavement sections.

PORTLAND CEMENT PAVEMENT LIGHT DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
4.5	5.0"	5.0"	12.0"

HEAVY DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
7.0	6.5"	5.0"	12.0"

* 95% compaction based on ASTM Test Method D1557 or CAL 216

** 95% compaction based on ASTM Test Method D1557 or CAL 216

***Minimum compressive strength of 3000 psi

INFILTRATION TESTING

The shallow soil conditions present at the subject site were evaluated by drilling shallow borings in the vicinity of the infiltration tests. The borings drilled at the site indicated the subsurface soil conditions consisted of medium dense to dense silty sand.

Infiltration rates were determined using the results of open borehole infiltration testing performed at the subject site. Infiltration testing performed on the near surface silty sand soils indicate infiltration rates of approximately 0.15 and 0.20 inch per hour. Based on the very low infiltration rates, the subsurface conditions encountered at the site and not considered conducive to infiltration. Detailed results of the percolation test and infiltration rate are attached in tabular format.

SOIL CORROSIVITY

Excessive sulfate in either the soil or native water may result in an adverse reaction between the cement in concrete (or stucco) and the soil. ACI 318-19 has developed a criteria for evaluation of sulfate levels and how they relate to cement reactivity with soil and/or water.

One soil sample was obtained from the site and tested in accordance with State of California Materials Manual Test Designation 417. The sulfate concentrations detected from these soil samples were 185 ppm, which classifies this material as Class S1 based on the ACI 318-19, Table 19.3.1.1. Therefore, it is recommended that concrete in contact with soil utilize Type II Cement with a minimum compressive strength of 4,000 psi and a maximum water to cement ratio of 0.50.

Electrical resistivity testing of the soils indicates that the onsite soils may have a severe potential for metal loss from electrochemical corrosion process. A qualified corrosion engineer may be consulted regarding mitigation of the corrosion effects of the onsite soils on underground metal utilities.

ADDITIONAL SERVICES

Krazan & Associates should be retained to review your final foundation and grading plans, and specifications. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings with respect to the recommendations presented in this report prior to the start of construction.

Variations in soil types and conditions are possible and may be encountered during construction. In order to permit correlation between the soil data obtained during this investigation and the actual soil conditions encountered during construction, a representative of Krazan & Associates, Inc. should be present at the site during the earthwork and foundation construction activities to confirm that actual subsurface conditions are consistent with those contemplated in our development of this report. This will allow us

the opportunity to compare actual conditions exposed during construction with those encountered in our investigation and to expedite supplemental recommendations if warranted by the exposed conditions. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

All earthworks should be performed in accordance with the recommendations presented in this report, or as recommended by Krazan & Associates during construction. Krazan & Associates should be notified at least five working days prior to the start of construction and at least two days prior to when observation and testing services are needed. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

The review of plans and specifications, and the observation and testing of earthwork related construction activities by Krazan & Associates are important elements of our services if we are to remain in the role of Geotechnical Engineer-Of-Record. If Krazan & Associates is not retained for these services, the client and the consultants providing these services will be assuming our responsibility for any potential claims that may arise during or after construction.

LIMITATIONS

Geotechnical Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using appropriate and current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Geotechnical Engineering, physical changes in the site due to site clearing or grading activities, new agency regulations, or possible changes in the proposed structure or development after issuance of this report will result in the need for professional review of this report. Updating or revisions to the recommendations report, and possibly additional study of the site may be required at that time. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that two years be considered a reasonable time for the usefulness of this report.

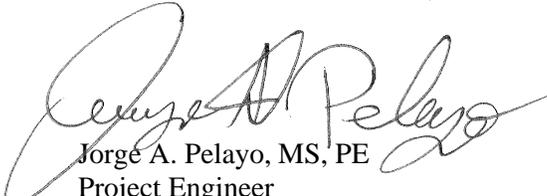
Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. The logs of the exploratory borings do not provide a warranty as to the conditions that may exist beneath the entire site. The extent and nature of subsurface soil and groundwater variations may not become evident until construction begins. It is possible that variations in soil conditions and depth to groundwater could exist beyond the points of exploration that may require additional studies, consultation, and possible design revisions. If conditions are encountered in the field during construction, which differ from those described in this report, our firm should be contacted immediately to provide any necessary revisions to these recommendations.

This report presents the results of our Geotechnical Engineering Investigation, which was conducted for the purpose of evaluating the soil conditions in terms of foundation and retaining wall design, and grading and paving of the site. This report does not include reporting of any services related to environmental studies conducted to assess the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere, or the presence of wetlands. Any statements in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey professional judgment regarding the presence of potentially hazardous or toxic substances. Conversely, the absence of statements in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, does not constitute our rendering professional judgment regarding the absence of potentially hazardous or toxic substances.

The conclusions of this report are based on the information provided regarding the proposed construction. We emphasize that this report is valid for the project as described in the text of this report and it should not be used for any other sites or projects. The geotechnical engineering information presented herein is based upon our understanding of the proposed project and professional interpretation of the data obtained in our studies of the site. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. The Geotechnical Engineer should be notified of any changes to the proposed project so the recommendations may be reviewed and re-evaluated. The work conducted through the course of this investigation, including the preparation of this report, has been performed in accordance with the generally accepted standards of geotechnical engineering practice, which existed in geographic area of the project at the time the report was written. No other warranty, express or implied, is made. This report is issued with the understanding that the owner chooses the risk they wish to bear by the expenditures involved with the construction alternatives and scheduling that are chosen.

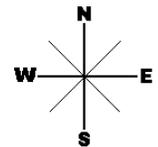
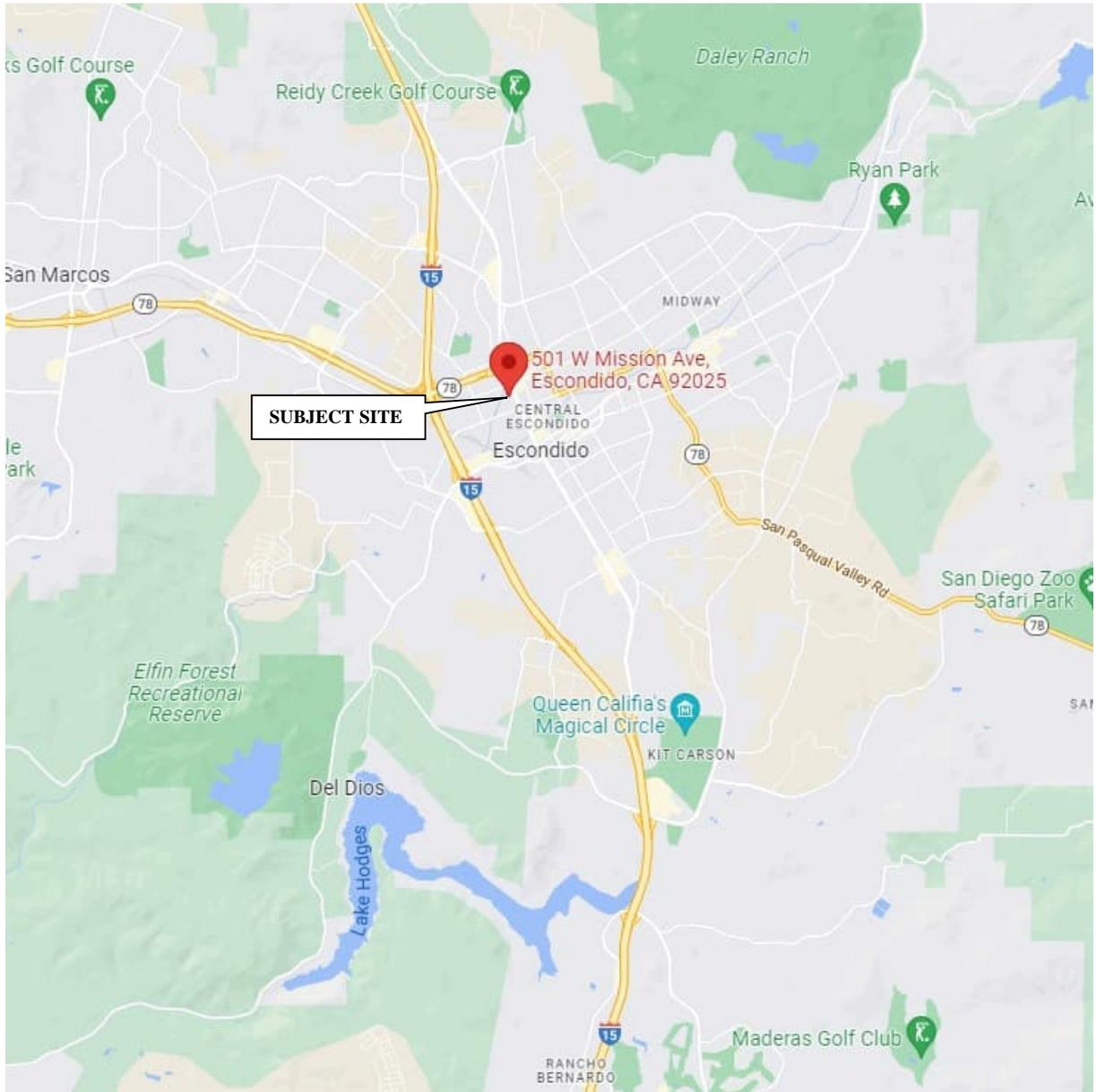
If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

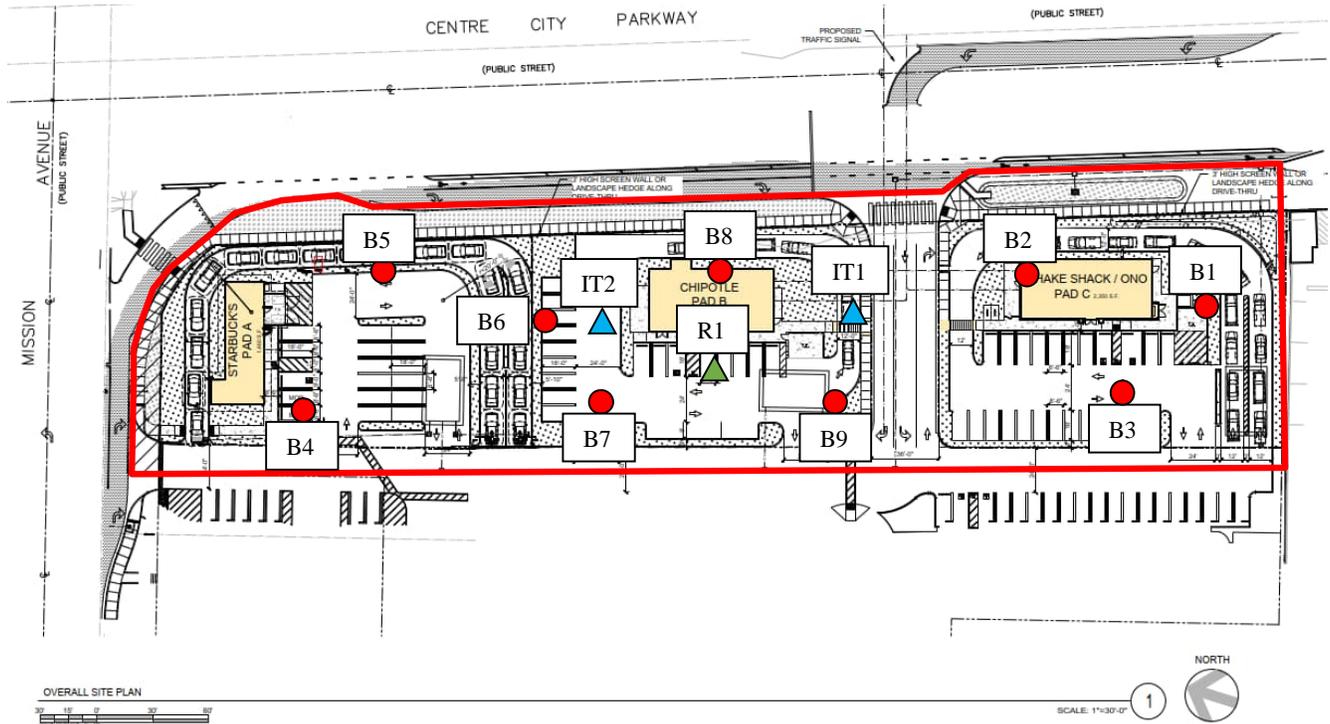

Jorge A. Pelayo, MS, PE
Project Engineer
RCE No. 91269



Figures

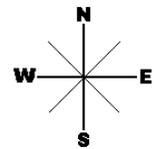


VICINITY MAP PROPOSED COMMERCIAL DEVELOPMENT SWC CENTRE CITY PARKWAY & MISSION AVENUE ESCONDIDO, CALIFORNIA	Scale: NTS	Date: July, 2024	
	Drawn by: GR	Approved by: JP	
	Project No. 112-24075	Figure No. 1	



- APPROXIMATE BORING LOCATION
- ▲ APPROXIMATE R-VALUE LOCATION
- ▲ APPROXIMATE INFILTRATION TEST LOCATION

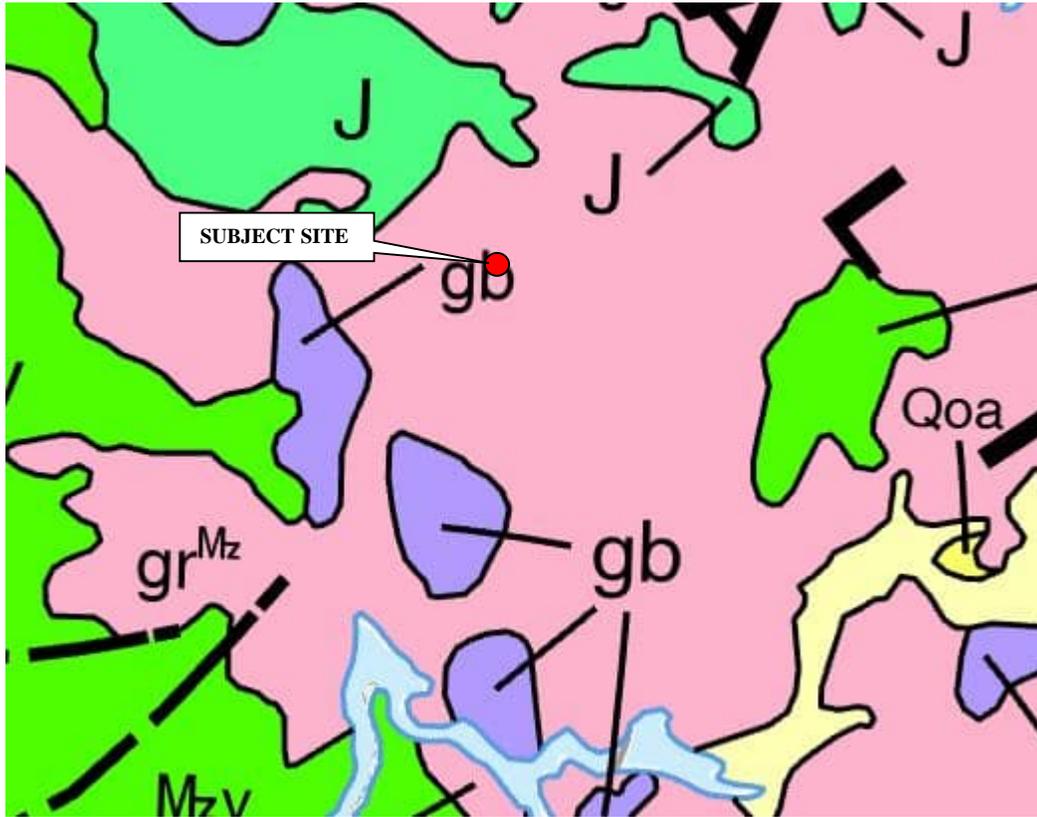
SITE MAP PROPOSED COMMERCIAL DEVELOPMENT SWC CENTRE CITY PARKWAY & MISSION AVENUE ESCONDIDO, CALIFORNIA	Scale: As Shown	Date: July, 2024	
	Drawn by: GR	Approved by: JP	
	Project No. 112-24075	Figure No. 2	



LEGEND:	
Earthquake Faults:	
	Fault
	Zoned Earthquake Fault
Liquefaction Layers	
	Liquefaction Layers
Peak Ground Acceleration (2% in 50 yrs)	
	0.18 - 0.5 (Low Liquefaction Risk)
	0.51 - 1.60 (High Liquefaction Risk)
Base Layers	
	Incorporated City Boundary
	Freeways
	Major Roads
	Streams
	Lakes

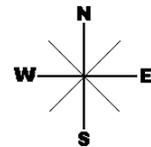
Source: SANGIS (Roads, Incorporated City Boundaries, Rivers, Lakes County of San Diego (Liquefaction Layers) USGS (Peak Ground Acceleration) State of California (Earthquake Faults)

LIQUEFACTION: COUNTY OF SAN DIEGO HAZARD MITIGATION PLANNING MAP PROPOSED COMMERCIAL DEVELOPMENT SWC CENTRE CITY PARKWAY & MISSION AVENUE ESCONDIDO, CALIFORNIA	Scale: NTS	Date: July, 2024	
	Drawn by: GR	Approved by: JP	
	Project No. 112-24075	Figure No. 3	



Generalized Rock Types: grMz

General Lithology	plutonic rocks
Age	Mesozoic
Description	Mesozoic granite, quartz monzonite, granodiorite, and quartz diorite.



Source: Department of Conservation: Geologic Map of California, 2015

GEOLOGIC MAP PROPOSED COMMERCIAL DEVELOPMENT SWC CENTRE CITY PARKWAY & MISSION AVENUE ESCONDIDO, CALIFORNIA	Scale: NTS	Date: July, 2024	
	Drawn by: GR	Approved by: JP	
	Project No. 112-24075	Figure No. 4	

*Log of Borings
&
Laboratory Testing*

Appendix A

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

Our field investigation consisted of a surface reconnaissance and a subsurface exploration program consisted of drilling, logging and sampling a total of nine (9) borings. The depths of exploration ranged from approximately 10 feet to 50 feet below the existing site surface.

A member of our staff visually classified the soils in the field as the drilling progressed and recorded a continuous log of each boring. Visual classification of the soils encountered in our exploratory borings was made in general accordance with the Unified Soil Classification System (ASTM D2487). A key for the classification of the soil and the boring logs are presented in this Appendix.

During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsoils. Samples were obtained from the borings by driving either a 2.5-inch inside diameter Modified California tube sampler fitted with brass sleeves or a 2-inch outside diameter, 1-3/8-inch inside diameter Standard Penetration (“split-spoon”) test (SPT) sampler without sleeves. Soil samples were retained for possible laboratory testing. The samplers were driven up to a depth of 18 inches into the underlying soil using a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler was recorded for each 6-inch penetration interval and the number of blows required to drive the sampler the last 12 inches are shown as blows per foot on the boring logs.

The approximate locations of our borings and bulk samples are shown on the Site Plan, Figure 2. These approximate locations were estimated in the field based on pacing and measuring from the limits of existing site features.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the soil underlying the site. The laboratory-testing program was formulated with emphasis on the evaluation of in-situ moisture, density, gradation, shear strength, consolidation potential, and R-Value of the materials encountered. In addition, chemical tests were performed to evaluate the soil/cement reactivity and corrosivity. Test results were used in our engineering analysis with respect to site and building pad preparation through mass grading activities, foundation and retaining wall design recommendations, pavement section design, evaluation of the materials as possible fill materials and for possible exclusion of some soils from use at the structures as fill or backfill.

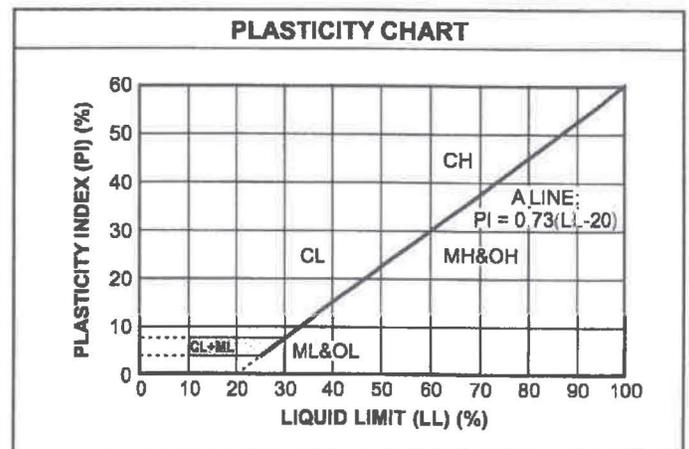
Select laboratory test results are presented on the boring logs, with graphic or tabulated results of selected tests included in this Appendix. The laboratory test data, along with the field observations, was used to prepare the final boring logs presented in the Appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART		
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	
	 GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	 GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
	 GM	Silty gravels, gravel-sand-silt mixtures
	 GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	
	 SW	Well-graded sands, gravelly sands, little or no fines
	 SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	 SM	Silty sands, sand-silt mixtures
	 SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%	 ML	Inorganic silts and very fine sands, rock flour, silty of 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 silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	 MH	Inorganic silts, micaceous or diatomaceous 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

CONSISTENCY CLASSIFICATION	
Description	Blows per Foot
<i>Granular Soils</i>	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
<i>Cohesive Soils</i>	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION		
Grain Type	Standard Sieve Size	Grain Size in Millimeters
Boulders	Above 12 inches	Above 305
Cobbles	12 to 13 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.042
Fine-grained	No. 40 to No. 200	0.042 to 0.074
Silt and Clay	Below No. 200	Below 0.074



California Modified Split Spoon Sampler



Standard Penetration Split Spoon Sampler

Log of Boring B1

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-1

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft			Water Content (%)				
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.								
							20	40	60	10	20	30	40	
0		Ground Surface												
0		LANDSCAPING = 4 Inches												
2		SILTY SAND (SM) Medium dense, fine-grained; reddish-brown, moist, drills firmly below 12 inches	104.1	15.4		33		▲				■		
4														
6			110.1	14.0		35		▲				■		
8														
10			111.6	24.1		27		▲				■		
10		End of Borehole												
12														
14														
16														
18		Water not encountered Boring backfilled with soil cuttings												
20														

Drill Method: Hollow Stem

Drill Date: 11-1-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B2

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-2

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water> Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)					
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30
Ground Surface													
0		SILTY SAND (SM) Very loose, fine-grained; reddish-brown, moist, drills easily											
2		Medium dense and drills firmly below 12 inches											
4													
6			104.8	12.0		30	▲					■	
8													
10			114.3	13.5		24	▲					■	
12													
14		GRAVELLY SAND (SP) Dense, fine- to coarse-grained; light brown, damp, drills firmly		6.0		30	▲					■	
16													
18		Becomes very dense below 18½ feet											
20		Water not encountered Boring backfilled with soil cuttings		7.1		50+	▲					■	

Drill Method: Hollow Stem

Drill Date: 11-1-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B3

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-3

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)						
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30	40
0		Ground Surface												
0		SILTY SAND (SM) Very loose, fine-grained; reddish-brown, moist Medium dense and drills firmly below 12 inches												
2														
4														
6			114.2	13.4		27	▲					■		
8														
10			115.0	17.1		30	▲					■		
10		End of Borehole												
12														
14														
16														
18		Water not encountered Boring backfilled with soil cuttings												
20														

Drill Method: Hollow Stem

Drill Date: 11-1-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B4

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-4

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > 23 Feet

Initial: 23 Feet

At Completion: 37 Feet

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)						
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30	40
0		Ground Surface												
0		ASPHALT PAVING = 3 inches AGGREGATE BASE = 1 inch												
2		SILTY SAND (SM) Medium dense, fine-grained; reddish-brown, moist, drills easily	117.0	13.5		25								
4														
6			116.0	13.8		27								
8														
10		Becomes brown below 10 feet												
10			116.3	18.4		21								
12														
14		GRAVELLY SAND (SP) Very dense, fine- to coarse-grained with SILT; light brown, damp, drills firmly		7.8		50+								
16														
18														
20														

Drill Method: Hollow Stem

Drill Date: 1-28-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 37 Feet

Sheet: 1 of 2

Log of Boring B4

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-4

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > 23 Feet

Initial: 23 Feet

At Completion: 37 Feet

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		
22	Saturated below 23 feet Becomes brown below 25 feet			7.2		50+		■
24								
26				13.3		50+		■
28								
30	SILTY SAND (SM) Very dense, fine- to medium-grained; brown, saturated, drills hard			15.5		50+		■
32								
34				18.4		50+		■
36	Auger refusal at 37 feet							
38	End of Borehole							
40	Water encountered at 23 feet Boring backfilled with soil cuttings							

Drill Method: Hollow Stem

Drill Date: 1-28-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 37 Feet

Sheet: 2 of 2

Log of Boring B5

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-5

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)					
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30
0		Ground Surface											
0		ASPHALT PAVING = 3 inches AGGREGATE BASE = 2 inches											
2		SILTY SAND (SM) Medium dense, fine-grained; reddish-brown, moist, drills easily	101.5	13.6		27					■		
4													
6			107.5	18.3		29					■		
8													
10			106.6	22.0		25					■		
10		End of Borehole											
12													
14													
16													
18		Water not encountered Boring backfilled with soil cuttings											
20													

Drill Method: Hollow Stem

Drill Date: 1-28-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B6

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-6

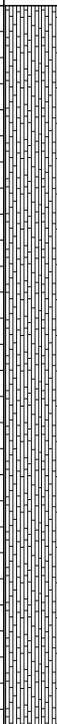
Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

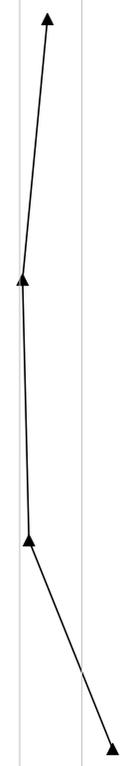
Logged By: Gabriel Ramirez

Depth to Water > Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)						
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30	40
0		Ground Surface												
0 - 14		SILTY SAND (SM) Very loose, fine-grained; reddish-brown, moist, drills easily Medium dense below 12 inches												
6			110.8	11.7		29								
10			117.9	15.2		21								
14 - 20		GRAVELLY SAND (SP) Medium dense, fine- to coarse-grained; light brown, damp, drills easily Becomes very dense below 18½ feet Water not encountered Boring backfilled with soil cuttings												
16				9.2		23								
20				7.0		50+								



Drill Method: Hollow Stem

Drill Date: 1-28-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B7

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-7

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)						
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30	40
0		Ground Surface												
0		SILTY SAND (SM) Very loose, fine-grained; reddish-brown, moist, drills easily Medium dense below 12 inches												
2														
4														
6			120.7	15.4		24	↑ ↓							
8														
10			116.9	19.1		25								
10		End of Borehole												
12														
14														
16														
18		Water not encountered Boring backfilled with soil cuttings												
20														

Drill Method: Hollow Stem

Drill Date: 1-28-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B8

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-8

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)						
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30	40
0		Ground Surface												
0		SILTY SAND (SM) Very loose, fine-grained; reddish-brown, moist, drills easily Medium dense below 12 inches												
2														
4														
6			116.3	14.3		35								
8														
10			117.6	15.0		40								
10		End of Borehole												
12														
14														
16														
18		Water not encountered Boring backfilled with soil cuttings												
20														

Drill Method: Hollow Stem

Drill Date: 1-28-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B9

Project: Commercial Development Escondido

Project No: 112-24075

Client: 503 West Mission LLC

Figure No.: A-9

Location: SWC Centre City Parkway & Mission Avenue, Escondido, CA

Logged By: Gabriel Ramirez

Depth to Water > Not Encountered

Initial: N/A

At Completion: N/A

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)						
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		20	40	60	10	20	30	40
0		Ground Surface												
0		SILTY SAND (SM) Very loose, fine-grained; reddish-brown, moist, drills easily Medium dense below 12 inches												
2														
4														
6			113.8	14.3		26								
8		Becomes dense below 8½ feet												
10			118.3	14.1		45								
10		End of Borehole												
12														
14														
16														
18		Water not encountered Boring backfilled with soil cuttings												
20														

Drill Method: Hollow Stem

Drill Date: 1-28-22

Drill Rig: CME 75

Krazan and Associates

Hole Size: 8½ Inches

Driller: One Way Drilling, Inc.

Elevation: 10 Feet

Sheet: 1 of 1

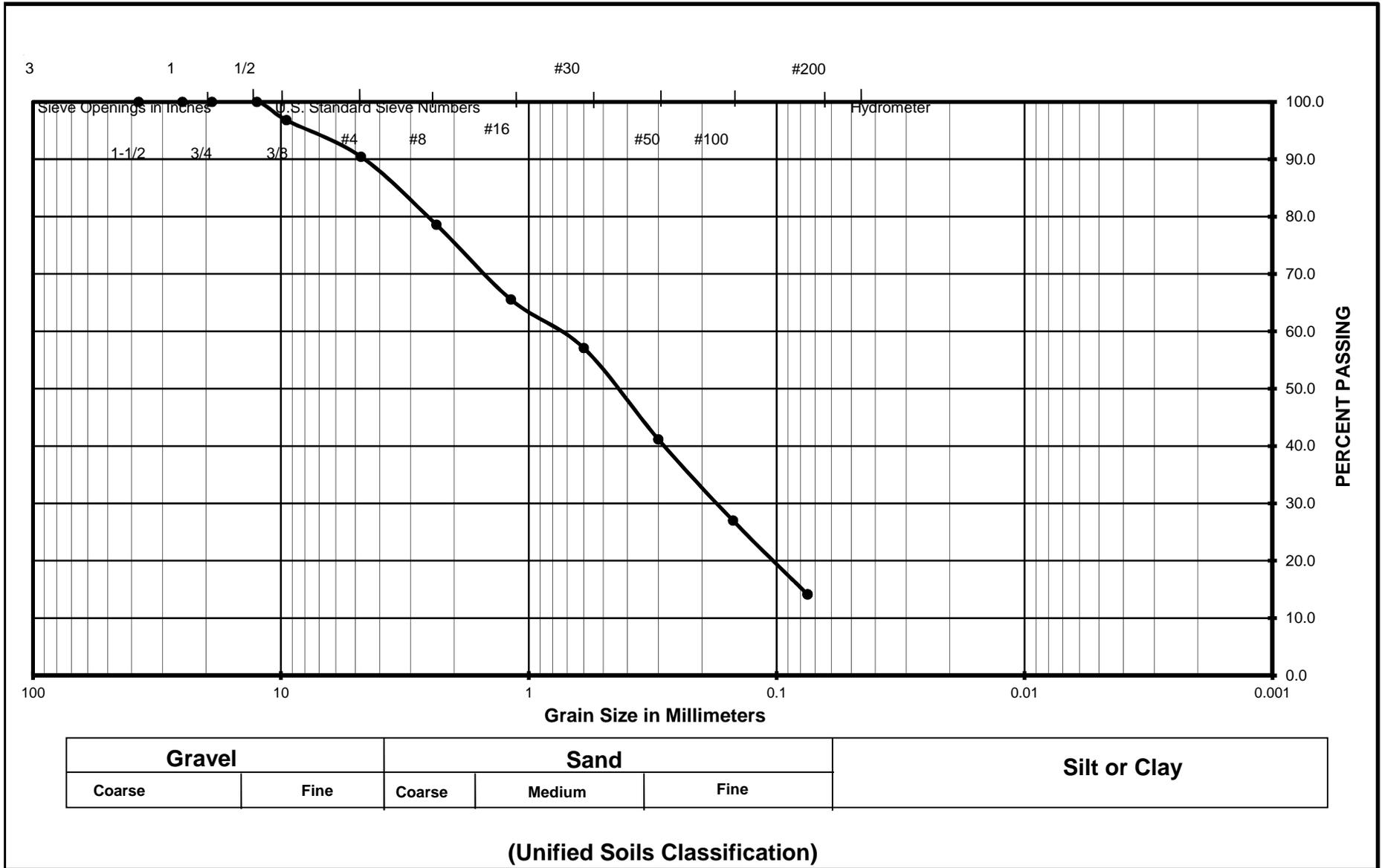
Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 2'
 Soil Classification : SM

Wet Weight	:	385.00
Dry Weight	:	385.00
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	12.3	3.2	3.2	96.8
#4	4.75	24.5	6.4	9.6	90.4
#8	2.36	45.6	11.8	21.4	78.6
#16	1.18	50.3	13.1	34.5	65.5
#30	0.60	32.5	8.4	42.9	57.1
#50	0.30	61.3	15.9	58.8	41.2
#100	0.15	54.5	14.2	73.0	27.0
#200	0.08	49.6	12.9	85.9	14.1

Grain Size Analysis



Project Name Escondido
 Project Number 11224075
 Soil Classification SM
 Sample Number B-1 @ 2'

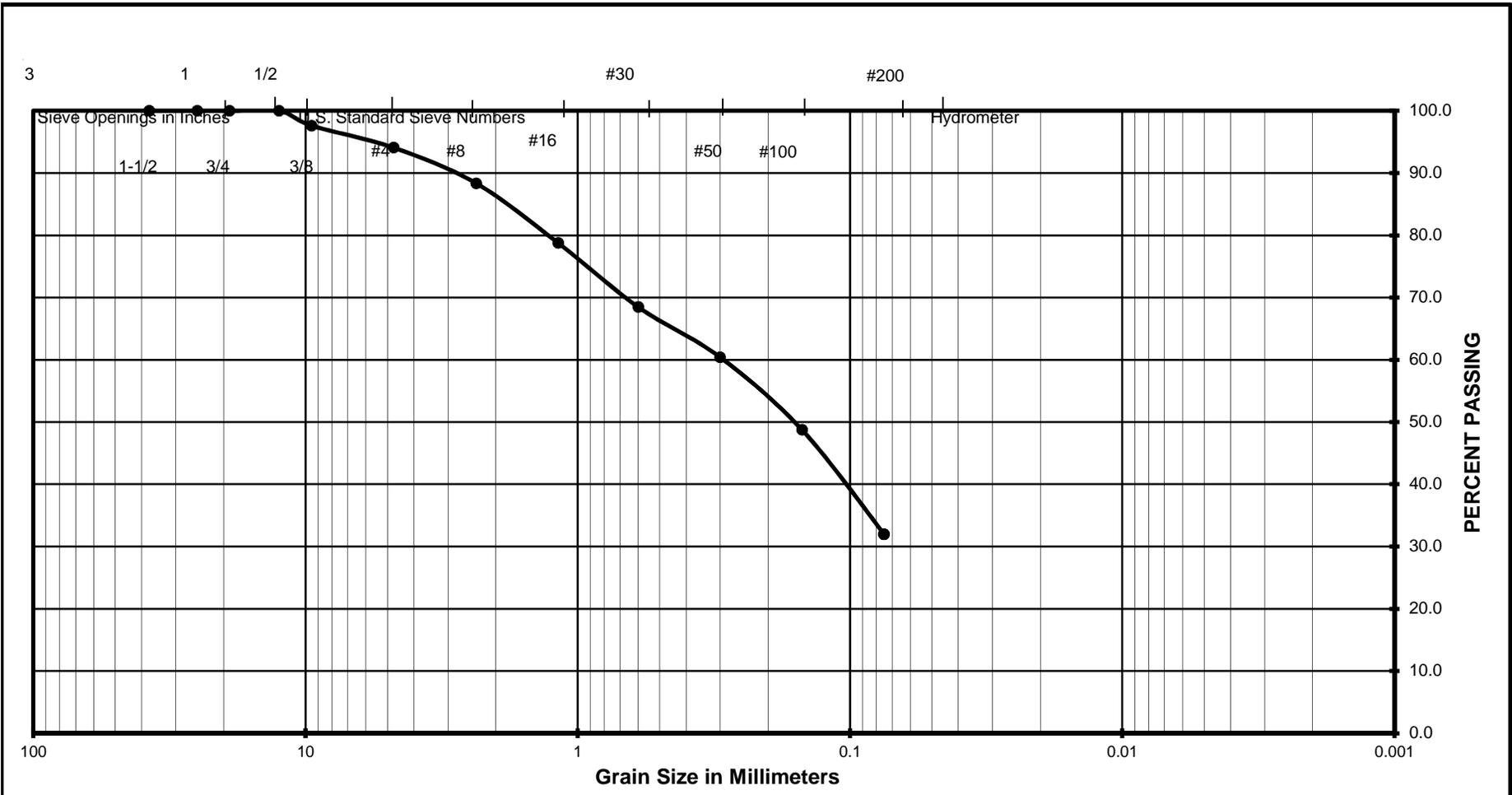
Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 5'
 Soil Classification : SM

Wet Weight	:	725.30
Dry Weight	:	725.30
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	17.4	2.4	2.4	97.6
#4	4.75	25.6	3.5	5.9	94.1
#8	2.36	41.6	5.7	11.7	88.3
#16	1.18	69.5	9.6	21.2	78.8
#30	0.60	74.5	10.3	31.5	68.5
#50	0.30	58.6	8.1	39.6	60.4
#100	0.15	84.6	11.7	51.3	48.7
#200	0.08	121.5	16.8	68.0	32.0

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	Escondido
Project Number	11224075
Soil Classification	SM
Sample Number	B-1 @ 5'

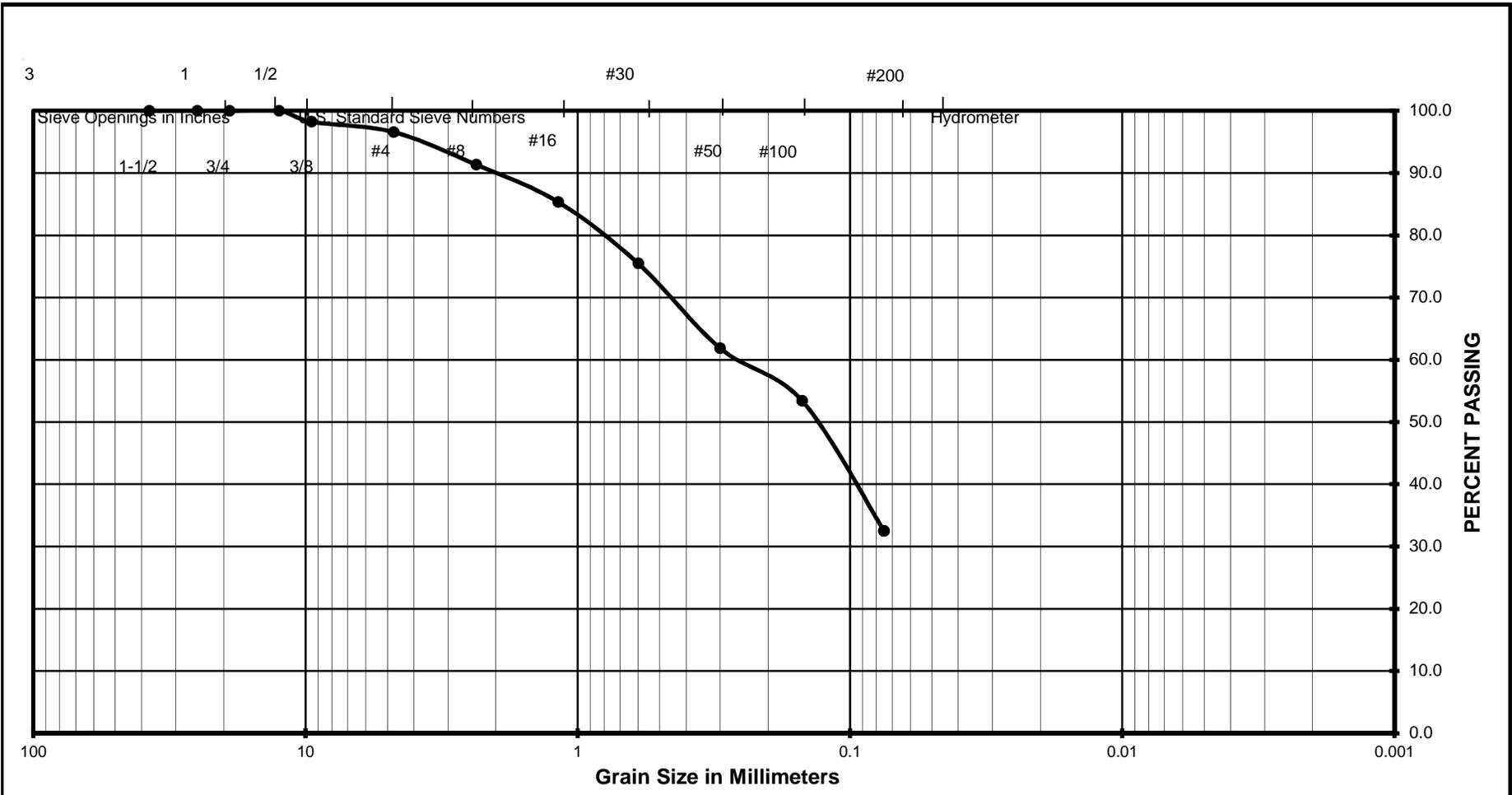
Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 10'
 Soil Classification : SM

Wet Weight	:	694.20
Dry Weight	:	694.20
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	12.3	1.8	1.8	98.2
#4	4.75	11.4	1.6	3.4	96.6
#8	2.36	36.5	5.3	8.7	91.3
#16	1.18	41.6	6.0	14.7	85.3
#30	0.60	68.4	9.9	24.5	75.5
#50	0.30	94.6	13.6	38.1	61.9
#100	0.15	58.6	8.4	46.6	53.4
#200	0.08	145.2	20.9	67.5	32.5

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	Escondido
Project Number	11224075
Soil Classification	SM
Sample Number	B-1 @ 10'

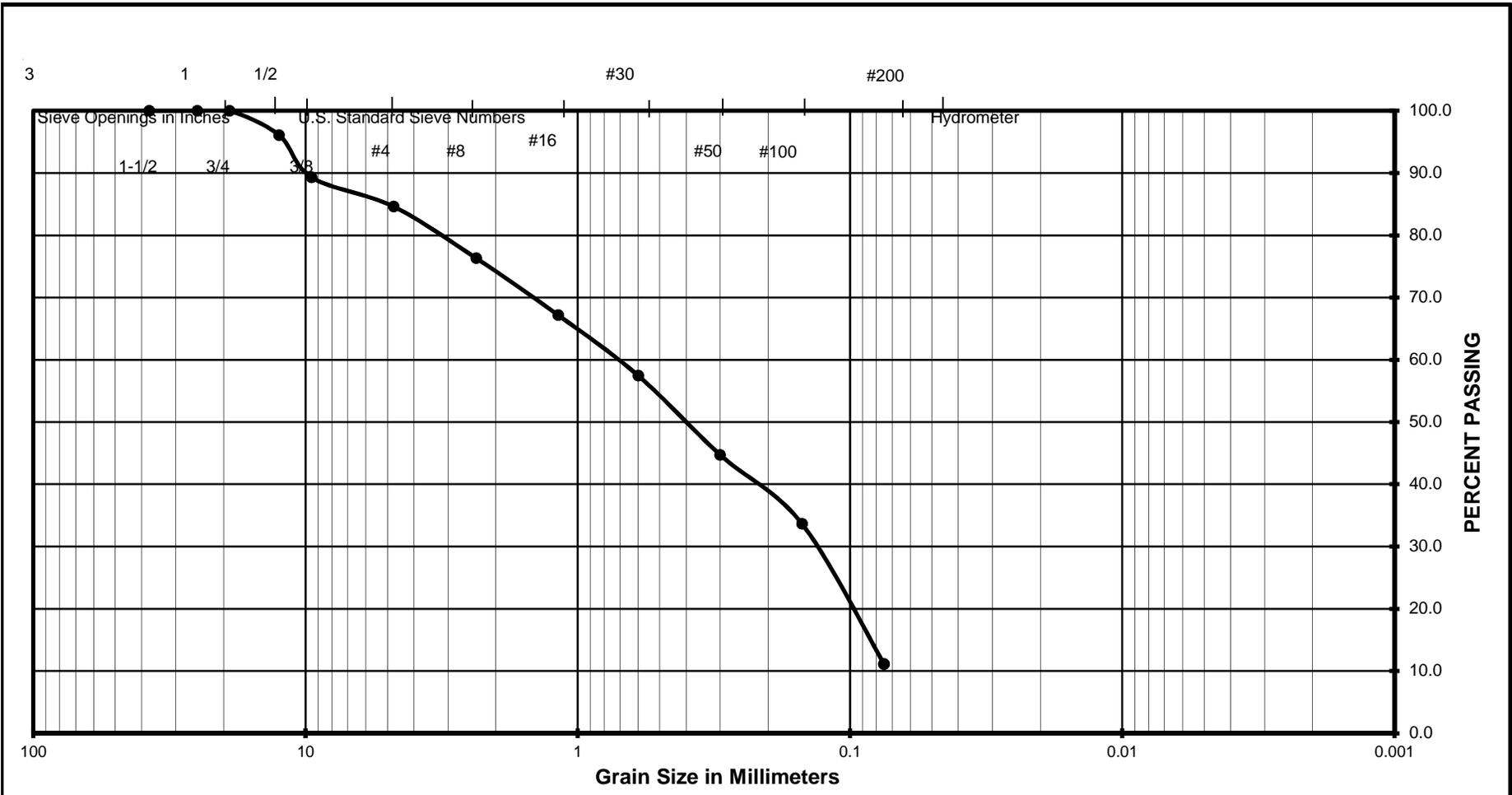
Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 15'
 Soil Classification : SP

Wet Weight	:	672.50
Dry Weight	:	672.50
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50	26.4	3.9	3.9	96.1
3/8"	9.50	45.6	6.8	10.7	89.3
#4	4.75	31.5	4.7	15.4	84.6
#8	2.36	55.8	8.3	23.7	76.3
#16	1.18	61.5	9.1	32.8	67.2
#30	0.60	65.3	9.7	42.5	57.5
#50	0.30	85.6	12.7	55.3	44.7
#100	0.15	74.6	11.1	66.4	33.6
#200	0.08	151.5	22.5	88.9	11.1

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	Escondido
Project Number	11224075
Soil Classification	SP
Sample Number	B-1 @ 15'

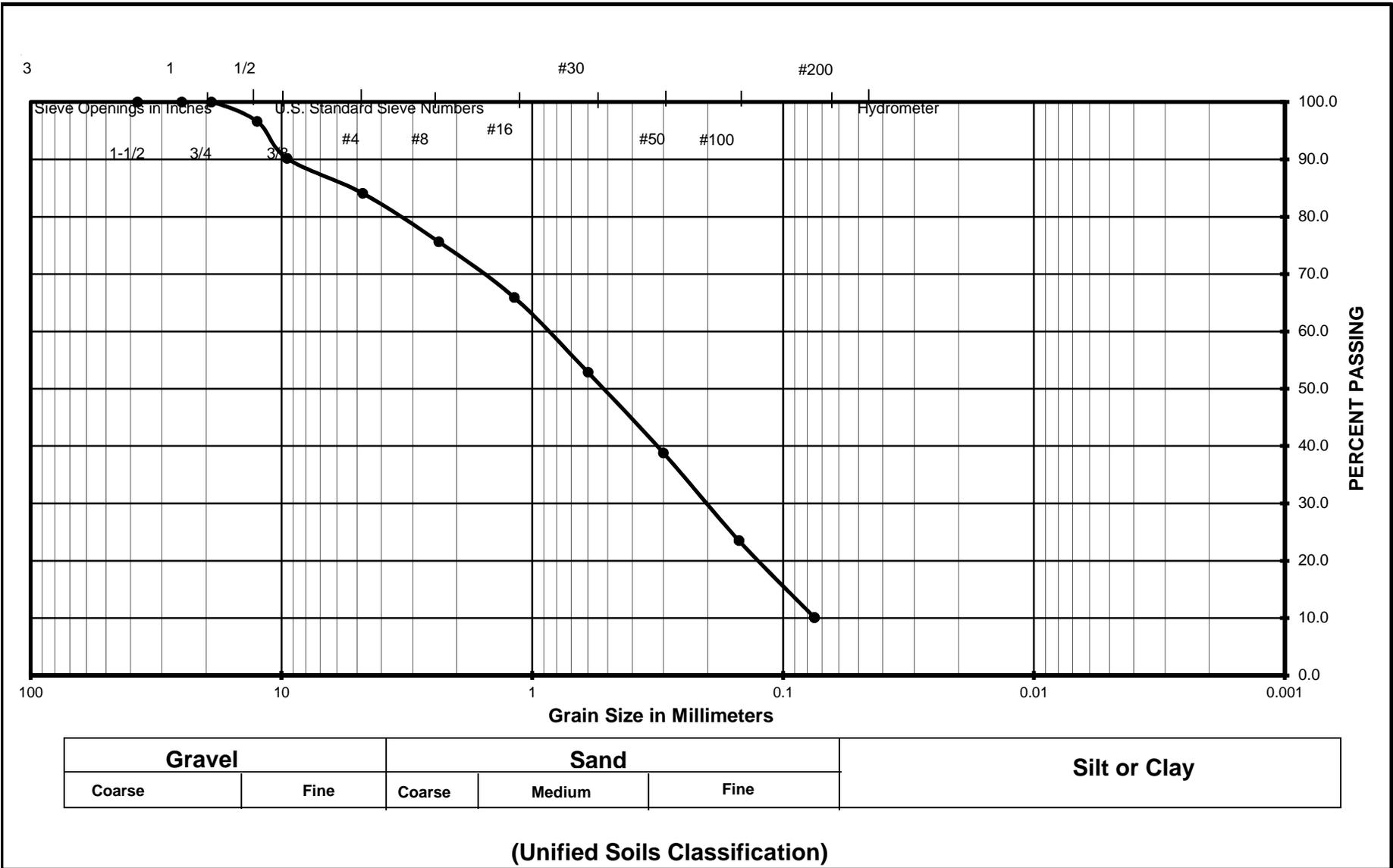
Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 20'
 Soil Classification : SP

Wet Weight	:	487.10
Dry Weight	:	487.10
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50	16.5	3.4	3.4	96.6
3/8"	9.50	31.4	6.4	9.8	90.2
#4	4.75	29.6	6.1	15.9	84.1
#8	2.36	41.2	8.5	24.4	75.6
#16	1.18	47.4	9.7	34.1	65.9
#30	0.60	63.5	13.0	47.1	52.9
#50	0.30	68.5	14.1	61.2	38.8
#100	0.15	74.5	15.3	76.5	23.5
#200	0.08	65.3	13.4	89.9	10.1

Grain Size Analysis



Project Name Escondido
 Project Number 11224075
 Soil Classification SP
 Sample Number B-1 @ 20'

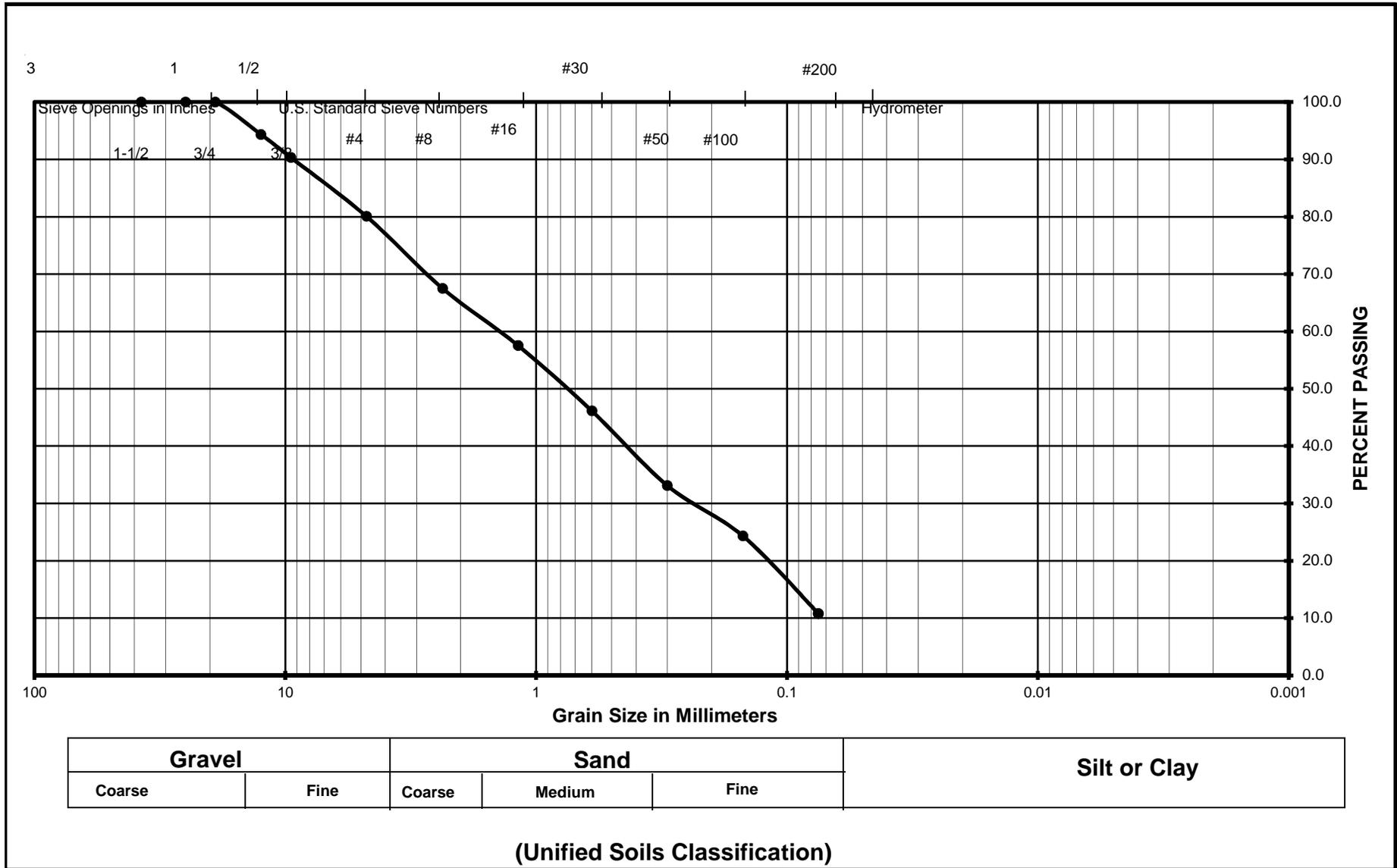
Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 25'
 Soil Classification : SP

Wet Weight	:	487.50
Dry Weight	:	487.50
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50	27.6	5.7	5.7	94.3
3/8"	9.50	19.6	4.0	9.7	90.3
#4	4.75	50.0	10.3	19.9	80.1
#8	2.36	61.3	12.6	32.5	67.5
#16	1.18	48.6	10.0	42.5	57.5
#30	0.60	55.5	11.4	53.9	46.1
#50	0.30	63.5	13.0	66.9	33.1
#100	0.15	42.8	8.8	75.7	24.3
#200	0.08	66.0	13.5	89.2	10.8

Grain Size Analysis



Project Name	Escondido
Project Number	11224075
Soil Classification	SP
Sample Number	B-1 @ 25'

Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 30'
 Soil Classification : SP

Wet Weight	:	429.90
Dry Weight	:	429.90
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00	6.5	1.5	1.5	98.5
1/2"	12.50	11.7	2.7	4.2	95.8
3/8"	9.50	20.3	4.7	9.0	91.0
#4	4.75	54.3	12.6	21.6	78.4
#8	2.36	63.5	14.8	36.4	63.6
#16	1.18	47.0	10.9	47.3	52.7
#30	0.60	50.2	11.7	59.0	41.0
#50	0.30	47.5	11.0	70.0	30.0
#100	0.15	62.3	14.5	84.5	15.5
#200	0.08	42.8	10.0	94.5	5.5

Grain Size Analysis



Project Name	Escondido
Project Number	11224075
Soil Classification	SP
Sample Number	B-1 @ 30'

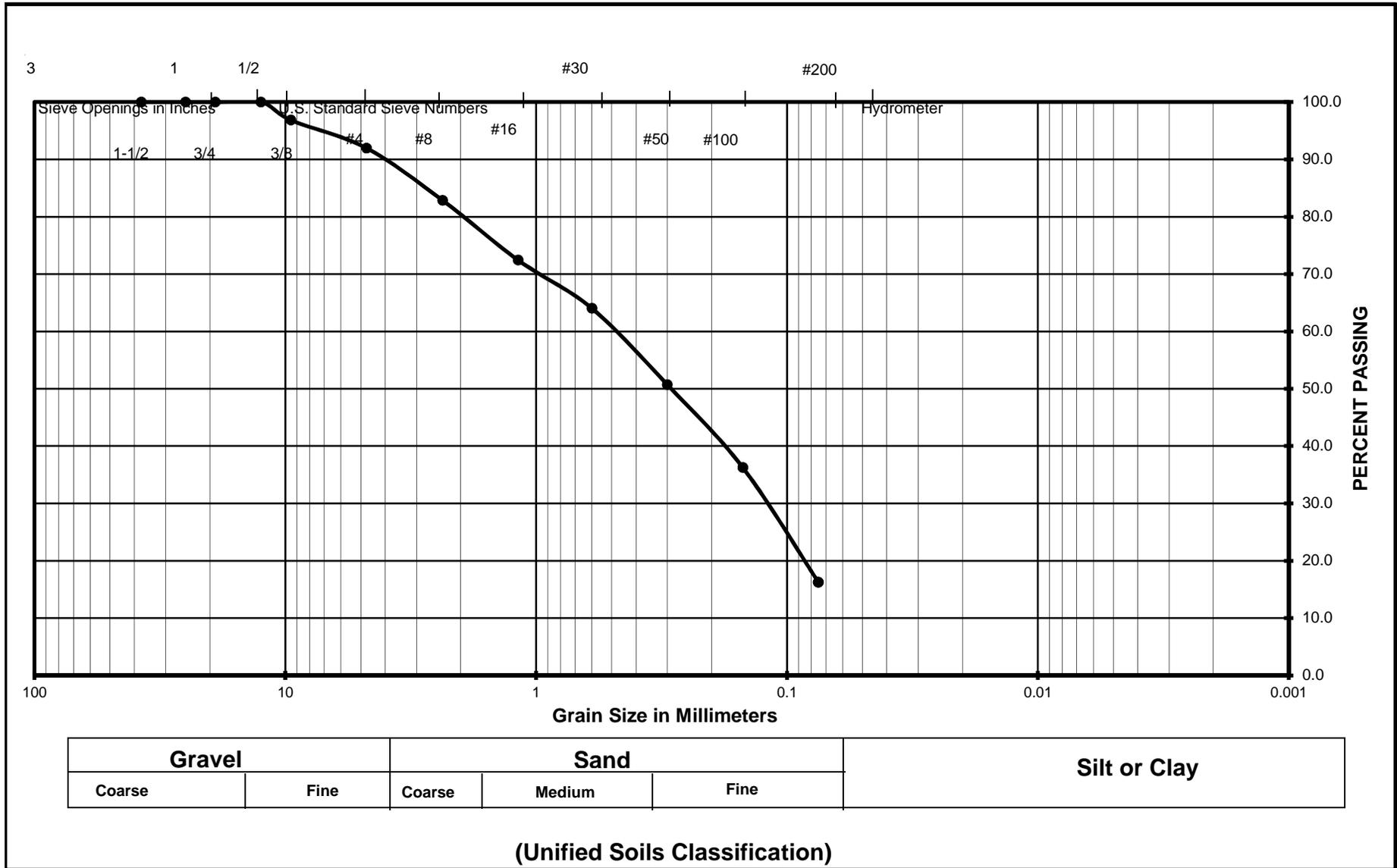
Sieve Analysis

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 35'
 Soil Classification : SM

Wet Weight	:	300.20
Dry Weight	:	300.20
Moisture Content	:	0%

Sieves Size/Number	Sieve Size, mm	Retained Weight	Retained. %	Cum % Retained	Cum. % Passing.
1-1/2"	37.50				100.0
1"	25.00				100.0
3/4"	19.00				100.0
1/2"	12.50				100.0
3/8"	9.50	9.5	3.2	3.2	96.8
#4	4.75	14.6	4.9	8.0	92.0
#8	2.36	27.4	9.1	17.2	82.8
#16	1.18	31.3	10.4	27.6	72.4
#30	0.60	25.2	8.4	36.0	64.0
#50	0.30	40.0	13.3	49.3	50.7
#100	0.15	43.4	14.5	63.8	36.2
#200	0.08	60.0	20.0	83.7	16.3

Grain Size Analysis



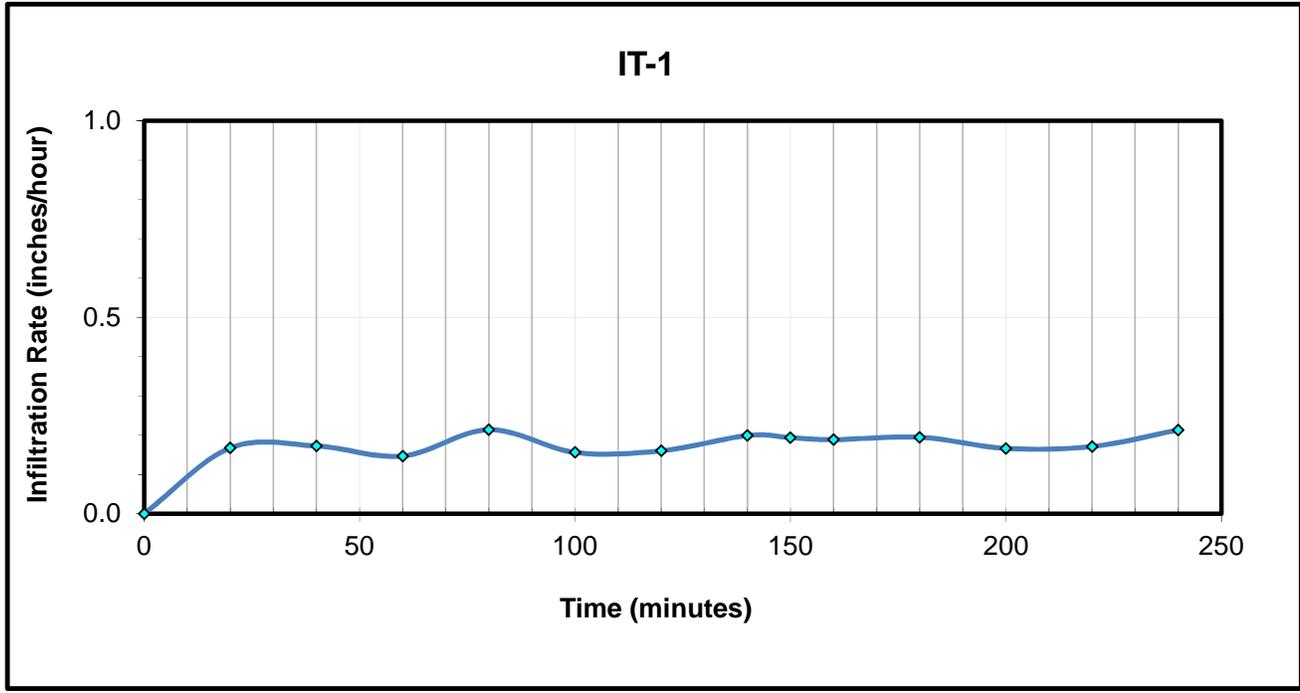
Project Name	Escondido
Project Number	11224075
Soil Classification	SM
Sample Number	B-1 @ 35'

RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	112-24075	Date	2/21/2022
Project Name	Commercial Development Escondido		
Project Address	503 W. Mission Avenue, Escondido, CA		

Test No:	IT-1	Total Depth (in.)	60	Test Size (in)	8
Depth To Water	>50'	Soil Classification	SC		

Reading	Elapsed Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		6.00	--	--
1	20.00	20.00	6.00	7.50	1.50	0.17
2	40.00	20.00	7.50	9.00	1.50	0.17
3	60.00	20.00	9.00	10.25	1.25	0.15
4	80.00	20.00	10.25	12.00	1.75	0.21
5	100.00	20.00	12.00	13.25	1.25	0.16
6	120.00	20.00	13.25	14.50	1.25	0.16
7	140.00	20.00	14.50	16.00	1.50	0.20
Refill	150.00			12.00	1.50	0.19
8	160.00	20.00	12.00	13.50	1.50	0.19
9	180.00	20.00	13.50	15.00	1.50	0.19
10	200.00	20.00	15.00	16.25	1.25	0.17
11	220.00	20.00	16.25	17.50	1.25	0.17
12	240.00	20.00	17.50	19.00	1.50	0.21
Infiltration Rate in Inches per Hour						0.15

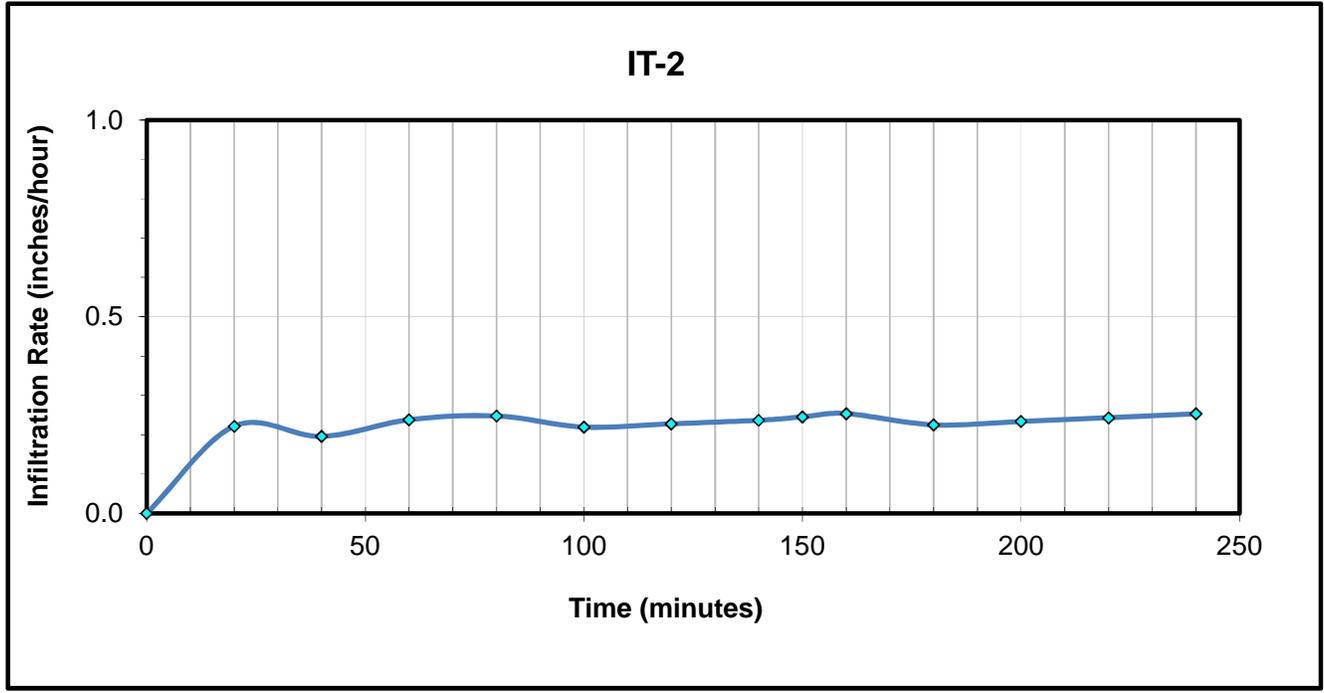


RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	112-24075	Date	2/21/2022
Project Name	Commercial Development Escondido		
Project Address	503 W. Mission Avenue, Escondido, CA		

Test No:	IT-2	Total Depth (in.)	60	Test Size (in)	8
Depth To Water	>50'	Soil Classification	SC		

Reading	Elapsed Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		12.00	--	--
1	20.00	20.00	12.00	13.75	1.75	0.22
2	40.00	20.00	13.75	15.25	1.50	0.20
3	60.00	20.00	15.25	17.00	1.75	0.24
4	80.00	20.00	17.00	18.75	1.75	0.25
5	100.00	20.00	18.75	20.25	1.50	0.22
6	120.00	20.00	20.25	21.75	1.50	0.23
7	140.00	20.00	21.75	23.25	1.50	0.24
Refill	150.00			18.00	1.63	0.25
8	160.00	20.00	18.00	19.75	1.75	0.25
9	180.00	20.00	19.75	21.25	1.50	0.23
10	200.00	20.00	21.25	22.75	1.50	0.23
11	220.00	20.00	22.75	24.25	1.50	0.24
12	240.00	20.00	24.25	25.75	1.50	0.25
Infiltration Rate in Inches per Hour						0.20



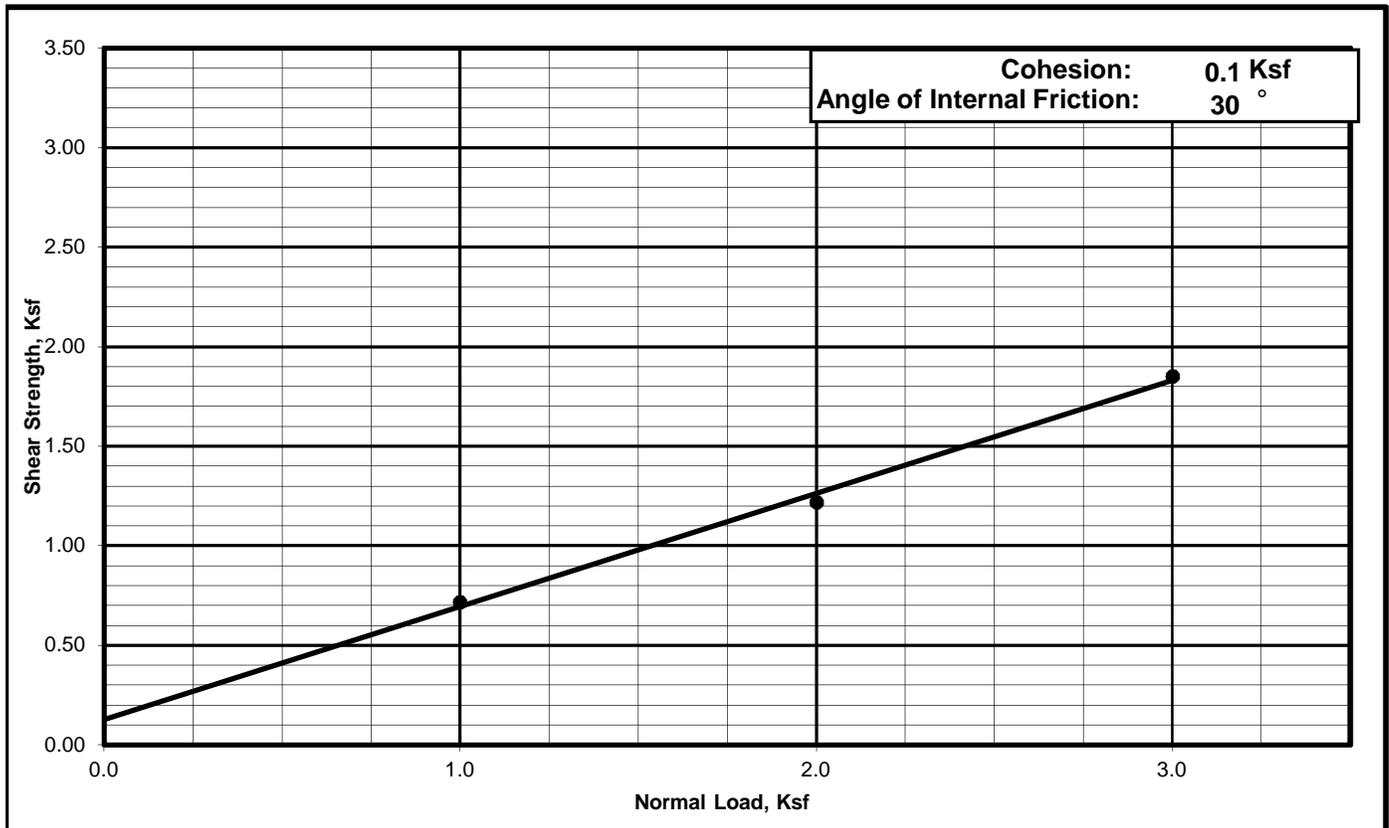
Direct Shear of Consolidated, Drained Soils ASTM D - 3080 / AASHTO T - 236

Project Number : 11224075
 Project Name : Escondido
 Date : 2/21/2022
 Sample Location : B-1 @ 2'
 Soil Classification : SM
 Sample Surface Area : 0.0289

STRESS DISPLACEMENT DATA

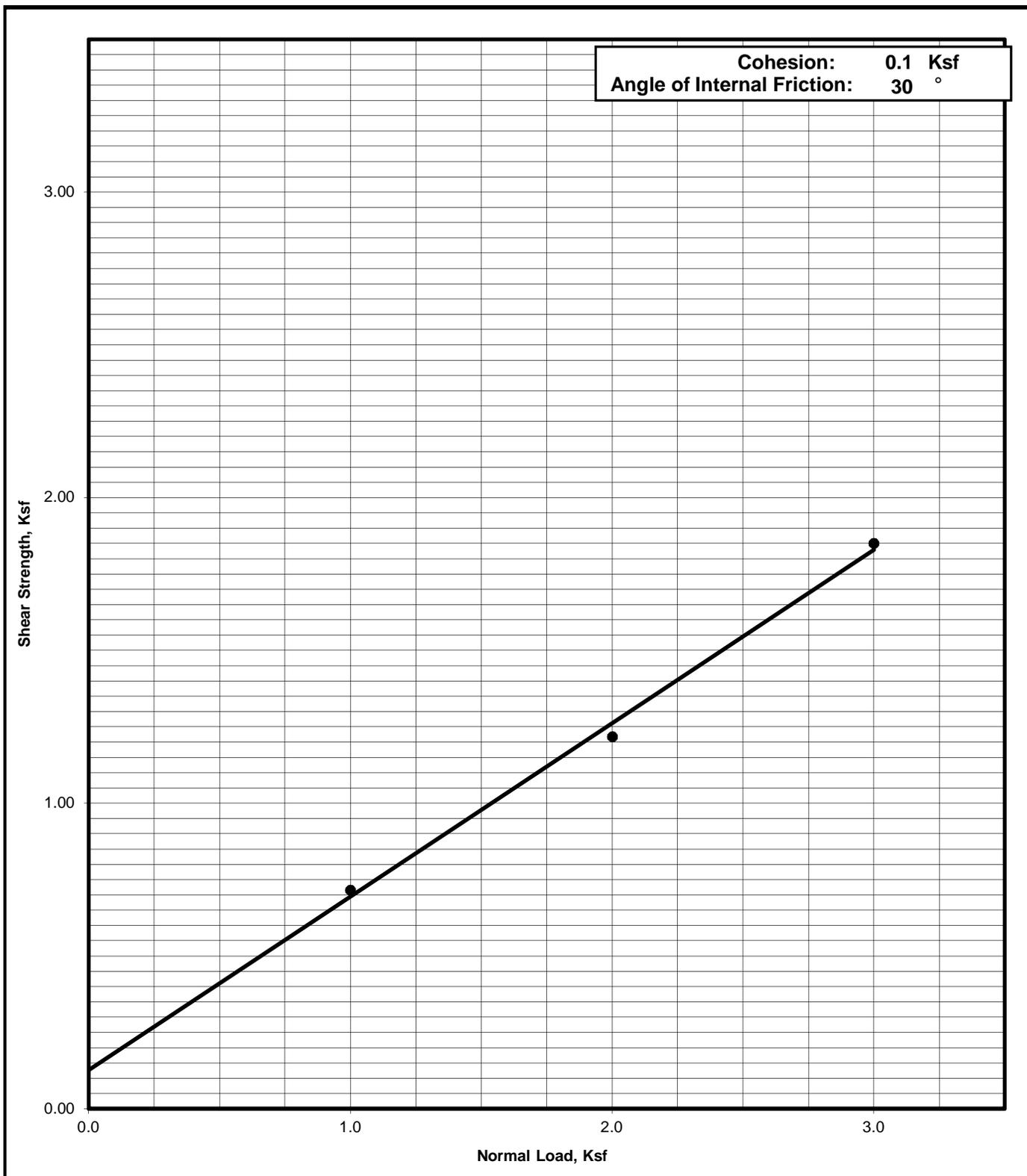
Lat. Disp. (in.)	Normal Load		
	1000	2000	3000
0	0	0	0
0.030	16.8	34.8	46.2
0.060	26.4	45.2	55.8
0.090	35.4	64.8	68.4
0.120	43.8	72.4	78.2
0.150	53.4	85.6	91.6
0.180	62	95	111.2
0.210		108.6	127.6
0.240			139.6
0.270			145.7
0.300			166
0.330			
0.360			

Normal Load psf	Shear force lbs	Shear Stress psf
1000	20.7	716
2000	35.2	1218
3000	53.5	1851



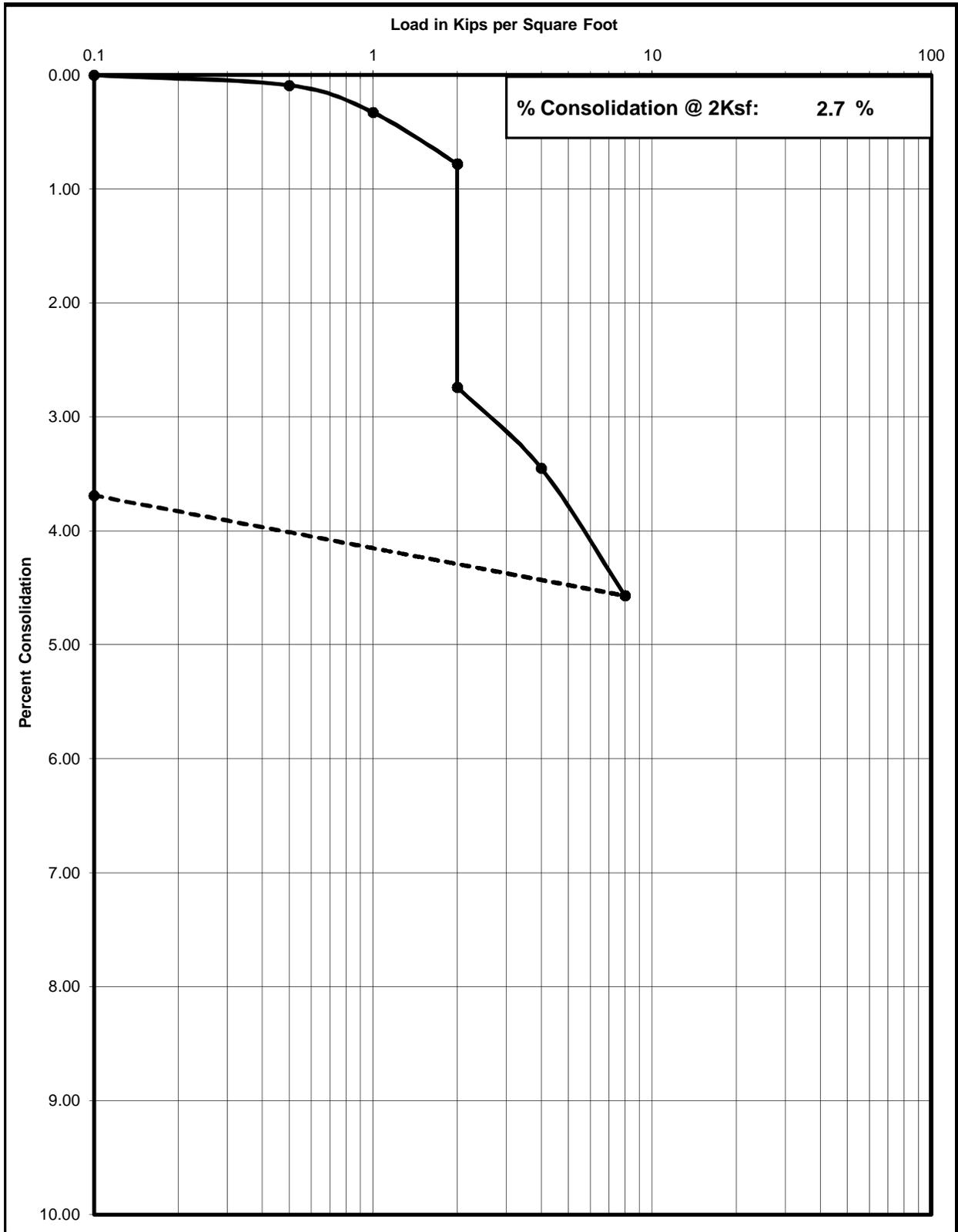
Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
11224075	B-1 @ 2'	SM	2/21/2022



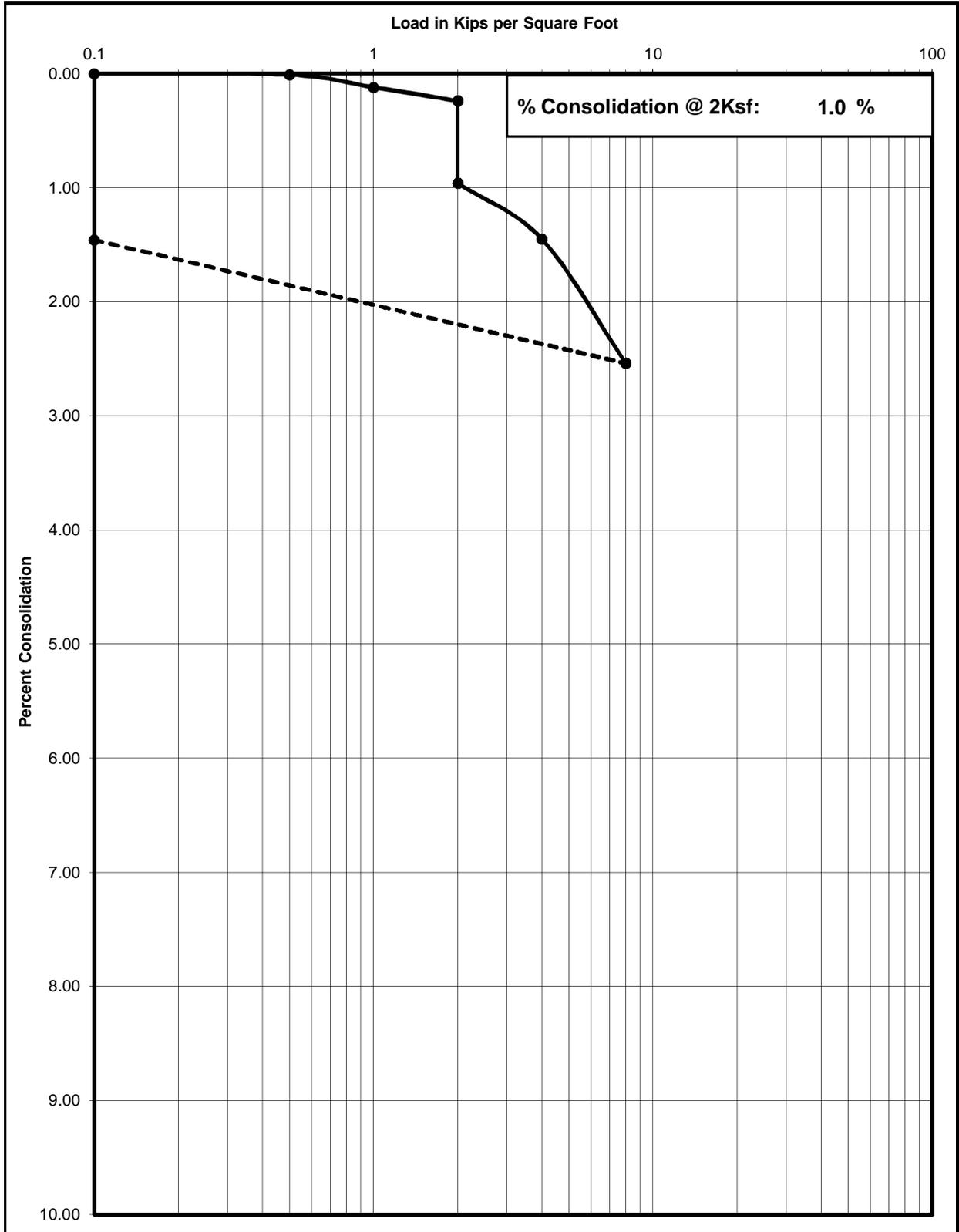
Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
11224075	B-1 @ 2'	2/21/2022	SM



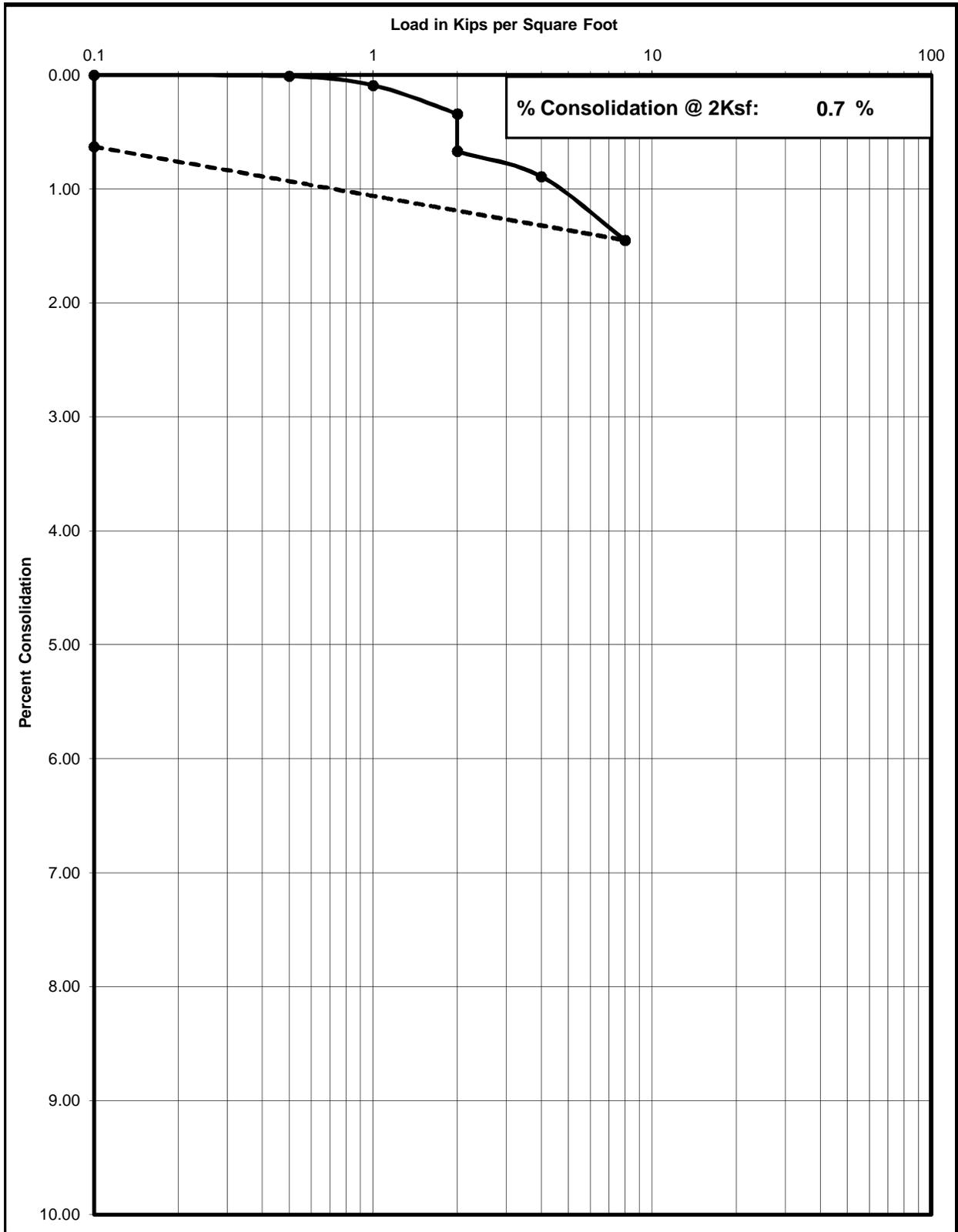
Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
11224075	B-1 @ 5'	2/21/2022	SM



Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
11224075	B-1 @ 10'	2/21/2022	SM



ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949)336-6544

Krazan & Associates, Inc.
1100 Olympic Drive, Ste. 103
Corona, CA 92888

P.O. NO: Verbal

LAB NO: C-5595

SPECIFICATION: CTM-643/417/422

MATERIAL: Soil

Sample ID: B-1 @ 0-5'

ANALYTICAL REPORT

CORROSION SERIES SUMMARY OF DATA

pH	MIN. RESISTIVITY per CT. 643 ohm-cm	SOLUBLE SULFATES per CT. 417 ppm	SOLUBLE CHLORIDES per CT. 422 ppm
7.5	3,200	185	89

RESPECTFULLY SUBMITTED



WES BRIDGER LAB MANAGER

*General Earthwork
Specifications*

Appendix B

APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including, but not limited to, the furnishing of all labor, tools and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthworks in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Incorporated, hereinafter referred to as the Geotechnical Engineer and/or Testing Agency. Attainment of design grades, when achieved, shall be certified by the project Civil Engineer. Both the Geotechnical Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary adjustments until all work is deemed satisfactory as determined by both the Geotechnical Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Geotechnical Engineer, Civil Engineer, or project Architect.

No earthwork shall be performed without the physical presence or approval of the Geotechnical Engineer. The Contractor shall notify the Geotechnical Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to the minimum relative compaction of 95 percent. Soil moisture-content requirements presented in the Geotechnical Engineer's report shall also be complied with. The maximum laboratory compacted dry unit weight of each soil placed as fill shall be determined in accordance with ASTM Test Method D1557-00 (Modified Proctor). The optimum moisture-content shall also be determined in accordance with this test method. The terms "relative compaction" and "compaction" are defined as the in-place dry density of the compacted soil divided by the laboratory compacted maximum dry density as determined by ASTM Test Method D1557-00, expressed as a percentage as specified in the technical portion of the Geotechnical Engineer's report. The location and frequency of field density tests shall be as determined by the Geotechnical Engineer. The results of these tests and compliance with these specifications shall be the basis upon which the Geotechnical Engineer will judge satisfactory completion of work.

SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the Geotechnical Engineering Investigation report.

The Contractor shall make his own interpretation of the data contained in the Geotechnical Engineering Investigation report and the Contractor shall not be relieved of liability under the Contract for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or wind-blown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing, over-excavation of the proposed building pad areas, preparation of foundation materials for receiving fill, construction of Engineered Fill including the placement of non-expansive fill where recommended by the Geotechnical Engineer.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter and all other matter determined by the Geotechnical Engineer to be deleterious. Site stripping to remove organic materials and organic-laden soils in landscaped areas shall extend to a minimum depth of 2 inches or until all organic-laden soil with organic matter in excess of 3 percent of the soils by volume are removed. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent that would permit removal of all roots greater than 1 inch in diameter. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavation should not be permitted until all exposed surfaces have been inspected and the Geotechnical Engineer is present for the proper control of backfill placement and compaction. Burning in areas that are to receive fill materials shall not be permitted.

Excavations required to achieve design grades, depressions, soft or pliant areas, or areas disturbed by demolition activities extending below planned finished subgrade levels should be excavated down to firm, undisturbed soil and backfilled with Engineered Fill. The resulting excavations should be backfilled with Engineered Fill.

EXCAVATION: Following clearing and grubbing operations, the proposed building pad area shall be over-excavated to a depth of at least five feet below existing grades or two feet below the deepest existing structure foundation within the limits of each of the building pads. The remaining areas of the building and adjoining exterior concrete flatwork or pavements at the building perimeter shall be over-excavated to a depth of at least one foot below existing grade. The areas of over-excavation and recompaction beneath footings and slabs shall extend out laterally a minimum of five feet beyond the perimeter of these elements.

All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable **TECHNICAL REQUIREMENTS**.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill or to support structures directly, shall be scarified to a depth of 8 inches, moisture-conditioned as necessary and compacted in accordance with the **TECHNICAL REQUIREMENTS**, above.

Loose soil areas and/or areas of disturbed soil shall be should be excavated down to firm, undisturbed soil, moisture-conditioned as necessary and backfilled with Engineered Fill. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas that are to receive fill materials shall be approved by the Geotechnical Engineer prior to the placement of any of the fill material.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Geotechnical Engineer. Material from the required site excavation may be utilized for construction of site fills, with the limitations of their use presented in the Geotechnical Engineer's report, provided the Geotechnical Engineer gives prior approval. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Geotechnical Engineer, and shall comply with the requirements for non-expansive fill, aggregate base or aggregate subbase as applicable for its proposed used on the site as presented in the Geotechnical Engineer's report.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. Fill materials should be placed and compacted in horizontal lifts, each not exceeding 8 inches in uncompacted thickness. Due to equipment limitations, thinner lifts may be necessary to achieve the recommended level of compaction. Compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Geotechnical Engineer. Additional lifts should not be placed if the previous lift did not meet the required dry density (relative compaction) or if soil conditions are not stable. The compacted subgrade in pavement areas should be non-yielding when proof-rolled with a loaded ten-wheel truck, such as a water truck or dump truck, prior to pavement construction.

Both cut and fill shall be surface-compacted to the satisfaction of the Geotechnical Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing, or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Geotechnical Engineer indicates that the moisture-content and density of previously placed fill is as specified.

*General Paving
Specifications*

Appendix C

APPENDIX C

PAVEMENT SPECIFICATIONS

1. DEFINITIONS - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term "Standard Specifications": hereinafter referred to is the 2018 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the applicable tests outlined in the Materials Manual.

2. SCOPE OF WORK - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically notes as "Work Not Included."

3. PREPARATION OF THE SUBGRADE - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 90 percent. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

4. UNTREATED AGGREGATE BASE - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2 material, 1½ inches maximum size. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

5. AGGREGATE SUBBASE - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class 2 material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

6. ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades, and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10. The mineral aggregate shall be Type B, ½ inch maximum size, medium grading, and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning, and mixing of the materials shall conform to Section 39.

The prime coat, spreading and compacting equipment, and spreading and compacting the mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50 degrees F. The surfacing shall be rolled with a combination steel-wheel and pneumatic rollers, as described in Section 39-6. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

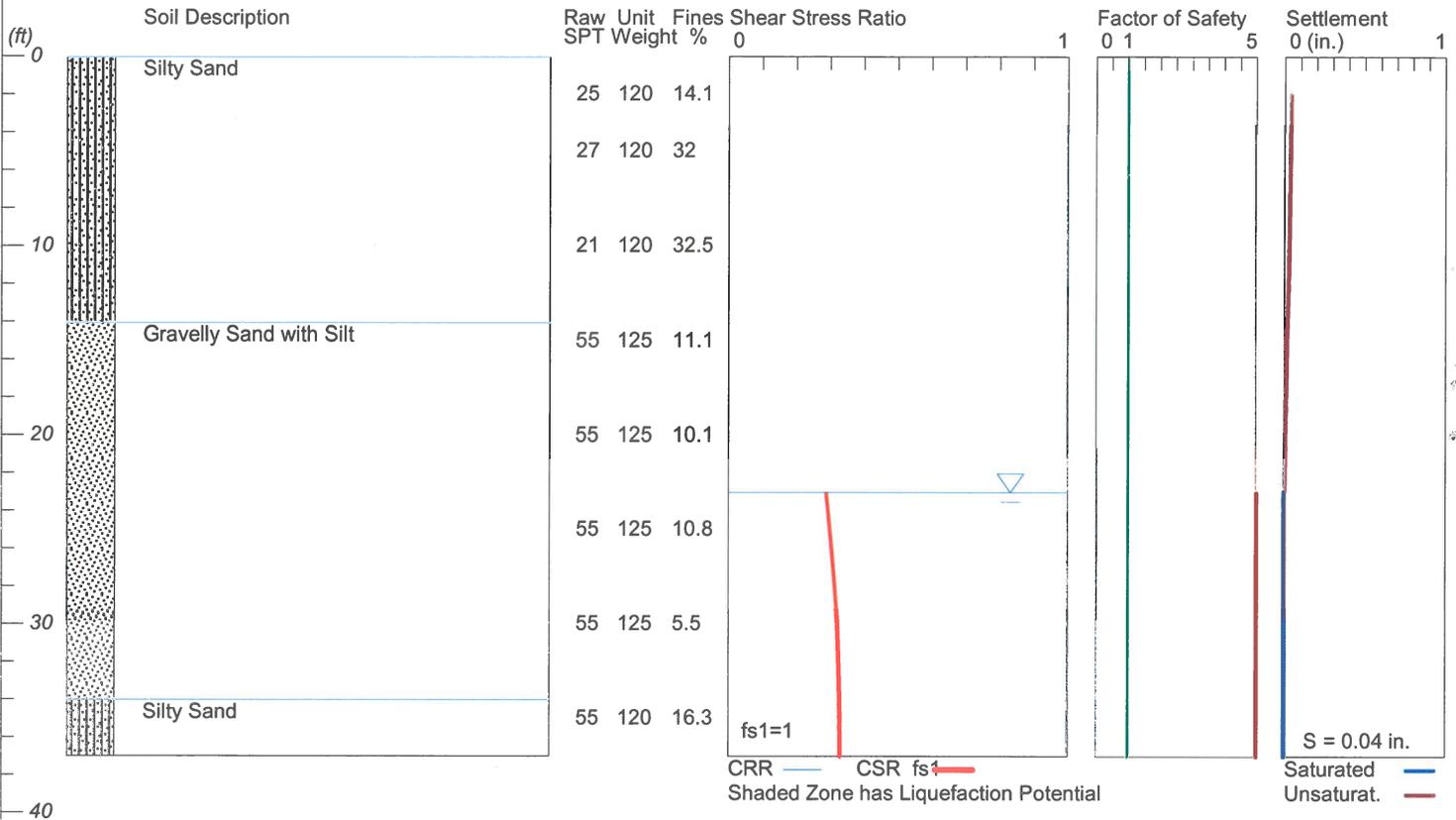
7. FOG SEAL COAT - The fog seal (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of Section 37.

Appendix D

LIQUEFACTION ANALYSIS

Hole No.=B-1 Water Depth=23 ft

Magnitude=6.5
Acceleration=0.47g



LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: UNTITLED
Title: Escondido
Subtitle:

Surface Elev. =
Hole No. =B-1
Depth of Hole= 37.00 ft
Water Table during Earthquake= 23.00 ft
Water Table during In-Situ Testing= 23.00 ft
Max. Acceleration= 0.47 g
Earthquake Magnitude= 6.50

Input Data:

Surface Elev. =
Hole No. =B-1
Depth of Hole=37.00 ft
Water Table during Earthquake= 23.00 ft
Water Table during In-Situ Testing= 23.00 ft
Max. Acceleration=0.47 g
Earthquake Magnitude=6.50
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
 2. Settlement Analysis Method: Tokimatsu/Seed
 3. Fines Correction for Liquefaction: Idriss/Seed
 4. Fine Correction for Settlement: During Liquefaction*
 5. Settlement Calculation in: All zones*
 6. Hammer Energy Ratio,
 7. Borehole Diameter,
 8. Sampling Method,
 9. User request factor of safety (apply to CSR) , User= 1
Plot one CSR curve (fs1=1)
 10. Use Curve Smoothing: No
- * Recommended Options

Ce = 1.25
Cb= 1
Cs= 1

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
2.00	25.00	120.00	14.10
5.00	27.00	120.00	32.00
10.00	21.00	120.00	32.50
15.00	55.00	125.00	11.10
20.00	55.00	125.00	10.10
25.00	55.00	125.00	10.80
30.00	55.00	125.00	5.50
35.00	55.00	120.00	16.30

UNTITLED. sum

Output Results:

Settlement of Saturated Sands=0.00 in.
 Settlement of Unsaturated Sands=0.04 in.
 Total Settlement of Saturated and Unsaturated Sands=0.04 in.
 Differential Settlement=0.020 to 0.027 in.

Depth ft	CRRm	CSRfs	F. S.	S_sat. in.	S_dry in.	S_all in.
2.00	2.88	0.30	5.00	0.00	0.04	0.04
2.05	2.88	0.30	5.00	0.00	0.04	0.04
2.10	2.88	0.30	5.00	0.00	0.04	0.04
2.15	2.88	0.30	5.00	0.00	0.04	0.04
2.20	2.88	0.30	5.00	0.00	0.04	0.04
2.25	2.88	0.30	5.00	0.00	0.04	0.04
2.30	2.88	0.30	5.00	0.00	0.04	0.04
2.35	2.88	0.30	5.00	0.00	0.04	0.04
2.40	2.88	0.30	5.00	0.00	0.04	0.04
2.45	2.88	0.30	5.00	0.00	0.04	0.04
2.50	2.88	0.30	5.00	0.00	0.04	0.04
2.55	2.88	0.30	5.00	0.00	0.04	0.04
2.60	2.88	0.30	5.00	0.00	0.04	0.04
2.65	2.88	0.30	5.00	0.00	0.04	0.04
2.70	2.88	0.30	5.00	0.00	0.04	0.04
2.75	2.88	0.30	5.00	0.00	0.04	0.04
2.80	2.88	0.30	5.00	0.00	0.04	0.04
2.85	2.88	0.30	5.00	0.00	0.04	0.04
2.90	2.88	0.30	5.00	0.00	0.04	0.04
2.95	2.88	0.30	5.00	0.00	0.04	0.04
3.00	2.88	0.30	5.00	0.00	0.04	0.04
3.05	2.88	0.30	5.00	0.00	0.04	0.04
3.10	2.88	0.30	5.00	0.00	0.04	0.04
3.15	2.88	0.30	5.00	0.00	0.04	0.04
3.20	2.88	0.30	5.00	0.00	0.04	0.04
3.25	2.88	0.30	5.00	0.00	0.04	0.04
3.30	2.88	0.30	5.00	0.00	0.04	0.04
3.35	2.88	0.30	5.00	0.00	0.04	0.04
3.40	2.88	0.30	5.00	0.00	0.04	0.04
3.45	2.88	0.30	5.00	0.00	0.04	0.04
3.50	2.88	0.30	5.00	0.00	0.04	0.04
3.55	2.88	0.30	5.00	0.00	0.04	0.04
3.60	2.88	0.30	5.00	0.00	0.04	0.04
3.65	2.88	0.30	5.00	0.00	0.04	0.04
3.70	2.88	0.30	5.00	0.00	0.04	0.04
3.75	2.88	0.30	5.00	0.00	0.04	0.04
3.80	2.88	0.30	5.00	0.00	0.04	0.04
3.85	2.88	0.30	5.00	0.00	0.04	0.04
3.90	2.88	0.30	5.00	0.00	0.04	0.04
3.95	2.88	0.30	5.00	0.00	0.04	0.04
4.00	2.88	0.30	5.00	0.00	0.04	0.04
4.05	2.88	0.30	5.00	0.00	0.04	0.04
4.10	2.88	0.30	5.00	0.00	0.04	0.04
4.15	2.88	0.30	5.00	0.00	0.04	0.04
4.20	2.88	0.30	5.00	0.00	0.04	0.04
4.25	2.88	0.30	5.00	0.00	0.04	0.04
4.30	2.88	0.30	5.00	0.00	0.04	0.04
4.35	2.88	0.30	5.00	0.00	0.04	0.04
4.40	2.88	0.30	5.00	0.00	0.04	0.04
4.45	2.88	0.30	5.00	0.00	0.04	0.04
4.50	2.88	0.30	5.00	0.00	0.04	0.04
4.55	2.88	0.30	5.00	0.00	0.04	0.04
4.60	2.88	0.30	5.00	0.00	0.04	0.04
4.65	2.88	0.30	5.00	0.00	0.04	0.04

UNTI TLED. sum						
29.90	2.88	0.32	5.00	0.00	0.00	0.00
29.95	2.88	0.32	5.00	0.00	0.00	0.00
30.00	2.88	0.32	5.00	0.00	0.00	0.00
30.05	2.88	0.32	5.00	0.00	0.00	0.00
30.10	2.88	0.32	5.00	0.00	0.00	0.00
30.15	2.88	0.32	5.00	0.00	0.00	0.00
30.20	2.88	0.32	5.00	0.00	0.00	0.00
30.25	2.90	0.32	5.00	0.00	0.00	0.00
30.30	2.90	0.32	5.00	0.00	0.00	0.00
30.35	2.90	0.32	5.00	0.00	0.00	0.00
30.40	2.90	0.32	5.00	0.00	0.00	0.00
30.45	2.90	0.32	5.00	0.00	0.00	0.00
30.50	2.90	0.32	5.00	0.00	0.00	0.00
30.55	2.90	0.32	5.00	0.00	0.00	0.00
30.60	2.90	0.32	5.00	0.00	0.00	0.00
30.65	2.90	0.32	5.00	0.00	0.00	0.00
30.70	2.90	0.32	5.00	0.00	0.00	0.00
30.75	2.90	0.32	5.00	0.00	0.00	0.00
30.80	2.90	0.32	5.00	0.00	0.00	0.00
30.85	2.90	0.32	5.00	0.00	0.00	0.00
30.90	2.90	0.32	5.00	0.00	0.00	0.00
30.95	2.90	0.32	5.00	0.00	0.00	0.00
31.00	2.89	0.32	5.00	0.00	0.00	0.00
31.05	2.89	0.32	5.00	0.00	0.00	0.00
31.10	2.89	0.32	5.00	0.00	0.00	0.00
31.15	2.89	0.32	5.00	0.00	0.00	0.00
31.20	2.89	0.32	5.00	0.00	0.00	0.00
31.25	2.89	0.32	5.00	0.00	0.00	0.00
31.30	2.89	0.32	5.00	0.00	0.00	0.00
31.35	2.89	0.32	5.00	0.00	0.00	0.00
31.40	2.89	0.32	5.00	0.00	0.00	0.00
31.45	2.89	0.32	5.00	0.00	0.00	0.00
31.50	2.89	0.32	5.00	0.00	0.00	0.00
31.55	2.89	0.32	5.00	0.00	0.00	0.00
31.60	2.89	0.32	5.00	0.00	0.00	0.00
31.65	2.89	0.32	5.00	0.00	0.00	0.00
31.70	2.89	0.32	5.00	0.00	0.00	0.00
31.75	2.89	0.33	5.00	0.00	0.00	0.00
31.80	2.89	0.33	5.00	0.00	0.00	0.00
31.85	2.89	0.33	5.00	0.00	0.00	0.00
31.90	2.89	0.33	5.00	0.00	0.00	0.00
31.95	2.89	0.33	5.00	0.00	0.00	0.00
32.00	2.89	0.33	5.00	0.00	0.00	0.00
32.05	2.89	0.33	5.00	0.00	0.00	0.00
32.10	2.89	0.33	5.00	0.00	0.00	0.00
32.15	2.88	0.33	5.00	0.00	0.00	0.00
32.20	2.88	0.33	5.00	0.00	0.00	0.00
32.25	2.88	0.33	5.00	0.00	0.00	0.00
32.30	2.88	0.33	5.00	0.00	0.00	0.00
32.35	2.88	0.33	5.00	0.00	0.00	0.00
32.40	2.88	0.33	5.00	0.00	0.00	0.00
32.45	2.88	0.33	5.00	0.00	0.00	0.00
32.50	2.88	0.33	5.00	0.00	0.00	0.00
32.55	2.88	0.33	5.00	0.00	0.00	0.00
32.60	2.88	0.33	5.00	0.00	0.00	0.00
32.65	2.88	0.33	5.00	0.00	0.00	0.00
32.70	2.88	0.33	5.00	0.00	0.00	0.00
32.75	2.88	0.33	5.00	0.00	0.00	0.00
32.80	2.88	0.33	5.00	0.00	0.00	0.00
32.85	2.88	0.33	5.00	0.00	0.00	0.00
32.90	2.88	0.33	5.00	0.00	0.00	0.00
32.95	2.88	0.33	5.00	0.00	0.00	0.00
33.00	2.88	0.33	5.00	0.00	0.00	0.00

UNTITLED. sum						
36.20	2.85	0.33	5.00	0.00	0.00	0.00
36.25	2.85	0.33	5.00	0.00	0.00	0.00
36.30	2.85	0.33	5.00	0.00	0.00	0.00
36.35	2.85	0.33	5.00	0.00	0.00	0.00
36.40	2.85	0.33	5.00	0.00	0.00	0.00
36.45	2.85	0.33	5.00	0.00	0.00	0.00
36.50	2.85	0.33	5.00	0.00	0.00	0.00
36.55	2.85	0.33	5.00	0.00	0.00	0.00
36.60	2.85	0.33	5.00	0.00	0.00	0.00
36.65	2.85	0.33	5.00	0.00	0.00	0.00
36.70	2.85	0.33	5.00	0.00	0.00	0.00
36.75	2.85	0.33	5.00	0.00	0.00	0.00
36.80	2.85	0.33	5.00	0.00	0.00	0.00
36.85	2.85	0.33	5.00	0.00	0.00	0.00
36.90	2.85	0.33	5.00	0.00	0.00	0.00
36.95	2.84	0.33	5.00	0.00	0.00	0.00
37.00	2.84	0.33	5.00	0.00	0.00	0.00

* F. S. <1, Liquefaction Potential Zone
(F. S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1 tsf (ton/ft ²)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user
request factor of safety)
F. S. Factor of Safety against liquefaction, F. S. =CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils