Geotechnical
Environmental
Hydrogeology
Material Testing
Construction Inspection

May 19, 2021

Project No. 21-7238

Proficiency Rubidoux LLC
11777 San Vicente Boulevard, Suite 780
Los Angeles, CA 90049

Attention: Matt Englhard, Vice President

Subject: Geotechnical Update Report, Proposed Warehouse Development, 26th St. and Avalon St., City of Jurupa Valley, California

Matt,

In accordance with your request and authorization, TGR Geotechnical, Inc. (TGR) has prepared a geotechnical update report for the proposed development at the subject site in the City of Jurupa Valley, California. This report presents geotechnical design and grading recommendations for the proposed development. These recommendations were developed based on our review of the previous studies performed by NorCal Engineering (2005 and 2019), our site visit, geophysical investigation and a review of the current proposed development plan. The work was performed in general accordance with our proposal dated April 1, 2021.

Based on our study the proposed development is feasible from a geotechnical viewpoint provided the recommendations presented in this report are implemented during design and construction.

If you have any questions regarding this report, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

TGR GEOTECHNICAL, INC.

REGISTERED PROFESSIONAL ENGINEER SANJAY GOVIL No. GE2382 EXP. 6/30/2022 GEOTECHNICAL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL GEOLOGIST EDWARD LOUIS BURROWS No. 1750 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

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ATTACHMENTS

Plate 1 – Geotechnical Map

Figure 1 – Site Location Map
Figure 2 – Regional Geology Map
Figure 3 – Regional Fault Map

Appendix A – References
Appendix B – Log of Trenches by NorCal Engineering (2005)
Appendix C – Laboratory Testing Results by NorCal Engineering (2005)
Appendix D – Infiltration Testing Calculations by NorCal Engineering (2019)
Appendix E – Site Seismicity and De-Aggregated Parameters
Appendix F – Seismic Shear-Wave Survey by Terra Geosciences (2021)
Appendix G – Standard Grading Guidelines

EXECUTIVE SUMMARY

Presented below are significant elements of our findings from a geotechnical viewpoint. These findings are based on geotechnical investigation, laboratory testing, and geologic and engineering analysis performed by NorCal Engineering (2005 and 2019).

Geotechnical/Geologic Concerns

- There are no known faults passing through or adjacent to the subject site. The subject site is not located within an Alquist-Priolo Earthquake Fault Zone. The nearest faults to the subject site are the Rialto-Colton fault mapped approximately 5.5 miles northeast of the site, the San Jacinto mapped approximately 6.1 miles southwest of the site, the Live Oak Canyon fault mapped approximately 9.4 miles east of the subject site, Loma Linda fault mapped approximately 9.6 miles east of the subject site and the Red Hill Etiwanda fault mapped 12.7 miles northwest of the subject site.
- Onsite soils have an expansion index of 4, correlating to a " very low" expansion potential.
- Soils may be cut vertically without shoring to a depth of approximately four (4) feet below adjacent surrounding grade. Deeper excavations shall be shored or laid back 1:1 (horizontal to vertical) or flatter.
- At the time of drilling, groundwater was not encountered to a depth of 15 feet below ground surface. Groundwater is not anticipated to impact the proposed development.
- The total seismic settlement is estimated to be negligible.
- During grading and trenching oversize particles may be encountered. All particles greater than 4-inches shall be removed and disposed off-site.

Foundations

- The proposed buildings may be supported on conventional shallow pad or continuous footing foundation systems.
- An allowable bearing capacity of 2,000 psf may be utilized for foundation design for footings supported on minimum ninety (90) percent compacted engineered fill.
- The minimum recommended footing width is eighteen (18) inches for continuous footing and twenty-four (24) inches for pad footing.
- All shallow foundations should extend a minimum of twenty-four (24) inches below the lowest adjacent grade.
- All shallow foundations shall be supported minimum of three (3) feet below the bottoms of footings of engineered fill with minimum ninety (90) percent relative compaction.
- Laboratory test results indicate that concrete in contact with onsite soils should be designed for exposure class S0 (minimum 2,500 psi concrete) and exposure class C1.

Slab-on-Grade

- The thickness and reinforcement of the slab shall be designed by the structural engineer and should include the anticipated loading condition.

- The subgrade material should be compacted to a minimum of ninety (90) percent of the maximum laboratory dry density (ASTM 1557) at near optimum moisture content to a minimum of two (2) feet or more.

- Areas requiring moisture sensitive flooring shall be underlain by a minimum 15-mil visqueen (Stego Warp or equivalent).

<u>Pavement Design</u>

ASPHALT PAVEMENT SECTION					PCC PAVEMENT SECTION		
Pavement Utilization	Traffic Index	Asphalt (Inch)	Aggregate Base (Inch)	Total (Inch)	*PCC	Aggregate Base (Inch)	Total (Inch)
Parking Stalls	4.5	3.0	4.0	7.0	*5.0	--	5.0
Auto Driveways	5.0	3.0	6.0	9.0	*6.0	--	6.0
Truck Aisles/ Driveways	6.0	4.0	6.0	10.0	*8.0	-	8.0
Loading Dock	7.0	4.0	7.0	11.0	*8.0	-	8.0

*Minimum concrete compressive strength of 3,500 psi.

INTRODUCTION

Site Descriptions and Proposed Project Development

The subject site is located north of the intersection of 26th Street and Avalon Street (Plate 1) in Jurupa Valley, California. The subject site consists of vacant undeveloped dirt covered land consisting of an approximately 81 acre parcel of land. The northerly portion of the site was previously used for surface mining. Stockpiled soils associated with the surface mining are present in the northern portion of the site. The southern portion of the subject site is generally flat with ascending slopes on the northwest portion of the property. The subject site is bounded by 25th Street to the north, the Union Pacific Railroad to the east, 28th street to the southwest and the Jurupa Mountains to the northwest.

Based on the referenced conceptual site plan the proposed development will consist of two buildings: a warehouse building (Building 1) which is approximately 1,200,000 sq. ft and associated truck docks and tractor-trailer parking on the north and south, drive aisles and vehicle parking to the east and west of the warehouse; an office building (Building 2) which is approximately 33,000 sq. ft and associated truck dock and tractor-trailer parking on the north and vehicle parking to the west. It is our understanding that an approximately 50 feet high cut slope with a 2H:1V gradient is proposed on the north side of the site and an approximately 25 feet height fill slope with a 2H:1V gradient over a retaining wall is proposed on the south side of the descending slope. The height of the new retaining wall varies from 4 feet to 18 feet. Infiltration basins are proposed along the south side of the side.

Scope of Work

The scope of work for this geotechnical investigation included the following:

- Site reconnaissance and review of referenced reports by NorCal Engineering (2005 and 2019) for the subject site made available to us.
- Completion of a seismic shear wave survey analysis at the subject site.
- Analyses of data, including site seismicity, and foundation design for proposed improvements, and soils engineering/earthwork with respect to the suitability of the proposed development.
- Preparation of this updated geotechnical report presenting all previous field and laboratory data by NorCal Engineering (2005 and 2019) along with geotechnical design recommendations for the currently proposed development.

Previous Studies

Two previous investigations for a proposed industrial building was conducted at the subject site by NorCal Engineering (2005 and 2019). The geotechnical investigation consisted of twenty-five subsurface backhoe excavations ranging from depths of 3.5 to 15 feet below ground surface, site seismicity, grading recommendations and engineering analysis for foundation, slab, retaining wall and pavement design. The location of the trench excavations are shown on Plate 1, Geotechnical Map. The infiltration investigation consisted of four backhoe excavations ranging from depths of 8 to 14 feet below ground surface and subsequent double ring infiltrometer percolation testing in the excavations. The trench logs and associated laboratory test data has been included in this geotechnical update report in Appendix B and C, respectively. The infiltration test data is included in Appendix D

Change of Consultant

The following is to inform the City of Jurupa that TGR Geotechnical, Inc. has been retained by our client, Proficiency Rubidoux LLC, as geotechnical consultant for the project. The previous geotechnical consultant, NorCal Engineering, is no longer involved in the project.

TGR has reviewed the geotechnical reports prepared by NorCal and concur with their recommendations except were superseded with our findings, conclusions and recommendations presented in this and forthcoming reports.

TGR assumes responsibility as project geotechnical consultant of record from this date forward.

Percolation Testing

Percolation testing was performed by NorCal Engineering (2019) at the subject site and their results are presented below. The infiltration test rates were determined utilizing the double ring infiltration test per ASTM D3385. Presented below are the field infiltration rates from the percolation tests performed at depths ranging from 8.1 to 14.1 feet below the existing grade. The field infiltration rates may be utilized in the final basin design with a safety factor of 2.0 or greater. The locations of the infiltration tests were not recorded in the documents provided. The log of infiltration test trenches are presented in Appendix B and the infiltration test data is presented in Appendix D.

- ST-1 at 8.1 feet 2.3 inches per hour
- ST-2 at 9.9 feet 1.5 inches per hour
- ST-3 at 10.7 feet 1.5 inches per hour
- ST-4 at 14.1 feet 84 inches per hour

Any infiltration device should be placed at least five (5) feet horizontally away from or beyond a 1:1 (horizontal to vertical) projection from the base of any proposed or existing structures or walls, whichever is greater. Any gravel backfill should be densified or any soil backfill should be compacted to at least ninety (90) percent of the maximum dry density during placement. The project geologist or engineer should observe infiltration device excavations during trenching to verify the anticipated soil units and geotechnical conditions as well as observe, probe and/ or test any densification or compaction of the infiltration trench and pit gravel and/or soil backfill.

Based on the California Department of Water Resources Water Data Library, groundwater is anticipated to be approximately 80 feet below the existing ground surface and should not be present within the current allowable limit of within 10 feet of the bottom of testing and/or proposed infiltration drainage devices as set forth by County of Riverside and California State requirements.

Seismic Shear-Wave Survey

A seismic shear-wave survey was performed at the subject site by Terra Geosciences on April 14, 2021 utilizing multi-channel analysis of surface waves and microtremor array measurement methods. One (1) geophysical line was utilized in the southeast portion of the subject site. The area selected for the geophysical line was most likely to have the greatest depth to bedrock based off trench logs from NorCal Engineering and is considered the most conservative estimation of site classification for the subject site. The location of the geophysical line is shown on Plate 1.

Analysis by Terra Geosciences revealed the average shear wave velocity in the upper 100 feet to be 1,640.8 feet per second, classifying the underlying soils as site class “C”, very dense soil and soft rock per ASCE 7-16, Table 20.3-1. Therefore, site seismic design parameters for the subject site are based on site class “C”.

GEOTECHNICAL FINDINGS

Geology

Regional Geologic Setting

The project site is located in the southeast portion of the Fontana 7.5 minute quadrangle, Riverside and San Bernardino Counties, California. Per the Geologic Map of the Riverside West/south ½ of Fontana quadrangles, San Bernardino and Riverside County, California (Dibblee, 2004), the subject site is underlain by Quaternary alluvial fan deposits comprised of sand and minor gravel from stream channels and quartz diorite. Figure 2 presents the Regional Geology Map.

Earth Units

Based on subsurface investigation by NorCal Engineering (2005), the subject area is underlain by approximately 6 to 18 inches of fill/disturbed topsoil consisting of silty sand and gravel. Below the topsoil, native silty sand with some clay and gravel were encountered to the maximum depth explored, approximately 15 feet below existing grade in the southerly portion of the site. In the northern portion of the subject site, bedrock consisting of granite was encountered at depths ranging from 1 to 2.5 feet below existing grade. These materials were noted to be slightly weathered and dense to hard. Some large boulders were noted in the mining area and more boulders can be encountered during the site grading. Detailed descriptions of the earth units encountered in our borings are presented in the trench logs (Appendix B).

Groundwater

Subsurface water was not encountered to a maximum depth of 15 feet below existing grade during the subsurface exploration by NorCal Engineering (2005). Per the California Department of Water Resources groundwater well Station 340080N1173940W001, the historic high groundwater level is approximately 80 feet below existing grade. Seasonal and long-term fluctuations in the groundwater may occur as a result of variations in subsurface conditions, rainfall, run-off conditions and other factors. Therefore, variations from field observations may occur. Static groundwater is not anticipated to impact the proposed development.

Seismic Review

Faulting and Seismicity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional faults such as the San Andreas, San Jacinto and Elsinore fault zones. These fault systems produce approximately 5 to 35 millimeters per year of slip between the plates.

By definition of the State Mining and Geology Board, an active fault is one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). The State Mining and Geology Board has defined a potentially active fault as any fault which has been active during the Quaternary Period (approximately the last 1,600,000 years). These definitions are used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic

Hazard Zones Act of 1972 and as subsequently revised in 1994 (Hart, 1997) as the Alquist-Priolo Geologic Hazard Zoning Act and Earthquake Fault Zones.

The intent of the act is to require fault investigations on sites located within Special Studies Zones to preclude new construction of certain inhabited structures across the trace of active faults.

The subject site is not included within any Earthquake Fault Zones as created by the Alquist-Priolo Earthquake Fault Zoning Act (Hart, 1997). Our review of geologic literature pertaining to the site area indicates that there are no known active or potentially active faults located within or immediately adjacent to the subject property.

The nearest fault to the subject site is the Rialto-Colton fault mapped approximately 5.0 miles northeast of the site. Other faults nearby include the San Jacinto mapped approximately 6.0 miles northeast of the site, Red Hill-Etiwanda and Sierra Madre fault mapped approximately 11.5 miles north of the subject site and San Andreas Fault is approximately 13 miles northeast of the site. The regional fault map, Figure 3, shows the location of the subject site in respect to the regional faults.

Secondary Seismic Hazards

Surface Fault Rupture and Ground Shaking

Since no known faults are located within the site, surface fault rupture is not anticipated. However, due to the close proximity of known active and potentially active faults, severe ground shaking should be expected during the life of the proposed structures.

Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated, fine-grained granular soils behave similarly to a fluid when subjected to high-intensity ground shaking. Liquefaction occurs when these ground conditions exist: 1) Shallow groundwater; 2) Low density, fine, clean sandy soils; and 3) High-intensity ground motion. Effects of liquefaction can include sand boils, settlement, and bearing capacity failures below foundations.

Due to the absence of shallow groundwater and the relatively high density of subsurface soils, high shear wave velocity and bedrock outcrop, the potential for liquefaction is considered negligible.

Seismically Induced Settlement

Ground accelerations generated from a seismic event can produce settlements in sands or in granular earth materials both above and below the groundwater table. This phenomenon is often referred to as seismic settlement and is most common in relatively clean sands, although it can also occur in other soil materials. Due to the presence of high density of subsurface soils and bedrock, the total seismic settlement is estimated to be negligible.

Lateral Spreading

Seismically induced lateral spreading involves primarily movement of earth materials due to earth shaking. Lateral spreading is demonstrated by near-vertical cracks with predominantly horizontal movement of the soil mass involved. Due to the absence of seismically induced liquefaction and the presence of granitic bedrock, the potential for lateral spreading at the subject site is considered very low.

Slope Stability

The proposed 2:1 (horizontal:vertical) cut and fill slopes are generally considered to be surficially and globally stable.

DISCUSSIONS AND CONCLUSIONS

General

Based on field exploration performed by NorCal Engineering (2005), laboratory testing and engineering analysis, it is our opinion that the proposed structures and proposed grading will be safe against hazard from landslide, settlement, or slippage and the proposed construction will have no adverse effect on the geologic stability of the adjacent properties provided our recommendations presented in this report are followed.

Conclusions

Based on our findings, the subject site is likely to be subjected to moderate ground shaking due to the proximity of known active and potentially active faults. This may reasonably be expected during the life of the structure and should be designed accordingly.

The primary conditions affecting the proposed project site development are as follows:

- Potential for hydro collapse in near-surface soils.

The engineering evaluation performed concerning site preparation and the recommendations presented are based on information provided to us and obtained by us during our office and fieldwork. This report is prepared for the development of the approximately 1,200,000 square foot warehouse and 33,000 square foot office buildings and associated parking lots and drive aisles at the subject property. In the event that any significant changes are made to the proposed development, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the recommendations of this report are verified or modified in writing by TGR.

RECOMMENDATIONS

Seismic Design Parameters

When reviewing the 2019 California Building Code the following data should be incorporated into the design.

Parameter	Value
Latitude (degree)	34.0143
Longitude (degree)	-117.3997
Site Class	C
Site Coefficient, F_a	1.2
Site Coefficient, F_v	1.4
Mapped Spectral Acceleration at 0.2-sec Period, S_s	1.5 g
Mapped Spectral Acceleration at 1.0-sec Period, S_1	0.6 g
Spectral Acceleration at 0.2-sec Period Adjusted for Site Class, S_{MS}	1.8 g
Spectral Acceleration at 1.0-sec Period Adjusted for Site Class, S_{M1}	0.84
Design Spectral Acceleration at 0.2-sec Period, S_{DS}	1.2 g
Design Spectral Acceleration at 1.0-sec Period, S_{D1}	0.56

The structural consultant should review the above parameters and the 2019 California Building Code to evaluate the seismic design.

Conformance to the criteria presented in the above table for seismic design does not constitute any type of guarantee or assurance that significant structural damage or ground failure will not occur during a large earthquake event. The intent of the code is “life safety” and not to completely prevent damage of the structure, since such design may be economically prohibitive.

Foundation Design Recommendations

The proposed buildings may be supported on continuous and/or spread footings. Bearing capacity recommendations for shallow foundations are presented below. These recommendations assume that the footings will be supported on a minimum of three (3) feet of engineered fill below the bottoms of footings. All footings shall meet the setback requirements presented in 2019 CBC.

For foundations supported on minimum three (3) feet of engineered fill below the bottoms of footings with minimum ninety (90) percent relative compaction an allowable bearing pressure of 2000 pounds per square foot may be used in design.

All shallow foundations should extend a minimum of twenty-four (24) inches below the lowest adjacent grade. Above value of allowable bearing pressure may be increased by 20 percent for each additional foot of width and depth (3,000 psf max). The minimum recommended footing width is eighteen (18) inches for continuous footing and twenty-four (24) inches for pad footing. A minimum reinforcement of two (2) No. 4 steel bar top and two (2) No. 4 steel bar bottom is required for continuous footings from a geotechnical viewpoint. Foundation design details such as concrete strength, reinforcements, etc should be established by the Structural Engineer.

The above values may be increased by one-third (1/3) for short-term wind or seismic loads.

The total and differential static settlement is anticipated to be 1-inch and 0.5-inch over 60 feet or less.

Resistance to lateral loads including wind and seismic forces may be provided by frictional resistance between the bottom of concrete and the underlying fill soils and by passive pressure against the sides of the foundations. A coefficient of friction of 0.40 may be used between concrete foundation and underlying soil. The recommended passive pressure of the engineered fill may be taken as an equivalent fluid pressure of 250 pounds per cubic foot (2,500 psf max). When combining passive and frictional resistance, the passive resistance shall be reduced by 1/3.

Footings located near property lines where the lateral removal cannot be achieved shall be designed for a reduced bearing capacity of 1,500 pounds per square foot and the passive resistance shall be ignored.

Retaining Wall Recommendations

The following soil parameters may be used for the design of the retaining wall with level backfill and a maximum height of eighteen (18) feet:

Conditions	Parameters
Active (Level)	40 psf/ft
Active (2:1)	60 psf/ft
Passive	350 (maximum 3500 psf)
Friction Coefficient	0.40

- The passive pressure in the upper 6 inches of soil not confined by slabs or pavement should be neglected.
- Retaining wall shall be designed for a seismic lateral load of $18H^2$ pounds for level backfill and $30H^2$ pounds for 2:1 backfill. The seismic load shall be applied at a distance of 0.6H above the base of the wall.
- All footings should meet the setback requirements presented in 2019 CBC.
- The retaining wall should be provided with a drainage system (Miradrain or equivalent) to prevent buildup of hydrostatic pressure behind the walls. We do not recommend omitting the drains behind walls.

In addition to the above lateral forces due to retained earth, surcharge due to improvements, such as an adjacent structure, should be considered in the design of the retaining wall. Loads applied within a 1:1 projection from the surcharging structure on the stem of the wall shall be considered as lateral surcharge. For lateral surcharge conditions, we recommend utilizing a horizontal load equal to 50 percent of the vertical load, as a minimum. This horizontal load should be applied below the 1:1 projection plane. To minimize the surcharge load from an adjacent footing, deepened footings may be considered.

Slab-On-Grade

The subgrade material should be compacted to a minimum of ninety (90) percent of the maximum laboratory dry density (ASTM 1557) to a minimum depth of three (3) feet. Prior to placement of concrete, the subgrade soils should be moistened to near optimum moisture content and verified by our field representative. The thickness and reinforcement of the slab shall be designed by the structural engineer and should include the anticipated loading condition (fork lift etc.) and the anticipated use of the building.

For moisture sensitive flooring, the floor slab should be underlain by minimum 15-mil impermeable polyethylene membrane (Stego Wrap, Moistop Plus, or any equivalent meeting the requirements of ASTM E1745, Class A rating) as a capillary break. Sand may be placed above and below the impermeable polyethylene membrane at the discretion of the project structural engineer/concrete contractor for proper curing and finish of the concrete slab-on-grade and protection of the membrane and is considered outside the scope of geotechnical engineering.

Flatwork

Flatwork should be a minimum of 4-inches thick should be reinforced with a minimum of No. 3 reinforcing bar on 24-inch centers in two horizontally perpendicular directions. Reinforcing should be properly supported to ensure placement near the vertical midpoint of the slab. "Hooking" of the reinforcement is not considered an acceptable method of positioning the steel. The subgrade material should be compacted to a minimum of ninety (90) percent of the maximum laboratory dry density (ASTM D1557) to a minimum depth of two (2) feet. Prior to placement of concrete, the subgrade soils should be moistened to near optimum moisture content and verified by our field representative. The actual thickness and reinforcement of the slab shall be designed by the structural engineer and should include the anticipated loading condition.

Modulus of Subgrade Reaction

The modulus of subgrade reaction may be taken as 150 pci (K_1) for one (1) square foot footing/slab founded on site soils. This value should be reduced for change in size per the following formula:

$$K = K_1 \left(\frac{B+1}{B}\right)^2$$

Where B = Width of Mat;
K = Coefficient of Subgrade Reaction of Footings Measuring B (ft) x B (ft).

Cement Type and Corrosion

Based on laboratory testing by NorCal Engineering (2005) concrete used should be designed in accordance with the provisions of ACI 318-14, Chapter 19 for Exposure Class S0 with a minimum unconfined compressive strength of 2,500 psi and for Exposure Class C1 (Moderate) – Concrete exposed to moisture but not a significant source of chlorides, per ACI 318-14 Table 19.3.1.1. Based on ACI 318 Table 19.3.2.1, for soil class S0 there is no restriction on the type of concrete to be used.

Corrosion tests indicate onsite soils are mild to moderately corrosive to corrosive for ferrous metals exposed to site soils.

TGR does not practice corrosion engineering. If needed, a qualified specialist should review the site conditions and evaluate the corrosion potential of the site soil to the proposed improvements and to provide the appropriate corrosion mitigations for the project.

Expansive Soil

Onsite soils have an expansion index of 4, correlating to a “very low” expansion potential.

Shrinkage/Subsidence

Removal and recompaction of the near surface soils in ais estimated to result in shrinkage ranging from 5 to 10 percent for alluvial and 0 to 5 percent bulking for the bedrock. Minor ground subsidence is expected to occur in the soils below the zone of removal, due to settlement and machinery working. The subsidence is estimated to be between one and two tenths of a foot.

Site Development Recommendations

General

During earthwork construction, all site preparation and the general procedures of the contractor should be observed, and the fill selectively tested by a representative of TGR. If unusual or unexpected conditions are exposed in the field, they should be reviewed by this office and if warranted, modified and/or additional recommendations will be offered. During construction, voids created from removal of buried elements (footings, pipelines, septic pits etc) shall be backfilled with engineered fill to a minimum of ninety (90) percent relative compaction per ASTM D1557) under the observation of TGR.

Grading

All grading should conform to the guidelines presented in the California Building Code (2019 edition), except where specifically superseded in the text of this report. Prior to grading, TGR’s representative should be present at the pre-construction meeting to provide grading guidelines, if needed, and review any earthwork.

Areas to receive fill shall be over excavate to the depth of 6 to 18 inches from existing ground prior to placement of fill. Deeper excavation may be required. To support the foundation a minimum three (3) feet of approved engineered fill should be placed under the footings and slab-on-grade, a minimum of two (2) feet of engineered fill is recommended under flatwork and pavement.

Site soils could be reused as engineered fill provided, they are free of oversized particles and the recommendations presented in this report are implemented. Exposed bottoms should be scarified a minimum of 6-inches, moisture conditioned and compacted to a minimum ninety (90) percent relative compaction at near optimum moisture content. Subsequently, site fill soils should be re-compacted to a minimum of ninety (90) percent relative compaction at near optimum moisture content. The lateral extent of removals beyond the building//footing limits should be equal to the depth of over-excavation or at least 5 feet, whichever is greater.

The depth of over-excavation should be reviewed by the Geotechnical Consultant during the actual construction. Any subsurface obstruction buried structural elements, and unsuitable material encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended.

Rippability

Per NorCal (2005), difficulty to excavate granite bedrock with a backhoe was noted. However, the mining operations was continuously using large excavators and other equipment to excavate and crush the rock without any blasting.

Seismic refraction survey was performed under the direction of NorCal to evaluate the rippability of the underlying dense soils and/or bedrock materials. The seismic lines revealed that the upper 3 to 10 feet of grading could be accomplished with easy processing. Below this layer, moderate to some difficulty in ripping may be necessary. No blasting is anticipated on the site.

Fill Placement

Prior to any fill placement TGR should observe the exposed surface soils. The site soils may be re-used as engineered fill provided, they are free of organic content and particle size greater than 4-inches. All particles greater than 4-inches shall be removed and disposed offsite. Fill shall be moisture-conditioned at near optimum moisture and compacted to a minimum relative compaction of ninety (90) percent in accordance with ASTM D1557. Any import soils shall be non-expansive and approved by TGR Geotechnical Inc.

Compaction

Prior to fill placement, the exposed surface should be scarified to a minimum depth of six (6) inches, fill placed in six (6) inch loose lifts moisture conditioned to near optimum moisture and compacted to a minimum relative compaction of ninety (90) percent in accordance with ASTM D1557.

Trenching

All excavations should conform to CAL-OSHA and local safety codes.

Temporary Excavation and Shoring

Temporary construction excavations may be anticipated during the proposed development. Soils may be cut vertically without shoring to a depth of approximately four (4) feet below adjacent surrounding grade. For deeper cuts, the slopes should be properly shored or sloped back to at least 1H:1V (Horizontal: Vertical) or flatter. The exposed slope face should be kept moist (but not saturated) during construction to reduce local sloughing. No surcharge loads should be permitted within a horizontal distance equal to the height of cut from the toe of excavation unless the cut is properly shored. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any nearby adjacent existing site facilities should be properly shored to maintain foundation support at the adjacent structures. Temporary excavation adjacent to property lines/existing footings may require A-B-C slot cuts.

Drainage

Positive site drainage should be maintained at all times. Water should be directed away from foundations and not allowed to pond and/or seep into the ground. Pad drainage should be directed towards street/parking or other approved area.

Utility Trench Backfill

All utility trench backfills in structural areas and beneath hardscape features should be brought to near optimum moisture content and compacted to a minimum relative compaction of ninety (90) percent of the laboratory standard. Flooding/jetting is not recommended.

Sand backfill, (unless trench excavation material), should not be allowed in parallel exterior trenches adjacent to and within an area extending below a 1:1 plane projected from the outside bottom edge of the footing. All trench excavations should minimally conform to CAL-OSHA and local safety codes. Soils generated from utility trench excavations may be used provided it is moisture conditioned and compacted to ninety (90) percent minimum relative compaction.

Preliminary Pavement Design

The Caltrans method of design was utilized to develop the following asphalt pavement section. The section was developed based on a tested "R-Value" for compacted site subgrade soils of 47.

Traffic indices of 4.5, 5, 6 and 7 were assumed for use in the evaluation of automobile parking stalls and driveways, and medium and heavy truck driveways, respectively. The traffic indices are subject to approval by controlling authorities and shall be approved by the project civil engineer.

ASPHALT PAVEMENT SECTION					**PCC PAVEMENT SECTION**		
Pavement Utilization	Traffic Index	Asphalt (Inch)	Aggregate Base (Inch)	Total (Inch)	*PCC	Aggregate Base (Inch)	Total (Inch)
Parking Stalls	4.5	3.0	4.0	7.0	*5.0	--	5.0
Auto Driveways	5.0	3.0	6.0	9.0	*6.0	--	6.0

Truck Aisles/ Driveways	6.0	4.0	6.0	10.0	*8.0	-	8.0
Loading Dock	7.0	4.0	7.0	11.0	*8.0	-	8.0

*Minimum concrete compressive strength of 3,500 psi.

Aggregate base material for Asphalt Pavement should consist of CAB/CMB complying with the specifications in Section 200-2.2/200-2.4 of the current "Standard Specifications for Public Works Construction" and should be compacted to at least ninety-five (95) percent of the maximum dry density (ASTM D1557). The surface of the base should exhibit a firm and unyielding condition just prior to the placement of asphalt concrete paving. The asphalt concrete shall be compacted to a minimum of ninety-five (95) percent relative compaction.

The pavement subgrade should be constructed in accordance with the recommendations presented in the grading section of this report.

The R-value and the associated pavement section should be confirmed at the completion of site grading.

An increase in the PCC pavement slab thickness, placement of steel reinforcement (or other alternatives such as Fibermesh) and joint spacing due to loading conditions including shrinkage and thermal effects may be necessary and should be incorporated by the structural engineer as necessary to prevent adverse impact on pavement performance and maintenance.

Geotechnical Review of Plans

All grading and foundation plans should be reviewed and accepted by the geotechnical consultant prior to construction. If significant time elapses since preparation of this report, the geotechnical consultant should verify the current site conditions, and provide any additional recommendations (if necessary) prior to construction.

Geotechnical Observation/Testing During Construction

Per sections 1705.6 and table 1705.6 of the 2019 California Building Code, periodic special inspection shall be performed to:

- Verify materials below shallow foundations are adequate to achieve the design bearing capacity;
- Verify excavations are extended to the proper depth and have reached proper material;
- Verify classification and test compacted materials; and
- Prior to placement of compacted fill, inspect subgrade and verify that the site has been prepared properly.

Per sections 1705.6 and table 1705.6 of the 2019 California Building Code, continuous special inspection shall be performed to:

- Verify use of proper materials, densities and lift thickness during placement and compaction of compacted fill.

The geotechnical consultant should also perform observation and/or testing at the following stages:

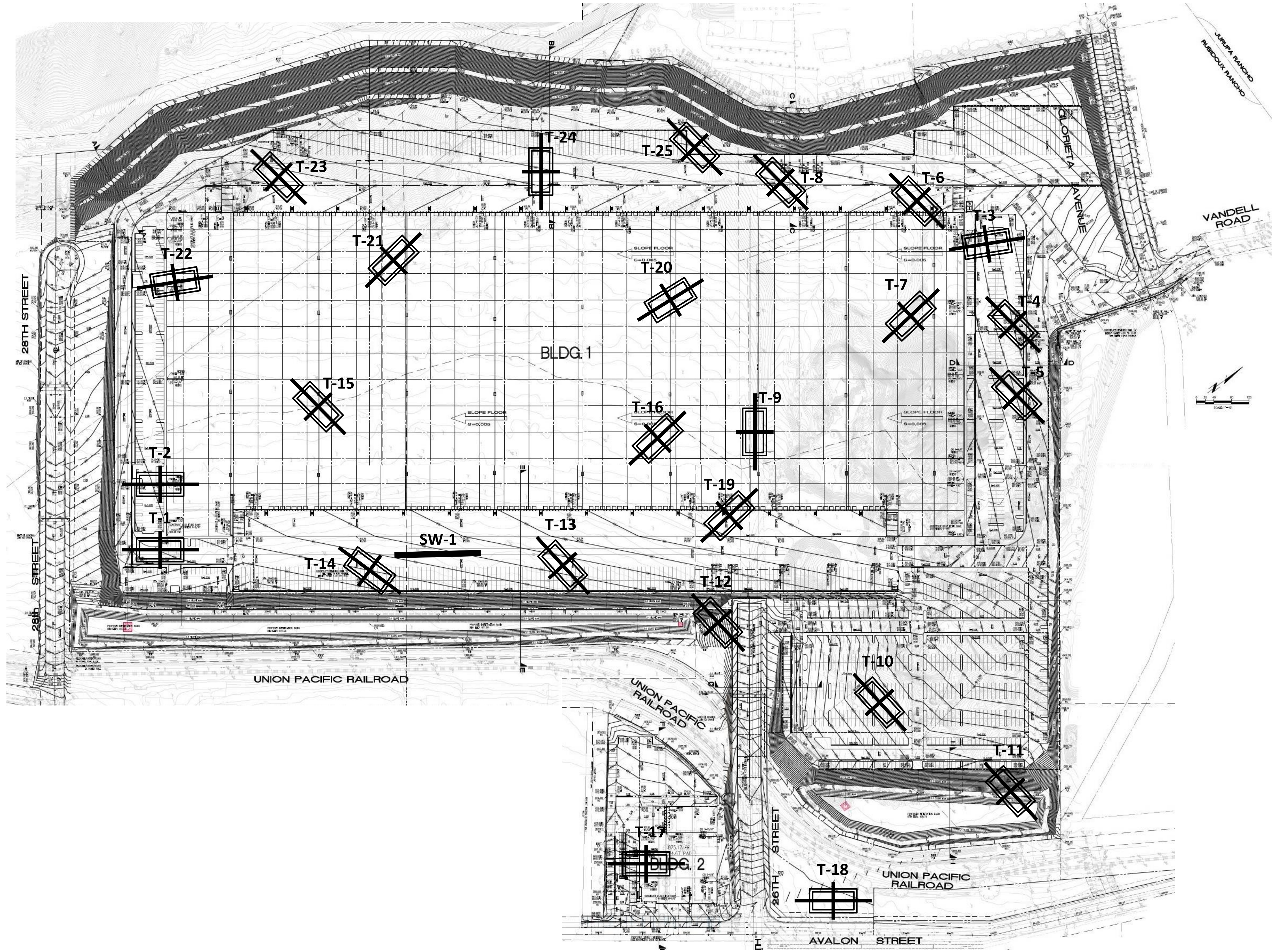
- During any grading and fill placement;
- After foundation excavation and prior to placing concrete;
- Prior to placing slab and flatwork concrete;
- During placement of aggregate base and asphalt concrete or Portland cement concrete;
- When any unusual soil conditions are encountered during any construction operation subsequent to issuance of this report.

Limitations

This report was prepared for a specific client and a specific project, based on the client's needs, directions and requirements at the time.

This report was necessarily based upon data obtained from a limited number of observances, site visits, soil and/or other samples, tests, analyses, histories of occurrences, spaced subsurface exploration and limited information on historical events and observations. Such information is necessarily incomplete. Variations can be experienced within small distances and under various climatic conditions. Changes in subsurface conditions can and do occur over time.

This report is not authorized for use by and is not to be relied upon by any party except the client with whom TGR contracted for the work. Use or reliance on this report by any other party is that party's sole risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify TGR from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of TGR.



T-24 APPROXIMATE LOCATION OF TEST PIT (NORCAL ENGINEERING 2005)

SW-1 APPROXIMATE LOCATION OF GEOPHYSICAL LINE (TERRA GEOSCIENCES 2021)

TGR Geotechnical Environmental Hydrogeology Material Testing Construction Inspection

GEOTECHNICAL MAP
26TH STREET AND AVALON STREET
JURUPA VALLEY, CALIFORNIA

Project No.: 21-7238

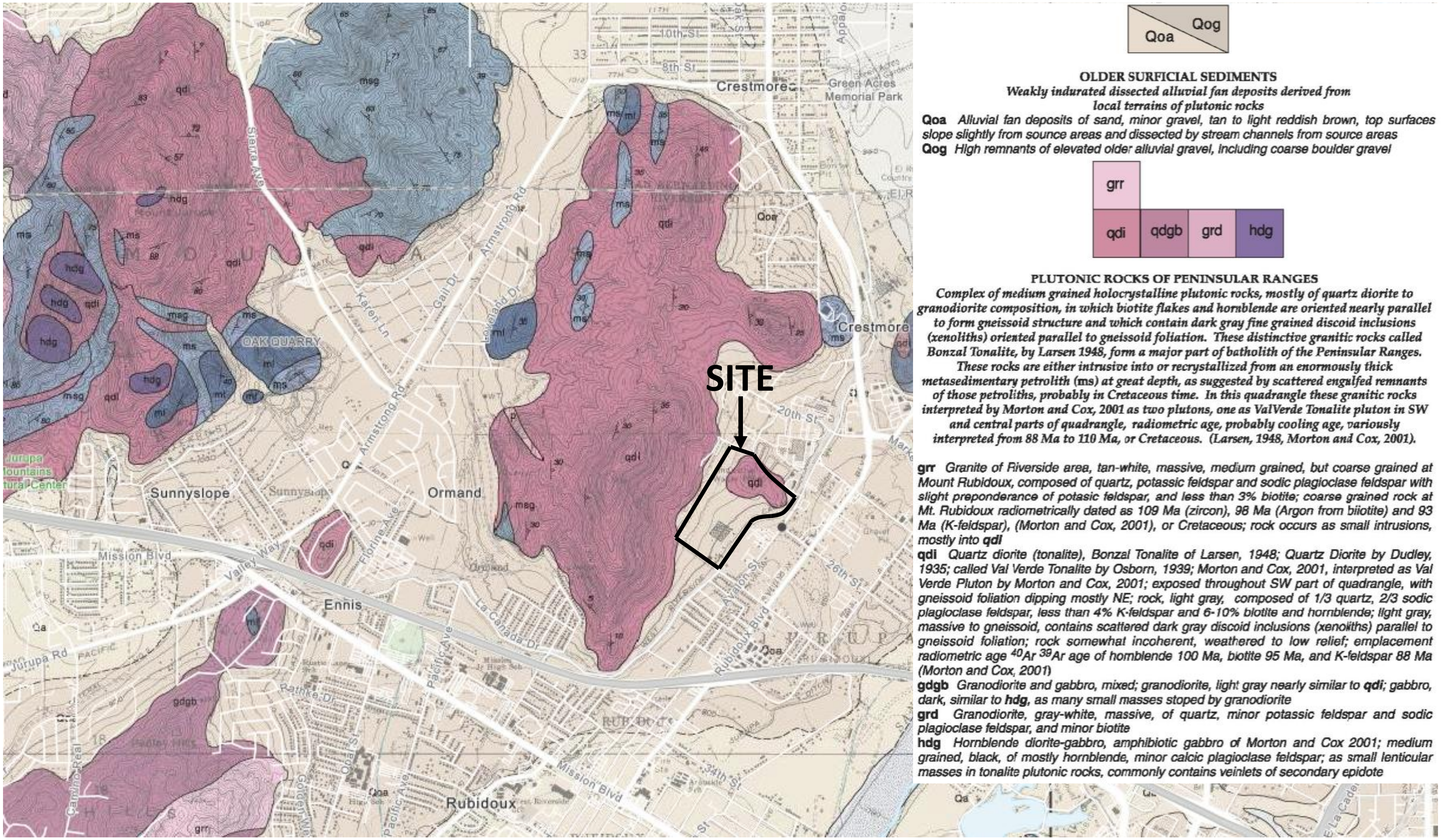
PLATE 1

Geotechnical
Environmental
Hydrogeology
Material Testing
Construction Inspection

SITE LOCATION MAP
26th STREET AND AVALON STREET
JURUPA VALLEY, CALIFORNIA

PROJECT NO. 21-7238

FIGURE 1



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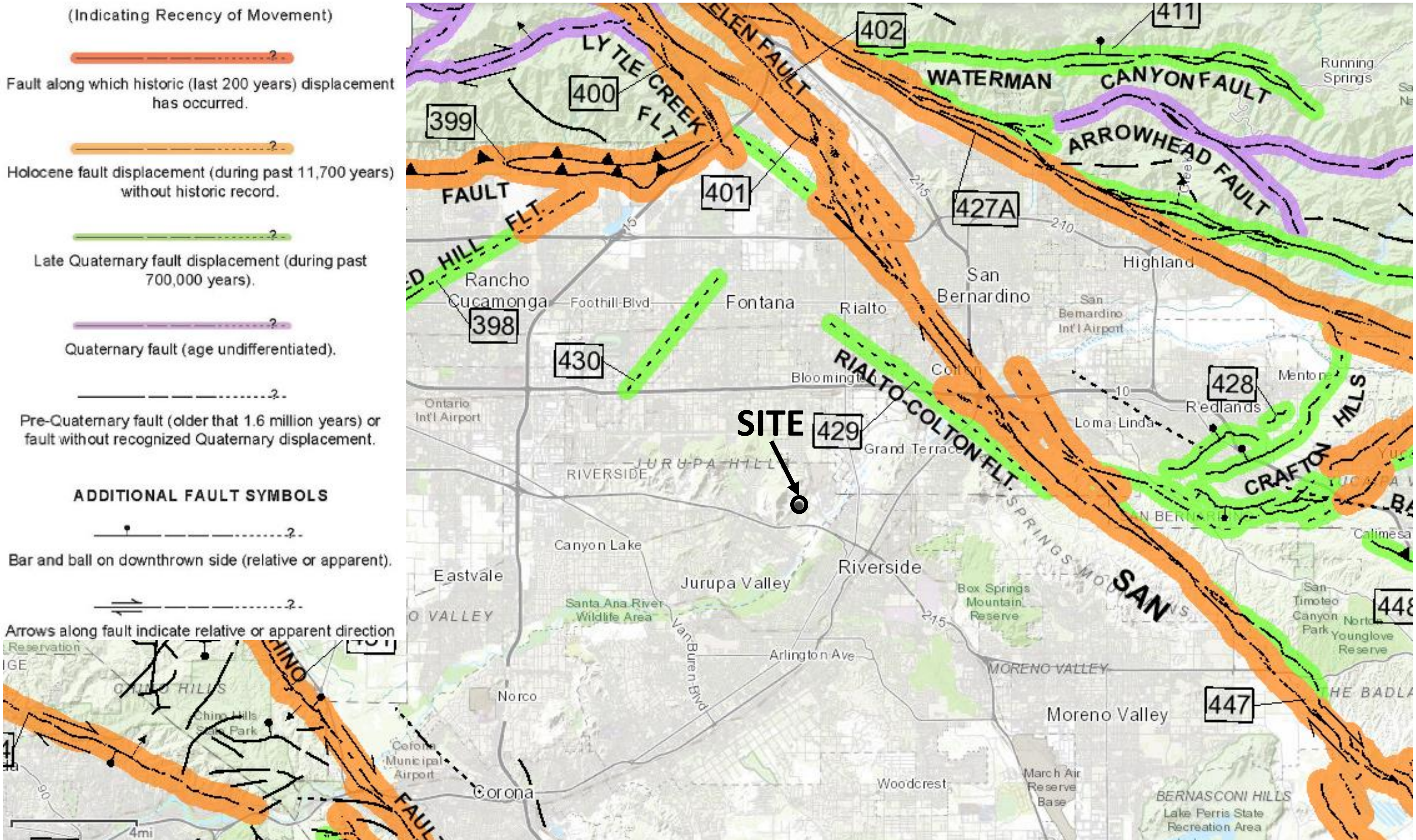
N

TGR Geotechnical Environmental Hydrogeology Material Testing Construction Inspection

REGIONAL GEOLOGY MAP
26th STREET AND AVALON STREET
JURUPA VALLEY, CALIFORNIA

PROJECT NO. 21-7238

FIGURE 2



Modified From: Jennings, C. W., 2010, Fault Activity Map of California and Adjacent Areas, California Division of Mines and Geology, Geologic Data Map Series, No. 6, Scale 1:750,000.

TGR — Geotechnical, Environmental, Hydrogeology, Material Testing, Construction Inspection

REGIONAL FAULT MAP
26th STREET AND AVALON STREET
JURUPA VALLEY, CALIFORNIA

PROJECT NO. 21-7238

FIGURE 3

APPENDIX A
REFERENCES

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APPENDIX A

References

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NorCal Engineering, Supplemental Soil Infiltration Study, Proposed Office/Warehouse Development – Intersection of 26th Street and Avalon Street, in the City of Jurupa Valley, California, P.N. 12627-05, dated January 29, 2019.

Thienes Engineering Inc., Conceptual Grading Plan, Rubidoux Commerce Park MA 17132, undated

APPENDIX B
LOG OF TRENCHES BY NORCAL ENGINEERING (2005 AND 2019)

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MAJOR DIVISION			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL. SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE				SP	POORLY-GRADED SANDS, GRAVEL-LY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINE (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

KEY:

Indicates 2.5-inch Inside Diameter. Ring Sample.

Indicates 2-inch OD Split Spoon Sample (SPT).

Indicates Shelby Tube Sample.

Indicates No Recovery.

Indicates SPT with 140# Hammer 30 in. Drop.

Indicates Bulk Sample.

Indicates Small Bag Sample.

Indicates Non-Standard

Indicates Core Run.

COMPONENT PROPORTIONS

DESCRIPTIVE TERMS	RANGE OF PROPORTION
Trace	1 - 5%
Few	5 - 10%
Little	10 - 20%
Some	20 - 35%
And	35 - 50%

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5mm) to No. 200 (0.074mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074 mm)

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
DAMP	Some perceptible moisture; below optimum
MOIST	No visible water; near optimum moisture content
WET	Visible free water, usually soil is below water table.

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N -VALUE

COHESIONLESS SOILS		COHESIVE SOILS		
Density	N (blows/ft)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	Very Soft	0 to 2	< 250
Loose	4 to 10	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	Very Stiff	15 to 30	2000 - 4000
		Hard	over 30	> 4000

Log of Trench T-1

Project Proficiency Capital/Rubidoux

Date of Drilling: 11/17/05 | **Groundwater Depth:** None Encountered

Drilling Method: Backhoe

Hammer Weight: | **Drop:**

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP/FILL SOILS Silty SAND with occasional gravel Reddish-brown, loose, dry						
	NATURAL SOILS Silty SAND with occasional gravel Reddish-brown, medium dense, damp Increase in density with depth		■		5.6	104.7	
5			■		4.4	116.2	
			■		7.7	106.5	
10			■		6.9	113.2	
			■		7.1	110.4	
15	Boring completed at depth of 15'						
20							
25							
30							
35							

Log of Trench T-2

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP/FILL SOILS Silty SAND with occasional gravel Reddish-brown, loose, dry		■		5.6	109.8	
	NATURAL SOILS Silty SAND with occasional gravel Reddish-brown, medium dense, damp						
5							
	Boring completed at depth of 7'						
10							
15							
20							
25							
30							
35							

Log of Trench T-3

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Surface Elevation Not Measured

Depth (feet)	Geotechnical Description	Lithology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
0	SURFICIAL FILL SOILS Silty SAND with gravel Grey, medium dense, dry to damp		■		6.1	109.9	
	NATURAL SOILS Slightly fine grained silty SAND with gravel Reddish-brown, dense to very dense, damp Increase in density with depth		■		4.2	120.7	
5			■		8.0	112.7	
	Silty SAND Reddish-brown, hard, damp Cemented		■		7.2	118.3	
			⊠		10.1		
	Boring completed at depth of 7.5'						
10							
15							
20							
25							
30							
35							

NorCal Engineering

Project No. 12627-05

Log of Trench T-4

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	SURFICIAL FILL SOILS Silty SAND with gravel Brown, loose, damp		⊠				
	Decomposed Granite BEDROCK Grey, dense to hard, damp Difficult to excavate						
5	Boring completed at depth of 3'						
10							
15							
20							
25							
30							
35							

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NorCal Engineering

Project No. 12627-05

Log of Trench T-5

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Surface Elevation Not Measured

Depth (feet)	Geotechnical Description	Lithology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
0	FILL SOILS Silty SAND with gravel Grey-brown, loose, damp						
	Decomposed Granite BEDROCK Grey, dense to hard, damp Increase in density with depth		■		4.1	119.3	
5							
	Boring completed at depth of 6'						
10							
15							
20							
25							
30							
35							

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NorCal Engineering

Project No. 12627-05

Log of Trench T-6

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	SURFICIAL FILL SOILS Silty SAND with gravel Grey, loose, dry						
	NATURAL SOILS Silty SAND with occasional gravel Brown, medium dense, damp Slight increase in density below 10'		■		4.5	107.7	
5			■		4.8	109.5	
10			■		4.7	113.5	
			■		4.7	111.4	
15	Boring completed at depth of 15'						
20							
25							
30							
35							

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NorCal Engineering	Project No. 12627-05	6

Log of Trench T-7

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lithology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	FILL SOILS Silty SAND with gravel Brown, loose, dry		☐		2.5		
	Decomposed Granite BEDROCK Grey, dense to hard, damp Increase in density with depth						
5	Boring completed at depth of 4.5'						
10							
15							
20							
25							
30							
35							

Log of Trench T-8

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	FILL SOILS Silty SAND with gravel Grey-brown, loose, dry						
	NATURAL SOILS Silty SAND with some clay Reddish-brown, dense, damp						
			☒		7.4		
5	Hard @ 3.5' (cemented)						
	Boring completed at depth of 5'						
10							
15							
20							
25							
30							
35							

Log of Trench T-9

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	FILL SOILS Slightly silty SAND with gravel Grey-brown, loose, dry						
	NATURAL SOILS Decomposed Granite BEDROCK Grey, dense, damp		☒		1.4		
5	Boring completed at depth of 4'						
10							
15							
20							
25							
30							
35							

Log of Trench T-10

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	NATURAL SOILS Silty SAND with clay, gravel Reddish-brown, medium dense, damp						
	Decomposed Granite BEDROCK Grey-brown, dense to hard, damp Increase in density with depth		■		1.7	137.3	
5	Boring completed at depth of 5'						
10							
15							
20							
25							
30							
35							

Log of Trench T-11

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Surface Elevation Not Measured

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
0	SURFICIAL FILL SOILS Silty SAND with occasional gravel Grey-brown, loose, dry						
	NATURAL SOILS Silty SAND with some clay and occasional gravel Reddish-brown, dense, damp Grading to Sandy SILT with depth						
5			■		5.2	106.2	
			■		3.9	103.5	
10			☒		3.0		
	Boring completed at depth of 12'						
15							
20							
25							
30							
35							

Log of Trench T-12

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	SURFICIAL FILL SOILS Silty SAND with organics Grey-brown, loose, damp						
	NATURAL SOILS Fine grained silty SAND with occasional gravel Reddish-brown, medium dense, damp						
5			■		5.7	105.1	
10			■		6.9	111.4	
	Boring completed at depth of 12'						
15							
20							
25							
30							
35							

Log of Trench T-13

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lithology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Fine grained silty SAND with occasional gravel Reddish-brown, medium dense, damp						
5	Boring completed at depth of 5'						
10							
15							
20							
25							
30							
35							

Log of Trench T-14

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Fine grained silty SAND with occasional gravel Reddish-brown, medium dense, damp						
5							
	Boring completed at depth of 8'						
10							
15							
20							
25							
30							
35							

NorCal Engineering

Project No.
12627-05

Log of Trench T-15

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Fine grained silty SAND with some clay Reddish-brown, medium dense, damp						
5							
	Boring completed at depth of 6.5'						
10							
15							
20							
25							
30							
35							

Log of Trench T-16

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Surface Elevation Not Measured

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Fine grained silty SAND with some clay Reddish-brown, medium dense, damp		■		4.6	113.8	
5							
			■		5.9	110.8	
10	Boring completed at depth of 10'						
15							
20							
25							
30							
35							

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NorCal Engineering

Project No. 12627-05

Log of Trench T-17

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
Hammer Weight:	Drop:

Surface Elevation Not Measured

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
0	FILL SOILS Silty SAND with gravel, rock Grey-brown, medium dense, dry to damp						
	NATURAL SOILS Sandy SILT with some clay Reddish-brown, firm, moist						
			■		11.7	106.4	
5							
			■		12.4	108.3	
10							
			■		11.1	112.4	
15	Boring completed at depth of 15'						
20							
25							
30							
35							

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NorCal Engineering

Project No. 12627-05

Log of Trench T-18

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Hand Auger	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	SURFICIAL FILL SOILS Silty SAND with gravel, organics Brown, loose, dry						
	NATURAL SOILS Fine grained silty SAND with some clay Reddish-brown, medium dense, damp to moist						
5							
	Boring completed at depth of 8'						
10							
15							
20							
25							
30							
35							

Log of Trench T-19

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lithology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	SURFICIAL FILL SOILS Silty SAND with gravel Reddish-brown, loose, dry						
	NATURAL SOILS Fine grained silty SAND with occasional gravel Reddish-brown, medium dense, damp						
5							
	Boring completed at depth of 6'						
10							
15							
20							
25							
30							
35							

Log of Trench T-20

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Surface Elevation Not Measured

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Fine grained silty SAND with occasional gravel Reddish-brown, dense, damp Increase gravel, rock @ 3' Increase sand content with depth		■		4.4	112.1	
			■		4.0	118.5	
5							
			■		6.1	115.4	
10	Boring completed at depth of 10'						
15							
20							
25							
30							
35							

Log of Trench T-21

Project: Proficiency Capital/Rubidoux

Date of Drilling: 11/17/05 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Depth (feet)	Geotechnical Description	Lithology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Fine grained silty SAND with gravel, rock Reddish-brown, medium dense, damp Dense to very dense @ 6'		■		4.0	122.1	
5			■		5.3	113.9	
	Boring completed at depth of 8'						
10							
15							
20							
25							
30							
35							

Log of Trench T-22

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	SURFICIAL FILL SOILS Gravelly SAND with gravel Grey-brown, loose, dry						
	NATURAL SOILS Decomposed Granite BEDROCK Grey dense, damp						
5	Boring completed at depth of 3.5'						
10							
15							
20							
25							
30							
35							

Log of Trench T-23

Project	Proficiency Capital/Rubidoux
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Surface Elevation Not Measured

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Silty SAND with occasional gravel Reddish brown, medium dense, damp						
5			■		2.6	120.2	
10	Boring completed at depth of 10'						
15							
20							
25							
30							
35							

Log of Trench T-24

Project: Proficiency Capital/Rubidoux	
Date of Drilling: 11/17/05	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:

Depth (feet)	Geotechnical Description	Lith-ology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP SOILS Loose, dry with roots						
	NATURAL SOILS Silty SAND with occasional gravel Reddish-brown, medium dense, damp Some rock @ 8' Increase in density @ 8'						
5							
10	Boring completed at depth of 10'						
15							
20							
25							
30							
35							

Log of Trench T-25

Project: Proficiency Capital/Rubidoux

Date of Drilling: 11/17/05 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Depth (feet)	Geotechnical Description	Lithology	Samples: Type	Samples: Blow counts	Laboratory: Moisture (%)	Laboratory: Dry Density (pcf)	Laboratory: Fines (%)
	Surface Elevation Not Measured						
0	DISTURBED TOP SOILS Loose, dry						
	NATURAL SOILS Silty SAND with occasional gravel Reddish-brown, medium dense, damp Some rock @ 6'		■		7.8	117.9	
5							
10	Boring completed at depth of 10'						
15							
20							
25							
30							
35							

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NorCal Engineering

Project No. 12627-05

Proficiency Rubidoux, LLC 12627-05	Log of Trench ST-1

Boring Location: 26th and Avalon, Jurupa Valley	
Date of Drilling: 1/28/19	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL SOILS Sandy SILT to Silty SAND with occasional gravel and rootlets Brown, soft, moist					
	GWT not encountered	NATURAL SOILS Sandy SILT Brown, medium stiff, damp; with some clay 2 to 4 feet					
5							
		Boring completed at depth of 8'	☐		3.7		
10							
15							
20							
25							
30							
35							

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NorCal Engineering

Proficiency Rubidoux, LLC 12627-05	Log of Trench ST-2

Boring Location: 26th and Avalon, Jurupa Valley

Date of Drilling: 1/28/19 | Groundwater Depth: None Encountered

Drilling Method: Backhoe

Hammer Weight: | Drop:

Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL SOILS Sandy SILT to Silty SAND with occasional gravel and rootlets Brown, soft, moist					
		NATURAL SOILS Sandy SILT with clay Brown, medium stiff, damp					
5	GWT not encountered						
		Boring completed at depth of 9'	⊠		5.5		
10							
15							
20							
25							
30							
35							

Proficiency Rubidoux, LLC
12627-05

Log of Trench ST-3

Boring Location: 26th and Avalon, Jurupa Valley
Date of Drilling: 1/28/19
Groundwater Depth: None Encountered
Drilling Method: Backhoe
Hammer Weight:
Drop:
Surface Elevation: Not Measured

Depth (feet)	Lith-ology	Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		FILL SOILS Sandy SILT to Silty SAND with occasional gravel and rootlets Brown, soft, moist					
	GWT not encountered	NATURAL SOILS Sandy SILT Brown, medium stiff, damp to moist					
5							
10		Boring completed at depth of 10'	☒		8.8		
15							
20							
25							
30							
35							

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NorCal Engineering

Proficiency Rubidoux, LLC 12627-05	Log of Trench ST-4

Boring Location: 26th and Avalon, Jurupa Valley	
Date of Drilling: 1/28/19	Groundwater Depth: None Encountered
Drilling Method: Backhoe	
Hammer Weight:	Drop:
Surface Elevation: Not Measured	

Depth (feet)	Lith-ology		Material Description	Samples: Type	Samples: Blow Counts	Laboratory: Moisture	Laboratory: Dry Density	Laboratory: Fines Content %
0		GWT not encountered	FILL SOILS Sandy SILT to Silty SAND with occasional gravel and rootlets Brown, soft, moist					
			NATURAL SOILS Sandy SILT Brown, medium stiff, moist Increase in density with depth					
5								
10								
			Slightly silty SAND Brown, medium dense, damp					
			Boring completed at depth of 14'	▽		2.0		
15								
20								
25								
30								
35								

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NorCal Engineering

APPENDIX C
LABORATORY TEST RESULTS BY NORCAL ENGINEERING (2005)

TABLE I
MAXIMUM DENSITY TESTS
(ASTM: D-1557)

Sample	Classification	Optimum Moisture	Maximum Dry Density (lbs./cu.ft.)
T-1 @ 1-2’	silty SAND	9.5	126.0
T-4 @ 0.5-1’	decomposed GRANITE	8.5	133.0

TABLE II
EXPANSION INDEX TESTS
(UBC 18-2)

Sample	Classification	Expansion Index
T-1 @ 1-2’	silty SAND	04

TABLE III
SOLUBLE SULFATE TESTS
(CT 417)

Sample	Sulfate Concentration (%)
T-1 @ 1-2’	.0061
T-4 @ 0.5-1’	.0062

TABLE IV
pH TESTS

Sample	pH
T-1 @ 1-2'	7.9
T-4 @ 0.5-1'	7.5

TABLE V
RESISTIVITY TESTS
(CT 643)

Sample	Resistivity (ohm-cm)
T-1 @ 1-2'	9,030
T-4 @ 0.5-1'	10,670

TABLE VI
CHLORIDE TESTS
(CT 422))

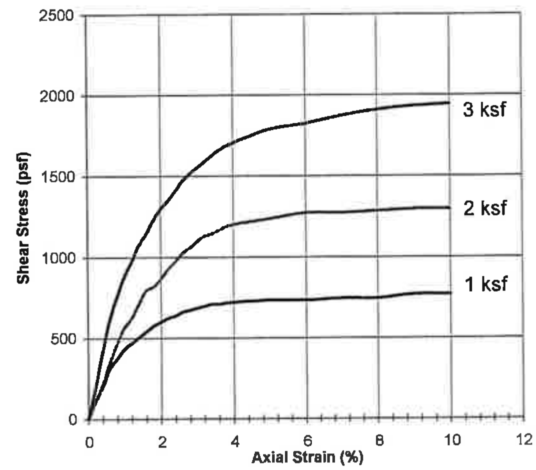
Sample	Concentration (ppm)
T-1 @ 1-2'	32
T-4 @ 0.5-1'	21

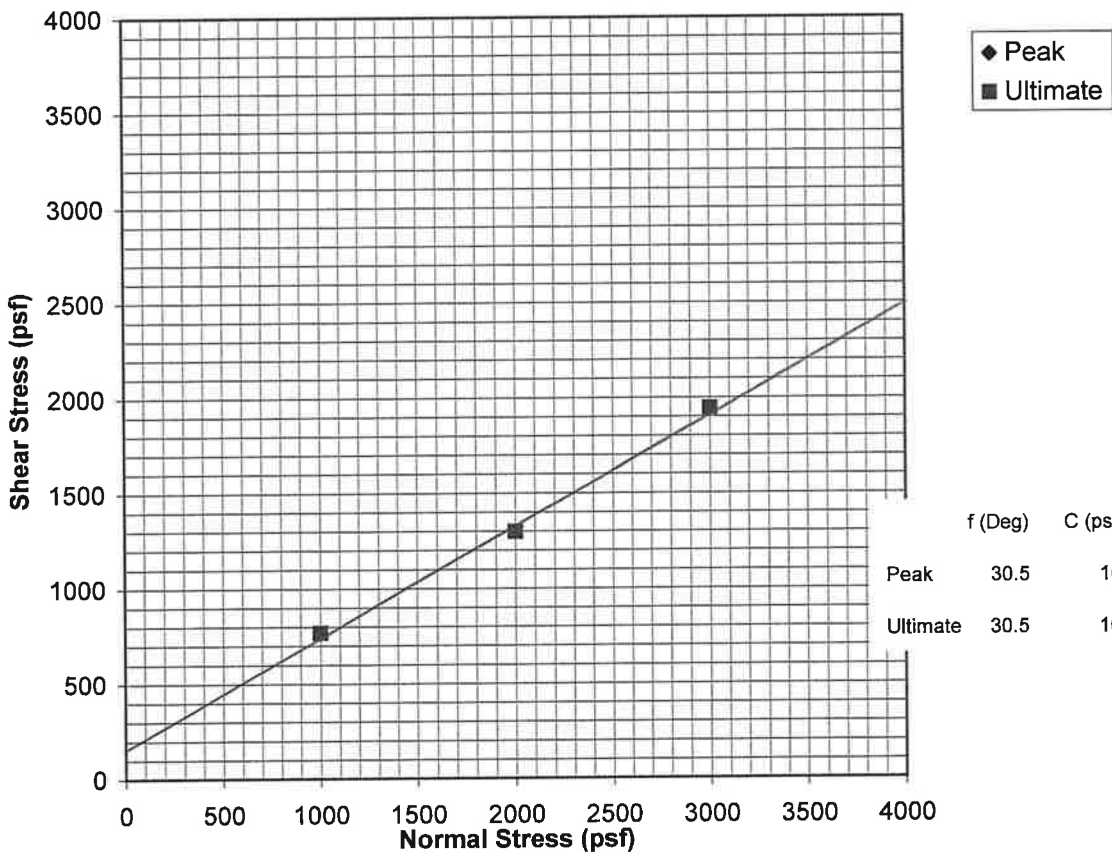
TABLE VII
RESISTANCE 'R' VALUE TESTS
(CA 301))

Sample	R-Value
B2 @ 1-3'	47

Sample No.	T1@1-2'
Sample Type:	Renolded-Saturated
Soil Description:	F-M Silty Sand

	1	2	3
Normal Stress, psf	1000	2000	3000
Peak Stress, psf	768	1296	1944
Displacement, in.	0.225	0.225	0.250
Ultimate Stress, psf	768	1296	1944
Displacement, in.	0.250	0.250	0.250
Initial Dry Density, pcf	117.5	117.5	117.5
Initial Water Content, %	9.5	9.5	9.5
Strain Rate, in/min.	0.020	0.020	0.020





	f (Deg)	C (psf)
Peak	30.5	160
Ultimate	30.5	160

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SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capitol - 26th & Avalon - Rubidoux

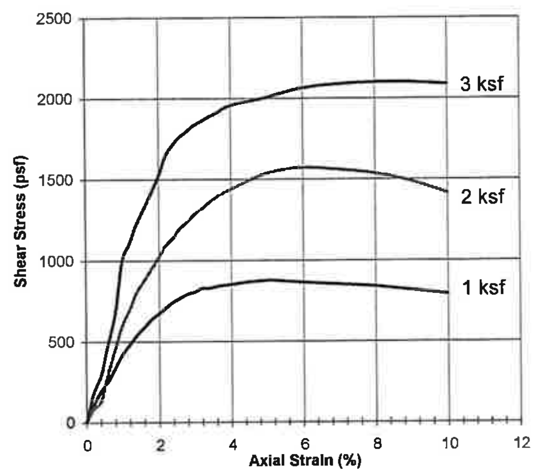
PROJECT: 12627-05 DATE: 11/28/2005

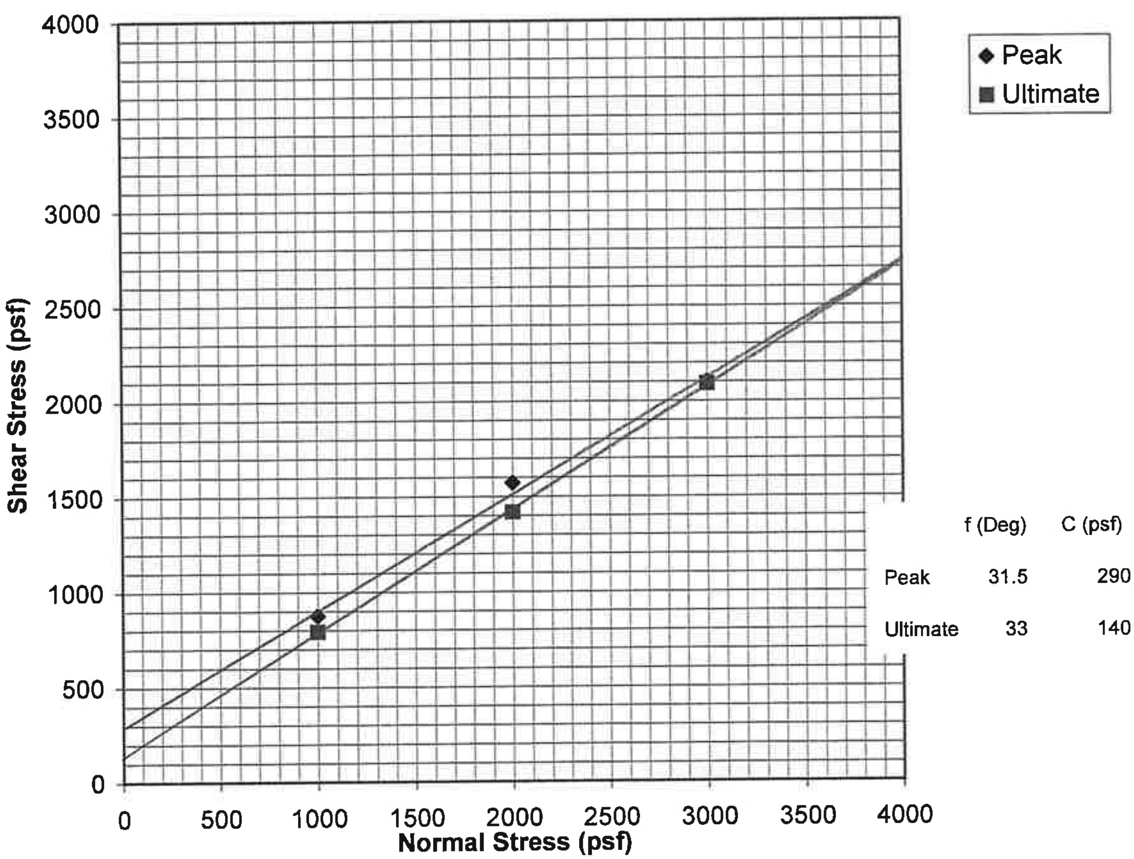
DIRECT SHEAR TEST

Plate A

Sample No.	T4@0.5-1'
Sample Type:	Remolded-Saturated
Soil Description:	F-C Silty Sand

	1	2	3
Normal Stress, psf	1000	2000	3000
Peak Stress, psf	876	1572	2100
Displacement, in.	0.125	0.150	0.200
Ultimate Stress, psf	792	1416	2088
Displacement, in.	0.250	0.250	0.250
Initial Dry Density, pcf	113.4	113.4	113.4
Initial Water Content, %	10.0	10.0	10.0
Strain Rate, in/min.	0.020	0.020	0.020





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SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capitol - 26th & Avalon - Rubidoux

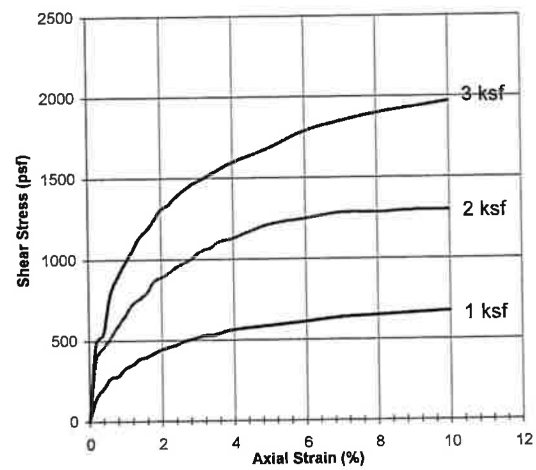
PROJECT: 12627-05 DATE: 11/28/2005

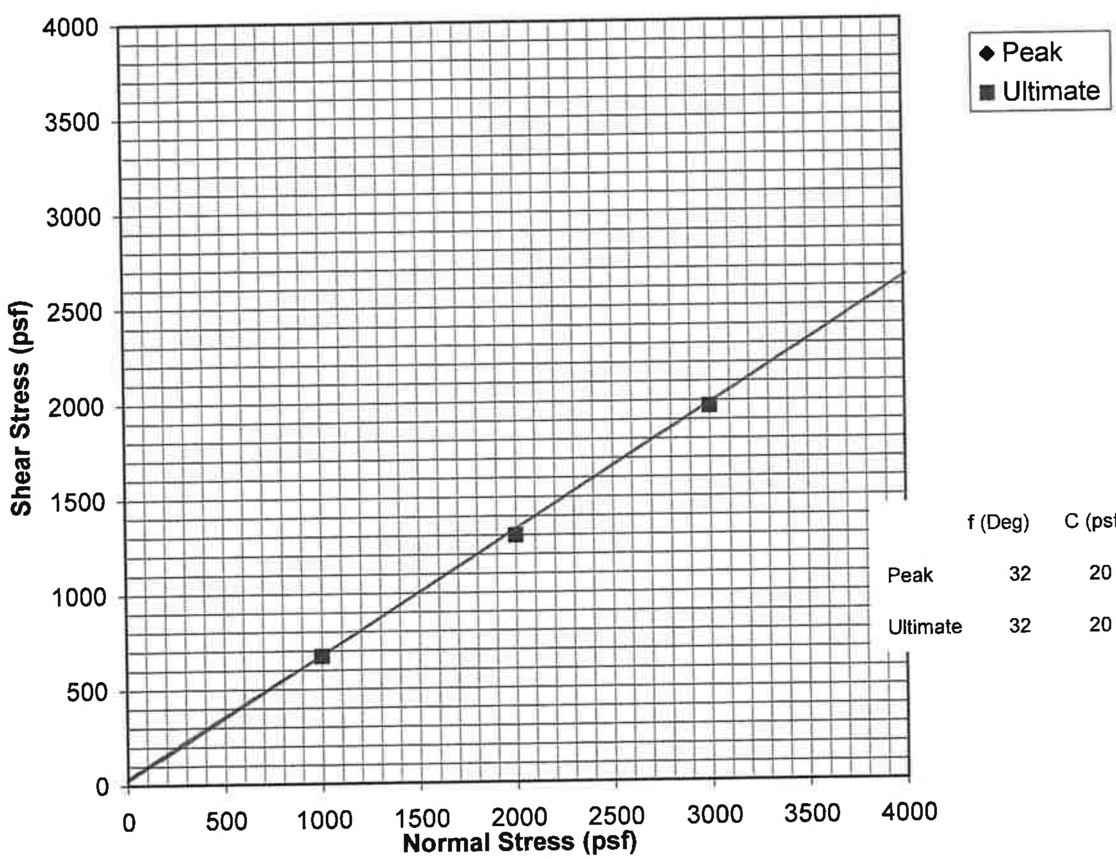
DIRECT SHEAR TEST

Plate B

Sample No.	T1@3.5'
Sample Type:	Undisturbed-Saturated
Soil Description:	F-M Silty Sand

	1	2	3
Normal Stress, psf	1000	2000	3000
Peak Stress, psf	672	1296	1968
Displacement, in.	0.250	0.225	0.250
Ultimate Stress, psf	672	1296	1968
Displacement, in.	0.250	0.250	0.250
Initial Dry Density, pcf	104.7	104.7	104.7
Initial Water Content, %	5.6	5.6	5.6
Strain Rate, in/min.	0.020	0.020	0.020





	f (Deg)	C (psf)
Peak	32	20
Ultimate	32	20

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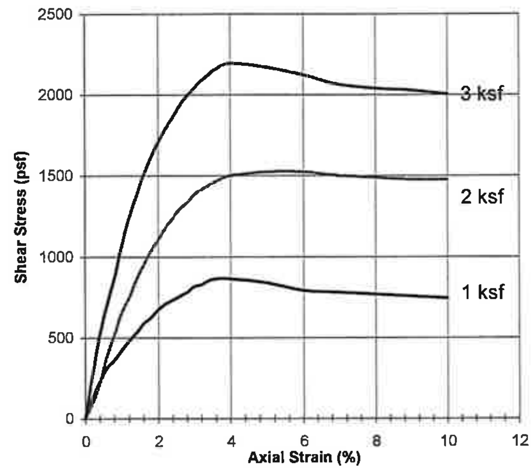
Proficiency Capitol - 26th & Avalon - Rubidoux

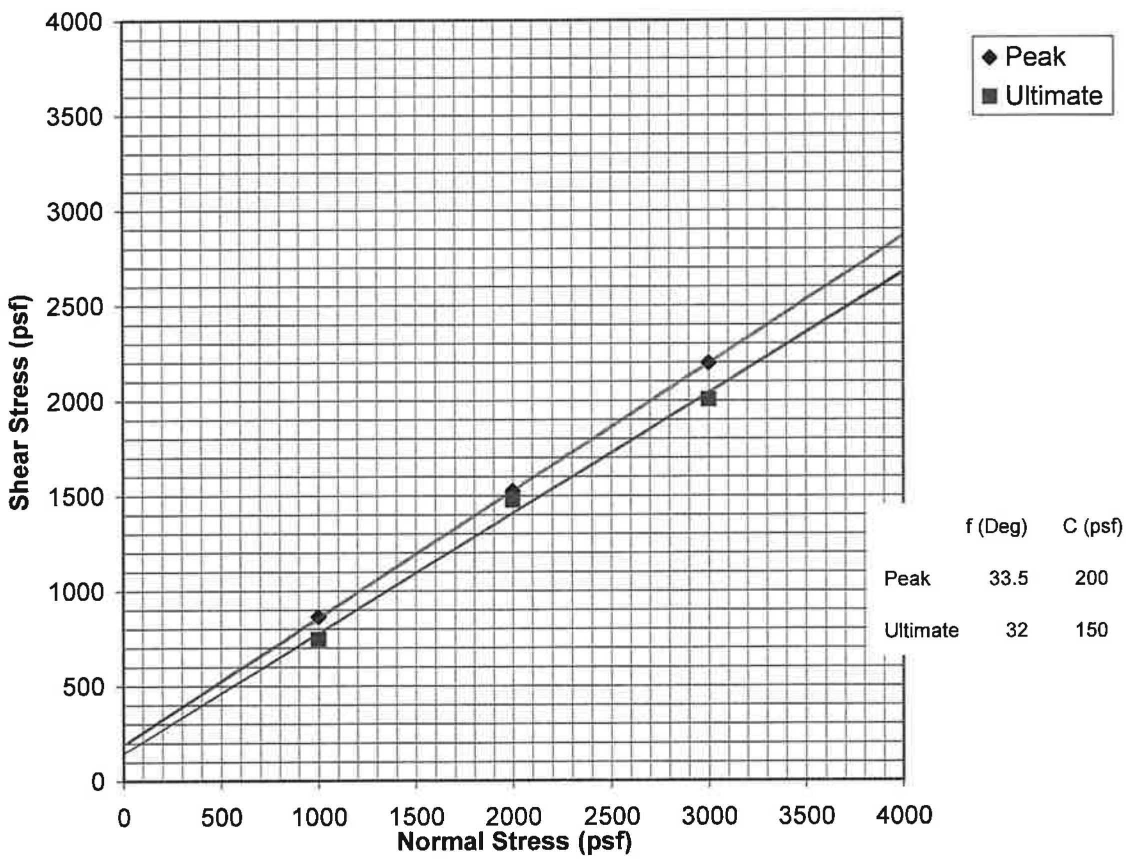
PROJECT: 12627-05 DATE: 11/28/2005

DIRECT SHEAR TEST
Plate C

Sample No.	T1@7'
Sample Type:	Undisturbed-Saturated
Soil Description:	F Silty Sand

	1	2	3
Normal Stress, psf	1000	2000	3000
Peak Stress, psf	864	1524	2196
Displacement, in.	0.090	0.125	0.100
Ultimate Stress, psf	744	1476	2004
Displacement, in.	0.250	0.250	0.250
Initial Dry Density, pcf	116.2	116.2	116.2
Initial Water Content, %	4.4	4.4	4.4
Strain Rate, in/min.	0.020	0.020	0.020





	f (Deg)	C (psf)
Peak	33.5	200
Ultimate	32	150

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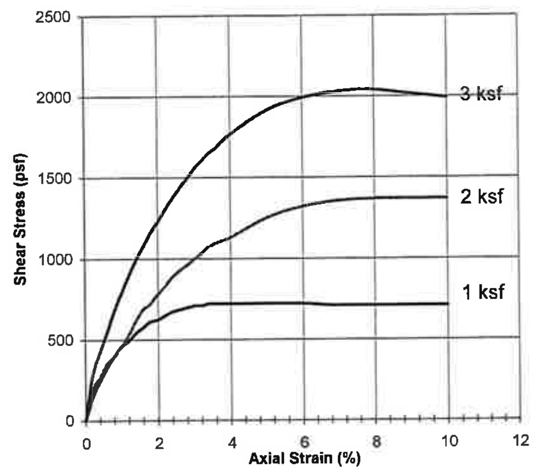
PROJECT: 12627-05 DATE: 11/28/2005

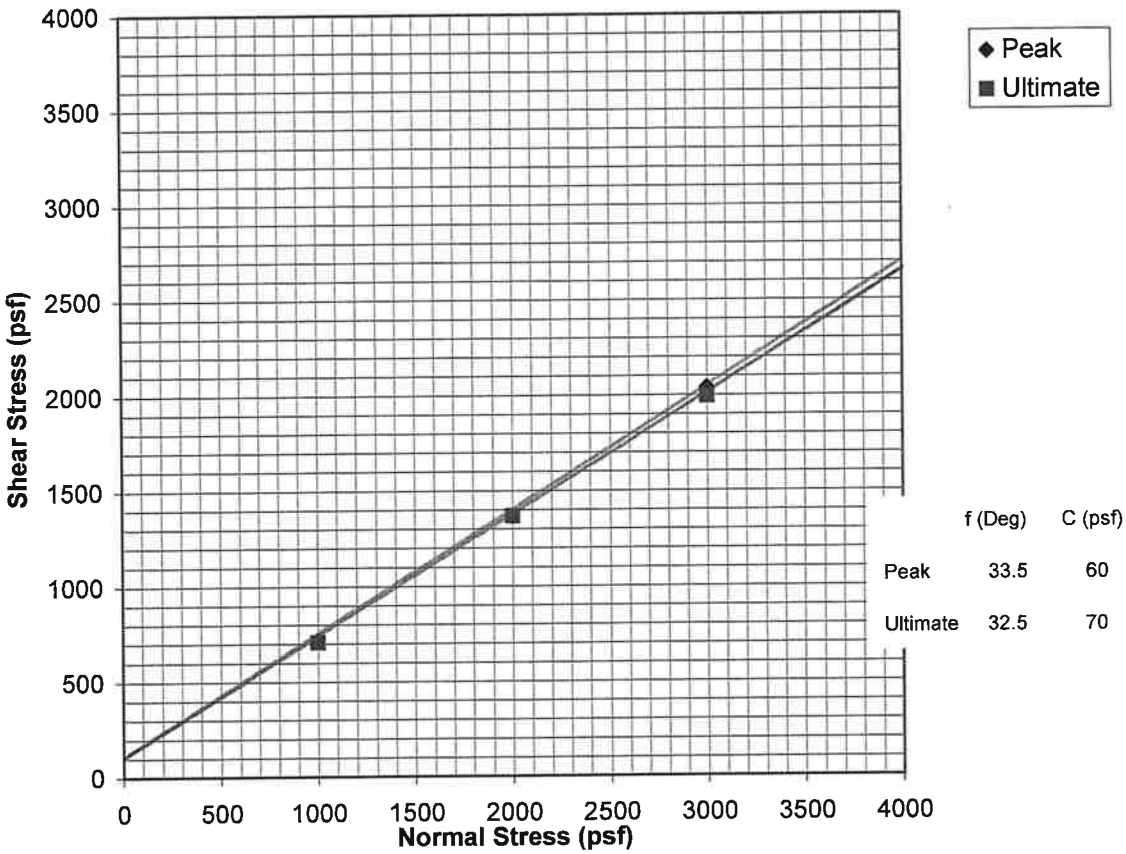
DIRECT SHEAR TEST

Plate D

Sample No.	T3@5'
Sample Type:	Undisturbed-Saturated
Soil Description:	F Silty Sand w/Clay

	1	2	3
Normal Stress, psf	1000	2000	3000
Peak Stress, psf	720	1368	2040
Displacement, in.	0.085	0.200	0.200
Ultimate Stress, psf	708	1368	1992
Displacement, in.	0.250	0.250	0.250
Initial Dry Density, pcf	112.7	112.7	112.7
Initial Water Content, %	8.0	8.0	8.0
Strain Rate, in/min.	0.020	0.020	0.020





	f (Deg)	C (psf)
Peak	33.5	60
Ultimate	32.5	70

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SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capitol - 26th & Avalon - Rubidoux

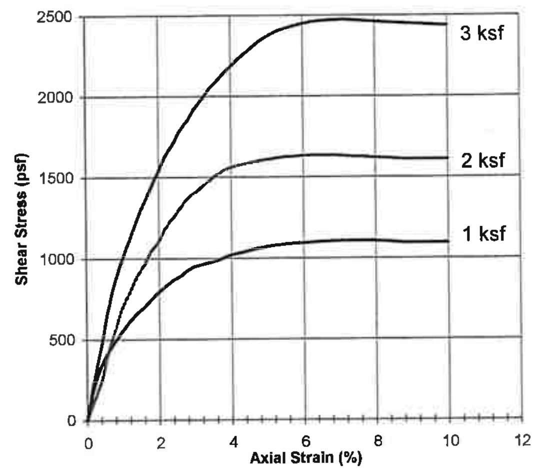
PROJECT: 12627-05 DATE: 11/28/2005

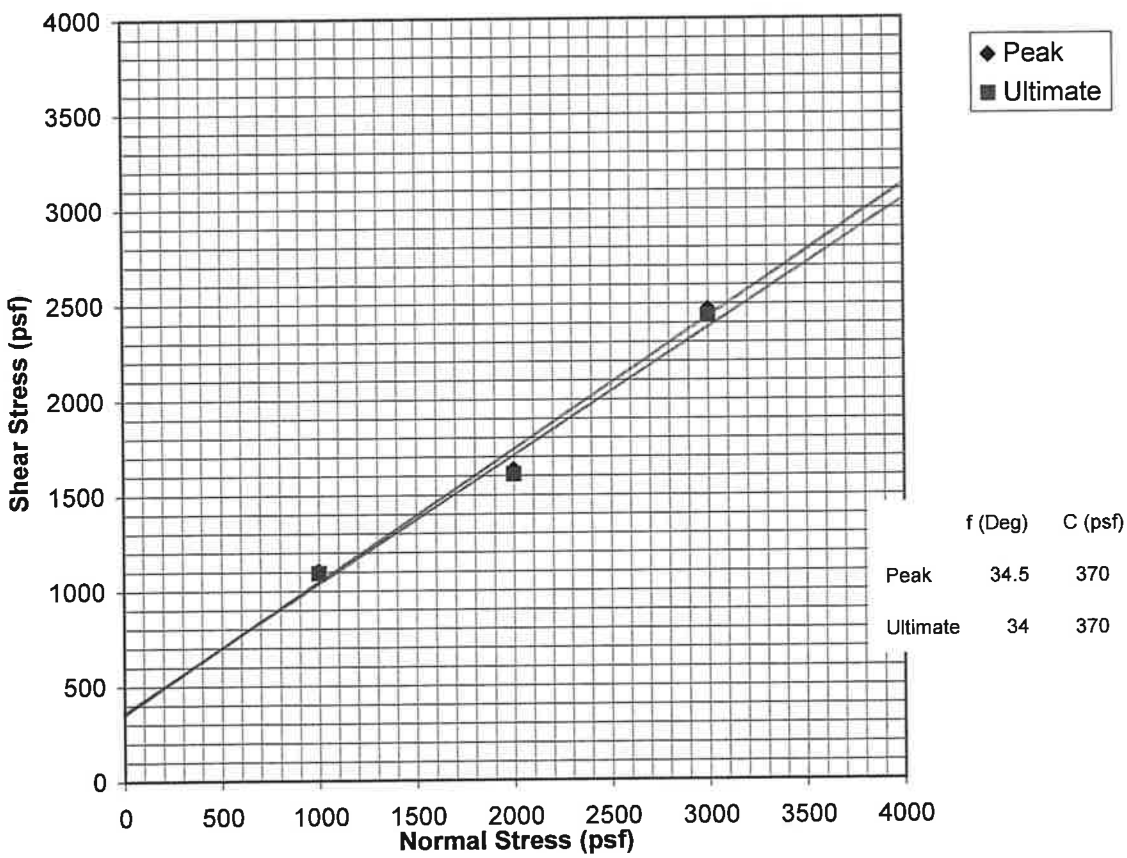
DIRECT SHEAR TEST

Plate E

Sample No.	T20@2'
Sample Type:	Undisturbed-Saturated
Soil Description:	F-M Silty Sand

	1	2	3
Normal Stress, psf	1000	2000	3000
Peak Stress, psf	1104	1632	2472
Displacement, in.	0.175	0.150	0.175
Ultimate Stress, psf	1092	1608	2436
Displacement, in.	0.250	0.250	0.250
Initial Dry Density, pcf	112.1	112.1	112.1
Initial Water Content, %	4.4	4.4	4.4
Strain Rate, in/min.	0.020	0.020	0.020





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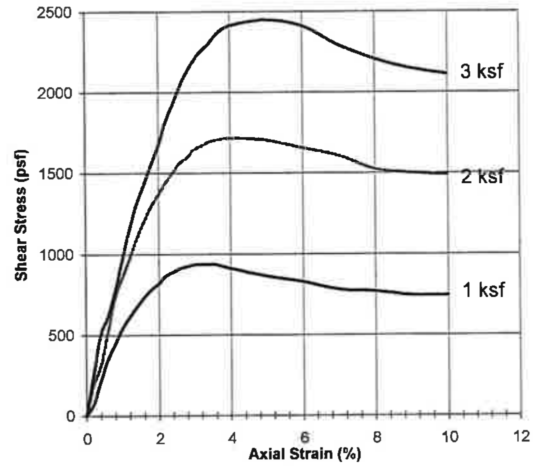
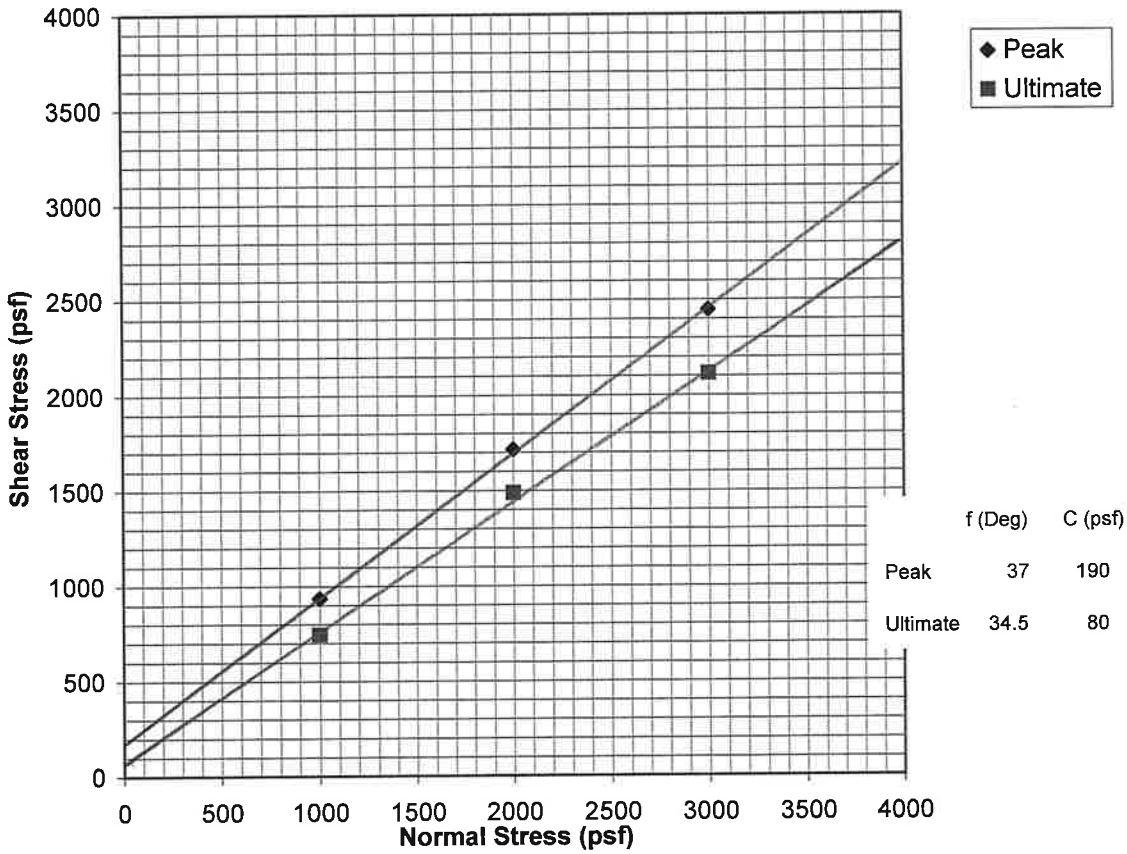
SOILS AND GEOTECHNICAL CONSULTANTS
Proficiency Capitol - 26th & Avalon - Rubidoux
PROJECT: 12627-05 DATE: 11/28/2005

DIRECT SHEAR TEST
Plate F

Sample No.	T20@4'
Sample Type:	Undisturbed-Saturated
Soil Description:	F-C Silty Sand w/Tr F Gravel

	1	2	3
Normal Stress, psf	1000	2000	3000
Peak Stress, psf	936	1716	2448
Displacement, in.	0.075	0.100	0.125
Ultimate Stress, psf	744	1488	2112
Displacement, in.	0.250	0.250	0.250
Initial Dry Density, pcf	118.5	118.5	118.5
Initial Water Content, %	4.0	4.0	4.0
Strain Rate, in/min.	0.020	0.020	0.020





	f (Deg)	C (psf)
Peak	37	190
Ultimate	34.5	80

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SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capitol - 26th & Avalon - Rubidoux

PROJECT: 12627-05 DATE: 11/28/2005

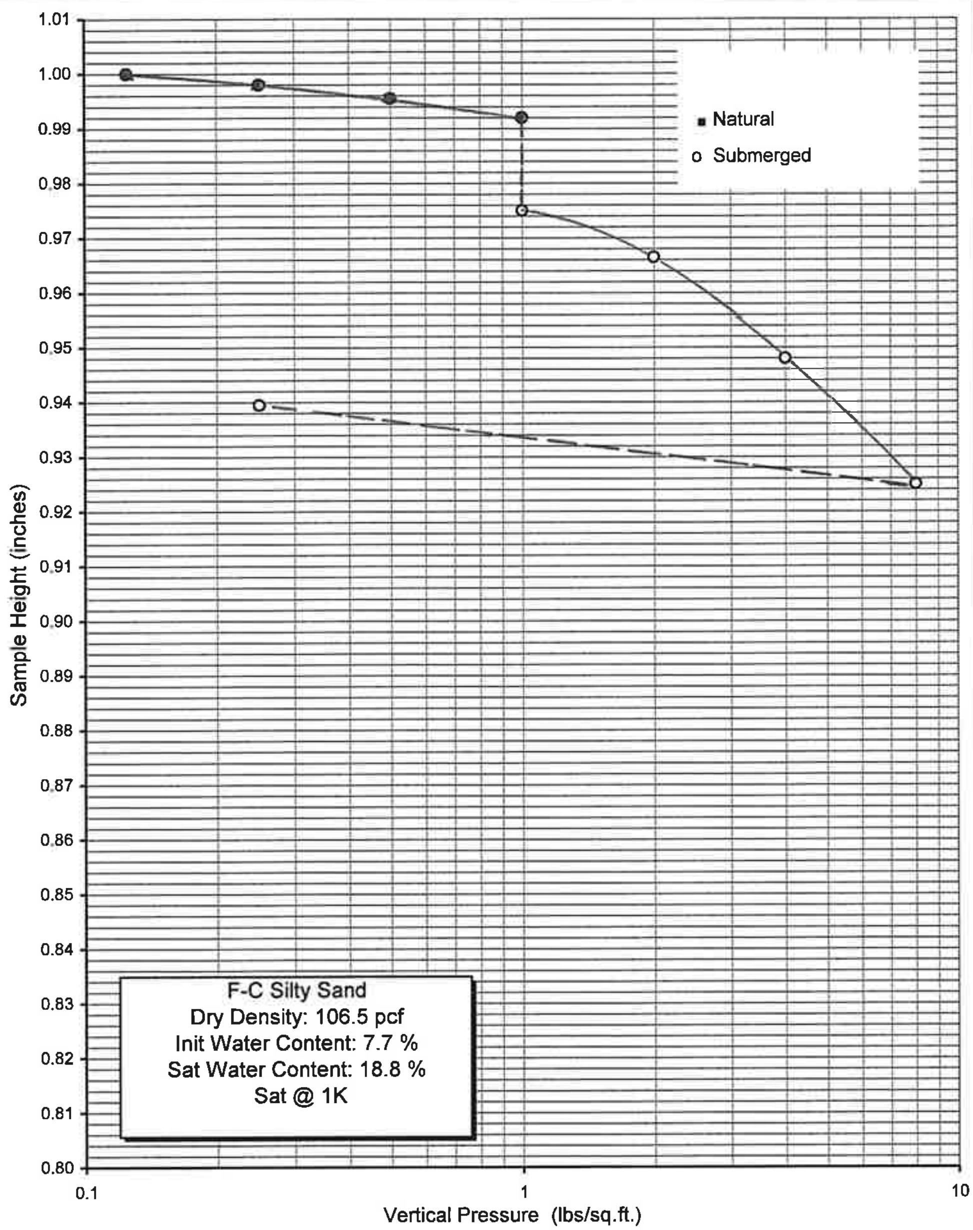
DIRECT SHEAR TEST

Plate G

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consol-idation (percent)	
	1		Saturated
0.125	**1.0000**	**0.0**	
0.25	**0.9980**	**0.2**	
0.5	**0.9955**	**0.4**	
1	**0.9920**	**0.8**	
1	**0.9750**	**2.5**	S
2	**0.9665**	**3.4**	
4	**0.9480**	**5.2**	
8	**0.9250**	**7.5**	
0.25	**0.9395**	**6.1**	

Tested: **11/21/2005**
Sample No: **T1**
Depth: **10'**

Sample No. T1 | Depth 10' | Date 11-21-05



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capital - 26th & Avalon - Rubidoux

PROJECT: 12627-05 DATE: 11/28/2005

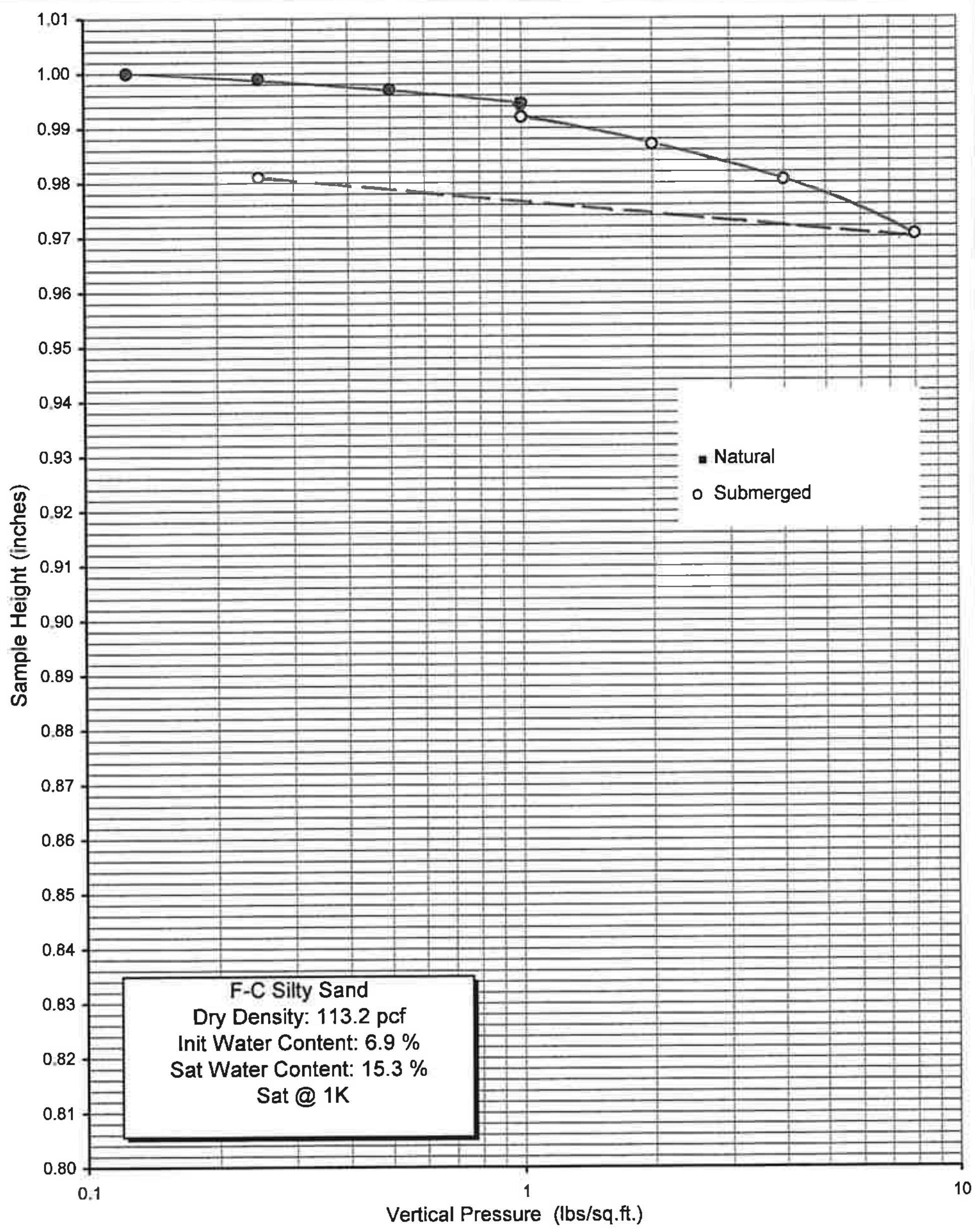
CONSOLIDATION TEST

Plate H

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consol-idation (percent)	
	1		Saturated
0.125	**1.0000**	**0.0**	
0.25	**0.9990**	**0.1**	
0.5	**0.9970**	**0.3**	
1	**0.9945**	**0.5**	
1	**0.9920**	**0.8**	S
2	**0.9870**	**1.3**	
4	**0.9805**	**2.0**	
8	**0.9705**	**3.0**	
0.25	**0.9810**	**1.9**	

Tested: **11/21/2005**
Sample No: **T1**
Depth: **12'**

Sample No. T1 | Depth 12' | Date 11-21-05



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SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capital - 26th & Avalon - Rubidoux

PROJECT: 12627-05 DATE: 11/28/2005

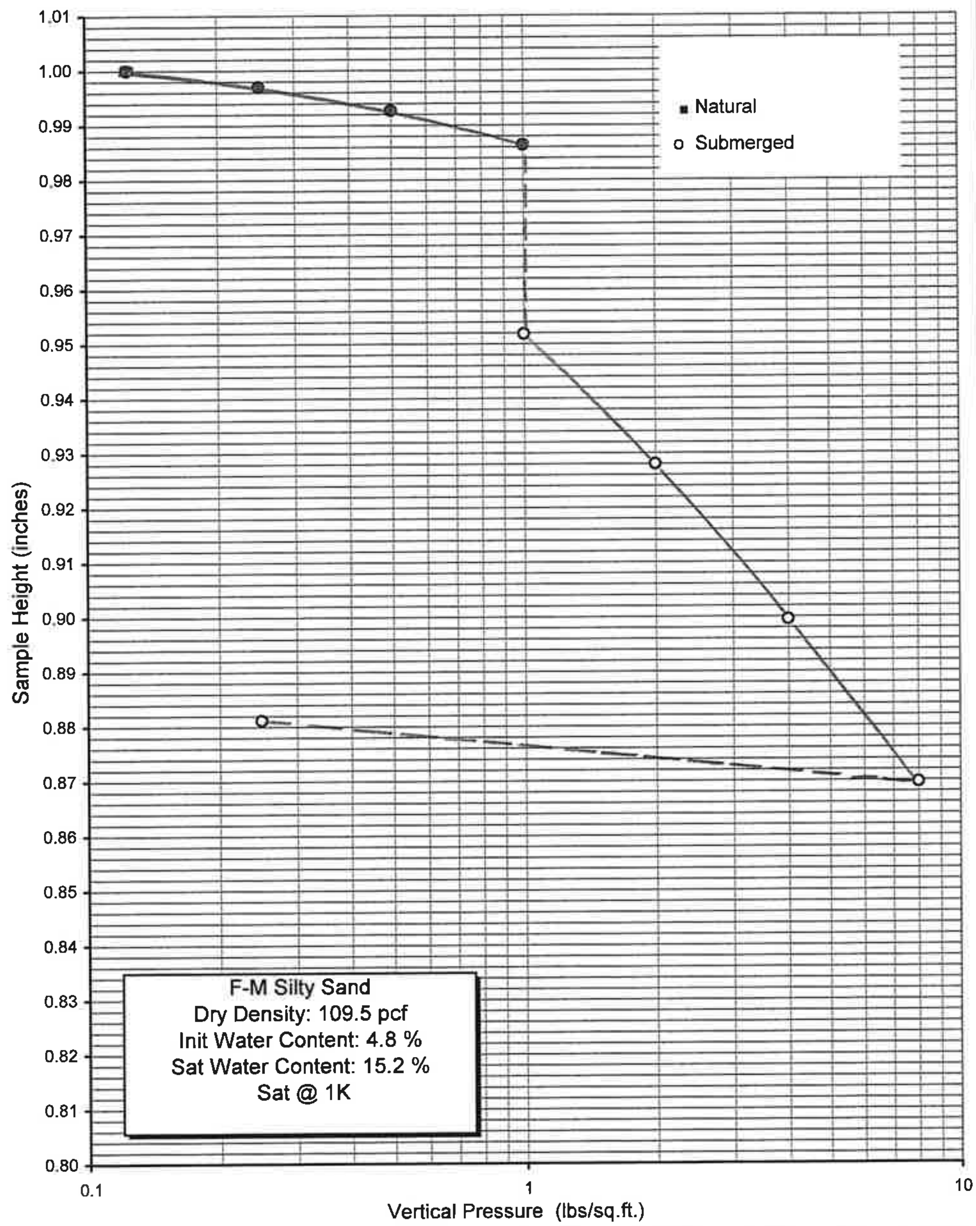
CONSOLIDATION TEST

Plate I

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consol-idation (percent)	
	1		Saturated
0.125	**1.0000**	**0.0**	
0.25	**0.9970**	**0.3**	
0.5	**0.9927**	**0.7**	
1	**0.9864**	**1.4**	
1	**0.9518**	**4.8**	S
2	**0.9280**	**7.2**	
4	**0.8995**	**10.1**	
8	**0.8697**	**13.0**	
0.25	**0.8812**	**11.9**	

Tested: **11/23/2005**
Sample No: **T6**
Depth: **6'**

Sample No. T6 | Depth 6' | Date 11-23-05



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SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capital - 26th & Avalon - Rubidoux

PROJECT: 12627-05 | DATE: 11/28/2005

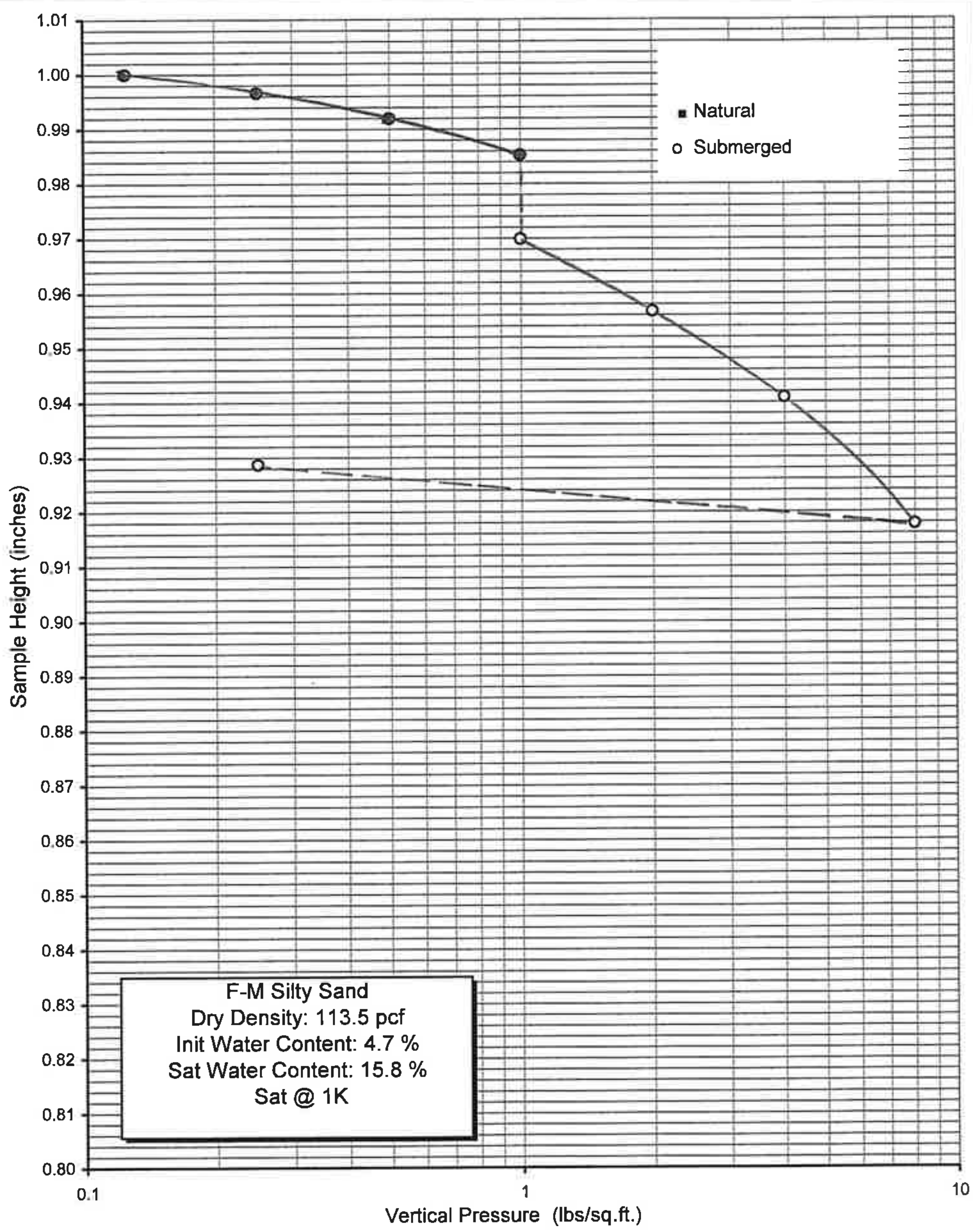
CONSOLIDATION TEST

Plate J

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consol-idation (percent)	
	1		Saturated
0.125	**1.0000**	**0.0**	
0.25	**0.9966**	**0.3**	
0.5	**0.9919**	**0.8**	
1	**0.9852**	**1.5**	
1	**0.9699**	**3.0**	S
2	**0.9567**	**4.3**	
4	**0.9409**	**5.9**	
8	**0.9177**	**8.2**	
0.25	**0.9287**	**7.1**	

Tested: **11/21/2005**
Sample No: **T6**
Depth: **10'**

Sample No. T6 | Depth 10' | Date 11-21-05



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capital - 26th & Avalon - Rubidoux

PROJECT: 12627-05 | DATE: 11/28/2005

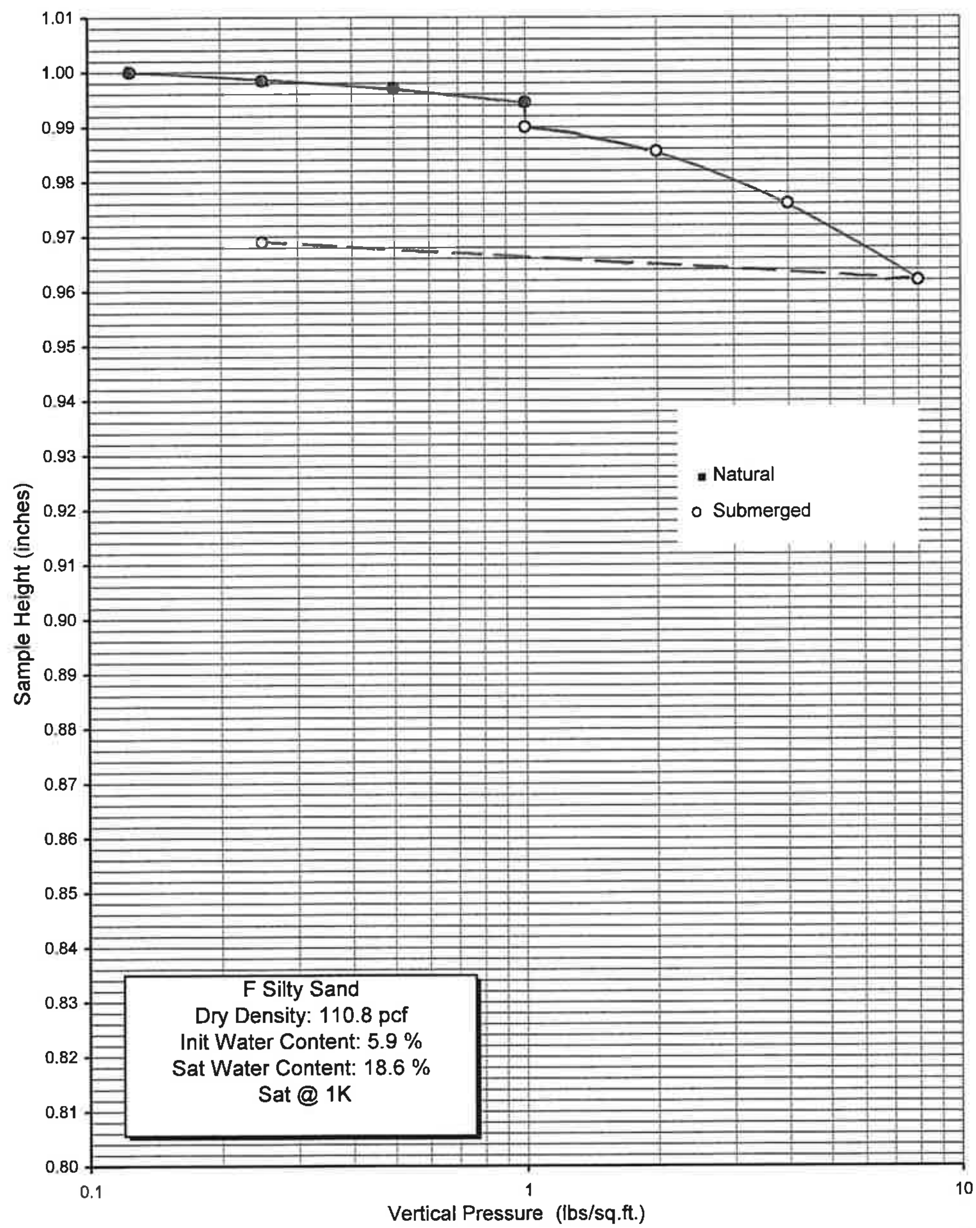
CONSOLIDATION TEST

Plate K

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consol-idation (percent)	
	1		
0.125	**1.0000**	**0.0**	Saturated
0.25	**0.9985**	**0.1**	
0.5	**0.9970**	**0.3**	
1	**0.9945**	**0.5**	
1	**0.9900**	**1.0**	S
2	**0.9855**	**1.5**	
4	**0.9760**	**2.4**	
8	**0.9620**	**3.8**	
0.25	**0.9690**	**3.1**	

Tested: **11/23/2005**
Sample No: **T16**
Depth: **8'**

Sample No. T16	Depth 8'	Date 11-23-05



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capital - 26th & Avalon - Rubidoux

PROJECT: 12627-05 DATE: 11/28/2005

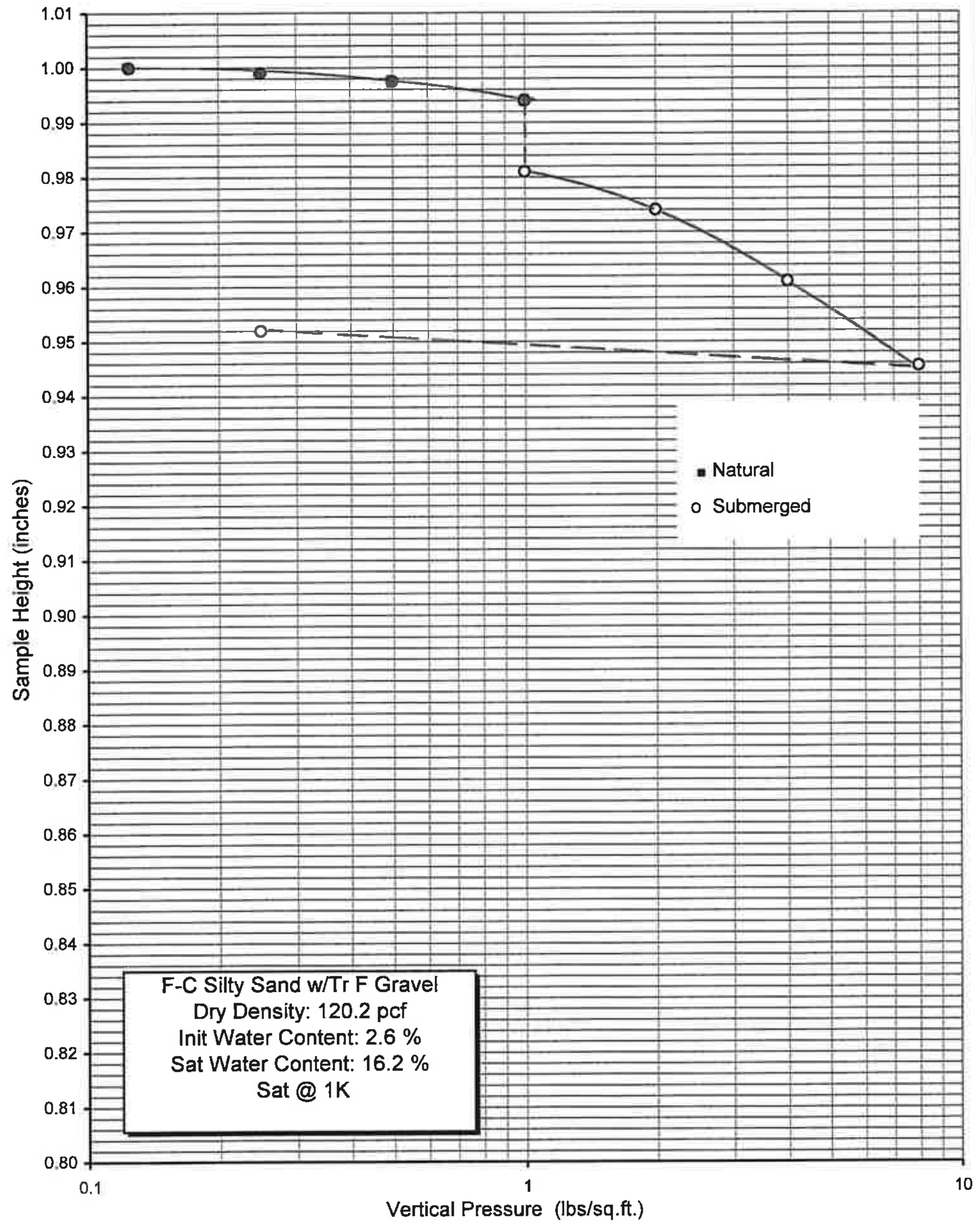
CONSOLIDATION TEST

Plate L

Vertical Pressure (kips/sq.ft.)	Sample Height (inches)	Consol-idation (percent)	
	1		
			Saturated
0.125	**1.0000**	**0.0**	
0.25	**0.9990**	**0.1**	
0.5	**0.9975**	**0.2**	
1	**0.9940**	**0.6**	
1	**0.9810**	**1.9**	S
2	**0.9740**	**2.6**	
4	**0.9610**	**3.9**	
8	**0.9455**	**5.5**	
0.25	**0.9520**	**4.8**	

Tested: **11/23/2005**
Sample No: **T23**
Depth: **5.5'**

Sample No. T23 | Depth 5.5' | Date 11-23-05



NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS

Proficiency Capital - 26th & Avalon - Rubidoux

PROJECT: 12627-05 DATE: 11/28/2005

CONSOLIDATION TEST

Plate M

APPENDIX D
INFILTRATION TESTING CALCULATIONS BY NORCAL ENGINEERING (2019)

TGR GEOTECHNICAL
DBE & 8(a) firm
3037 S. HARBOR BLVD
SANTA ANA, CA 92704
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www.tgrgeotech.com

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Proficiency Rubidoux, LLC
Project No.: 12627-05
Date: 1/28/19
Test No. ST-1
Depth: 8'
Tested By: J.S.

TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
8:48			68.2			36.9					
8:58	10	10	70.4	2.2		39.5	2.6				
8:58			68.8			35.9					
9:08	10	20	70.2	1.4		37.8	1.9				
9:08			68.7			36.1					
9:18	10	30	70.0	1.3		38.0	1.9				
9:18			68.4			36.8					
9:28	10	40	69.5	1.1		38.6	1.8				
9:28			68.3			37.0					
9:38	10	50	69.5	1.2		38.6	1.6				
9:38			68.4			37.4					
9:48	10	60	69.3	0.9		38.9	1.5		5.4	9.0	
9:48			68.2			37.2					
9:58	10	70	69.3	1.1		38.8	1.6		6.6	9.6	
9:58			69.1			37.6					
10:08	10	80	70.0	0.9		39.0	1.4		5.4	8.4	
10:08			69.0			37.7					
10:18	10	90	69.9	0.9		39.0	1.3		5.4	7.8	
10:18			68.6			37.3					
10:28	10	100	69.6	1.0		38.7	1.4		6.0	8.4	
10:28			68.6			37.1					
10:38	10	110	69.5	0.9		38.5	1.4		5.4	8.4	
10:38			68.4			37.4					
10:48	10	120	69.3	0.9		38.8	1.4		5.4	8.4	

Average = 5.7 / 8.6 cm/hr

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Proficiency Rubidoux, LLC
Project No.: 12627-05
Date: 1/28/19
Test No. ST-2
Depth: 9'
Tested By: J.S.

TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
9:02			98.7			39.5					
9:12	10	10	99.5	0.8		40.5	1.0				
9:12			99.5			40.5					
9:22	10	20	100.4	0.9		41.5	1.0				
9:22			100.4			41.5					
9:32	10	30	100.9	0.5		42.3	0.8				
9:32			100.9			42.3					
9:42	10	40	101.5	0.6		43.0	0.7				
9:42			101.5			43.0					
9:52	10	50	102.2	0.7		44.0	1.0				
9:52			102.2			44.0					
10:02	10	60	102.9	0.7		44.9	0.9		4.2	5.4	
10:02			102.9			44.9					
10:12	10	70	103.6	0.7		45.7	0.8		4.2	4.8	
10:12			103.6			45.7					
10:22	10	80	104.3	0.7		46.1	0.4		4.2	2.4	
10:22			104.3			46.1					
10:32	10	90	104.9	0.6		47.5	0.4		3.6	2.4	
10:32			102.1			43.0					
10:42	10	100	102.5	0.4		43.8	0.8		2.4	4.8	
10:42			102.5			43.8					
10:52	10	110	103.2	0.7		44.7	0.9		4.2	5.4	
10:52			103.2			44.7					
11:02	10	120	103.8	0.6		45.5	0.7		3.6	4.2	

Average = 3.8 / 4.2 cm/hr

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Proficiency Rubidoux, LLC
Project No.: 12627-05
Date: 1/28/19
Test No. ST-3
Depth: 10'
Tested By: J.S.

TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
11:15			71.0			39.9					
11:25	10	10	71.8	0.8		40.3	0.4				
11:25			71.8			40.3					
11:35	10	20	72.6	0.8		41.1	0.8				
11:35			72.6			41.1					
11:45	10	30	73.4	0.8		41.8	0.7				
11:45			73.4			41.8					
11:55	10	40	74.1	0.7		42.3	0.5				
11:55			74.1			42.3					
12:05	10	50	74.8	0.7		42.8	0.5				
12:05			74.8			42.8					
12:15	10	60	75.5	0.7		43.4	0.6		4.2	3.6	
12:15			75.5			43.4					
12:25	10	70	76.2	0.7		44.0	0.6		4.2	3.6	
12:25			76.2			44.0					
12:35	10	80	76.9	0.7		44.5	0.5		4.2	3.0	
12:35			76.9			44.5					
12:45	10	90	77.5	0.6		45.0	0.5		3.6	3.0	
12:45			77.5			45.0					
12:55	10	100	78.0	0.5		45.6	0.6		3.0	3.6	
12:55			78.0			45.6					
1:05	10	110	78.7	0.7		46.1	0.7		4.2	4.2	
1:05			78.7			46.1					
1:15	10	120	79.2	0.5		46.6	0.5		3.0	3.0	

Average = 3.8 / 3.4 cm/hr

NORCAL ENGINEERING

SOILS AND GEOTECHNICAL CONSULTANTS

Project: Proficiency Rubidoux, LLC
Project No.: 12627-05
Date: 1/28/19
Test No. ST-4
Depth: 14'
Tested By: J.S.

TIME (hr/min)	CHANGE TIME (min)	CUMULATIVE TIME (min)	INNER RING READING (cm)	INNER RING CHANGE	INNER RING FLOW (cc)	OUTER RING READING (cm)	OUTER RING CHANGE	OUTER RING FLOW (cc)	INNER RING INF RATE (cm/hr)	OUTER RING INF RATE (cm/hr)	INNER RING INF RATE (ft/hr)
11:37			98.5			39.2					
11:39	2	2	106.3	7.8		47.2	8.0				
11:39			99.4			38.4					
11:41	2	4	106.5	7.1		46.4	8.0				
11:41			98.6			37.6					
11:43	2	6	106.1	7.5		46.0	8.4				
11:43			97.5			37.7					
11:45	2	8	105.0	7.5		45.3	7.6				
11:45			99.0			37.4					
11:47	2	10	106.2	7.2		45.5	8.1				
11:47			97.9			37.8					
11:49	2	12	104.6	6.7		44.8	7.0		201	210	
11:49			98.2			37.6					
11:51	2	14	105.3	7.1		45.2	7.6		213	228	
11:51			97.8			37.7					
11:53	2	16	104.5	6.7		45.1	7.4		201	222	
11:53			99.0			37.9					
11:55	2	18	105.8	6.8		45.3	7.4		204	222	
11:55			99.0			38.9					
11:57	2	20	106.3	7.2		46.2	7.3		216	219	
11:57			99.1			39.2					
11:59	2	22	106.2	7.1		46.3	7.1		213	213	
11:59			99.6			38.8					
12:01	2	24	106.7	7.1		45.9	7.1		213	213	

Average = 209 / 218 cm/hr

APPENDIX E
SITE SEISMICITY AND DE-AGGREGATED PARAMETERS

Proficiency Rubidoux, Jurupa

Latitude, Longitude: 34.0143, -117.3997

Date	4/28/2021, 1:30:29 PM
Design Code Reference Document	ASCE7-16
Risk Category	III
Site Class	C - Very Dense Soil and Soft Rock

Type	Value	Description
S_S	1.5	MCE_R ground motion. (for 0.2 second period)
S_1	0.6	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.8	Site-modified spectral acceleration value
S_{M1}	0.84	Site-modified spectral acceleration value
S_{DS}	1.2	Numeric seismic design value at 0.2 second SA
S_{D1}	0.56	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	1.4	Site amplification factor at 1.0 second
PGA	0.552	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.662	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.764	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.88	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.658	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.721	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.552	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.939	Mapped value of the risk coefficient at short periods
C_{R1}	0.912	Mapped value of the risk coefficient at a period of 1 s

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U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.0143

Time Horizon

Return period in years

2475

Longitude

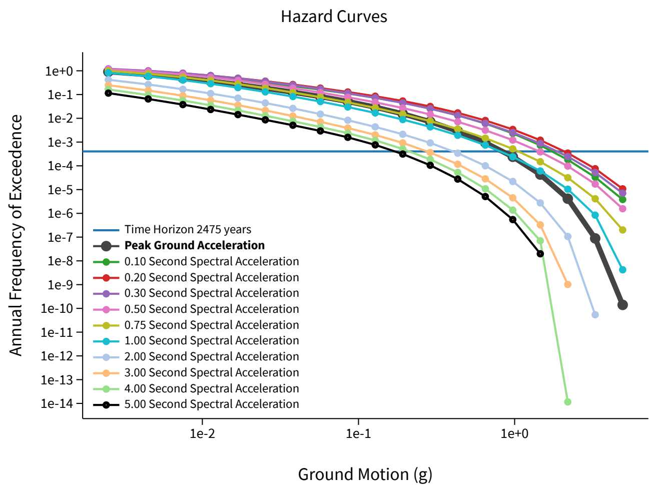
Decimal degrees, negative values for western longitudes

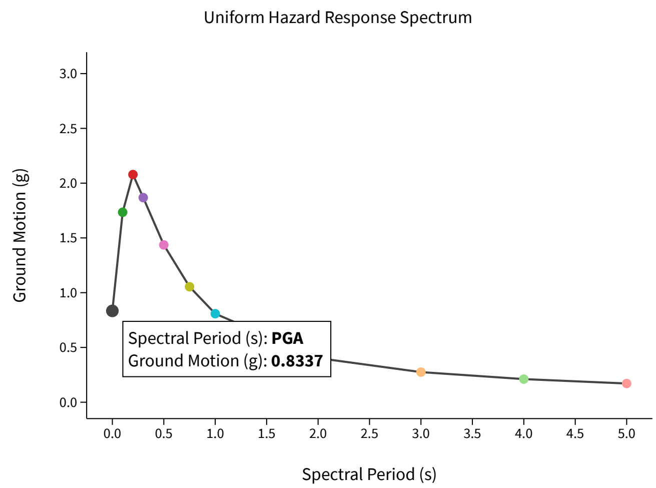
-117.3997

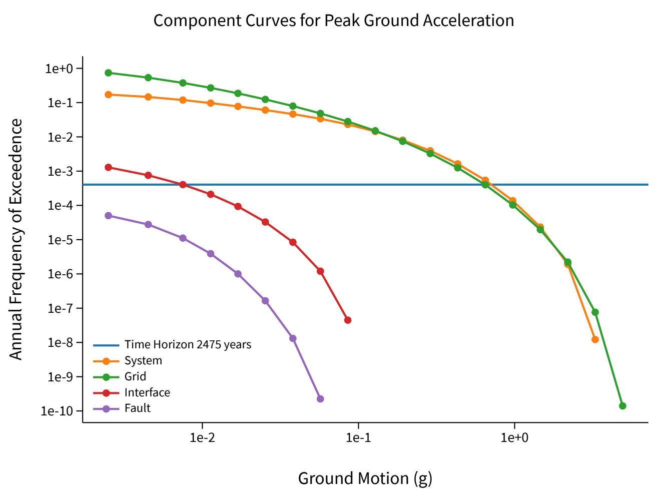
Site Class

537 m/s (Site class C)

Hazard Curve





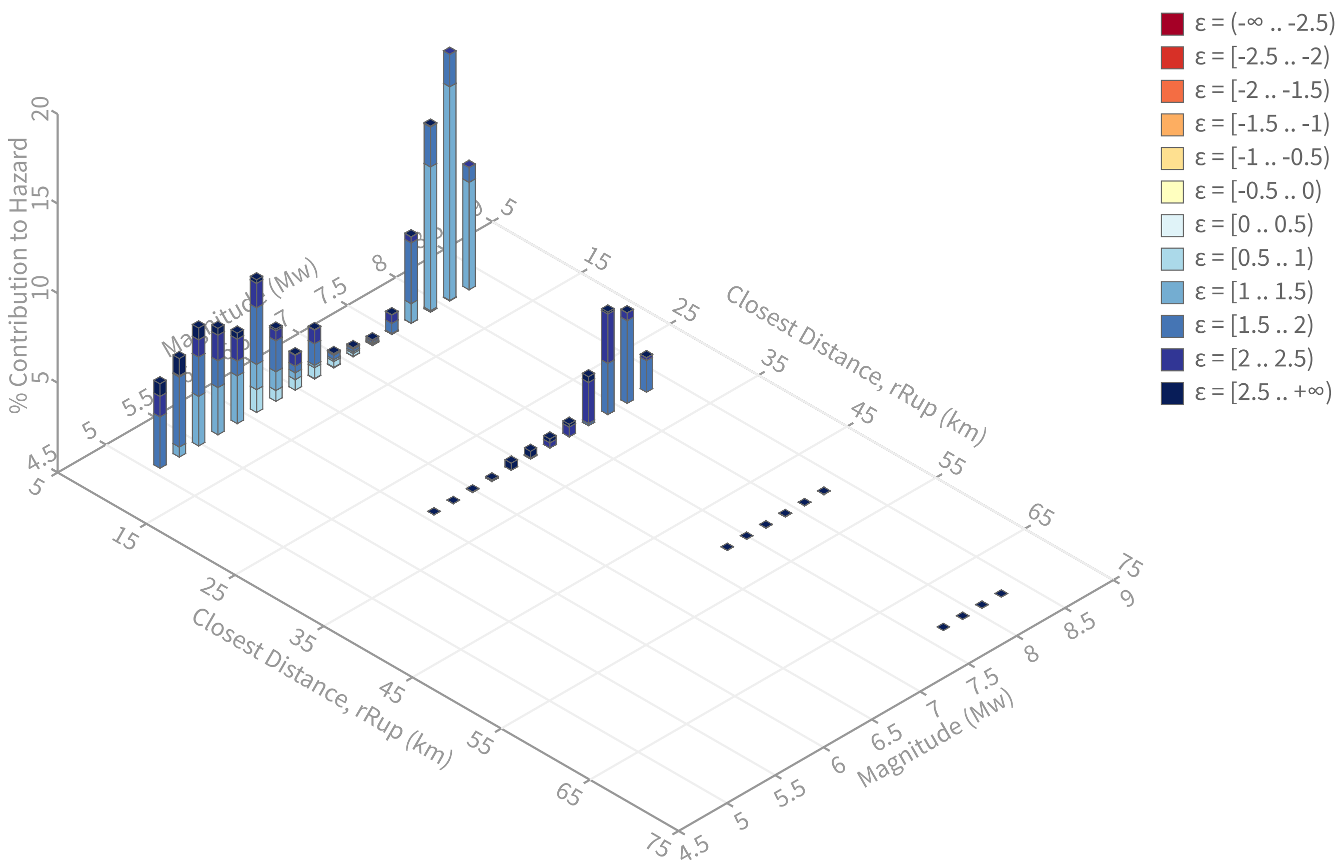


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.83368471 g

Recovered targets

Return period: 3005.1396 yrs
Exceedance rate: 0.00033276324 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.06 %

Mean (over all sources)

m: 7
r: 11.54 km
ε_0: 1.66 σ

Mode (largest m-r bin)

m: 8.1
r: 11.58 km
ε_0: 1.39 σ
Contribution: 13.76 %

Mode (largest m-r-ε_0 bin)

m: 8.1
r: 11.57 km
ε_0: 1.34 σ
Contribution: 11.92 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM31	System							28.41
San Jacinto (San Bernardino) [3]		11.57	8.03	1.41	117.303°W	34.080°N	50.76	17.25
San Andreas (San Bernardino N) [4]		21.11	7.93	2.02	117.278°W	34.175°N	31.96	5.58
San Andreas (North Branch Mill Creek) [0]		20.57	8.02	1.84	117.270°W	34.171°N	34.25	1.38
Fontana (Seismicity) [1]		10.86	6.60	2.03	117.485°W	34.081°N	313.34	1.05
UC33brAvg_FM32	System							28.25
San Jacinto (San Bernardino) [3]		11.57	8.03	1.42	117.303°W	34.080°N	50.76	17.15
San Andreas (San Bernardino N) [4]		21.11	7.93	2.02	117.278°W	34.175°N	31.96	5.65
San Andreas (North Branch Mill Creek) [0]		20.57	8.03	1.84	117.270°W	34.171°N	34.25	1.44
UC33brAvg_FM31 (opt)	Grid							21.69
PointSourceFinite: -117.400, 34.028		5.24	5.69	1.43	117.400°W	34.028°N	0.00	7.17
PointSourceFinite: -117.400, 34.028		5.24	5.69	1.43	117.400°W	34.028°N	0.00	7.17
PointSourceFinite: -117.400, 34.100		9.80	5.89	2.11	117.400°W	34.100°N	0.00	2.70
PointSourceFinite: -117.400, 34.100		9.80	5.89	2.11	117.400°W	34.100°N	0.00	2.70
UC33brAvg_FM32 (opt)	Grid							21.65
PointSourceFinite: -117.400, 34.028		5.24	5.69	1.43	117.400°W	34.028°N	0.00	7.16
PointSourceFinite: -117.400, 34.028		5.24	5.69	1.43	117.400°W	34.028°N	0.00	7.16
PointSourceFinite: -117.400, 34.100		9.80	5.89	2.11	117.400°W	34.100°N	0.00	2.70
PointSourceFinite: -117.400, 34.100		9.80	5.89	2.11	117.400°W	34.100°N	0.00	2.70

APPENDIX F
SEISMIC SHEAR-WAVE SURVEY BY TERRA GEOSCIENCES (2021)

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TERRA GEOSCIENCES

SEISMIC SHEAR-WAVE SURVEY

PROFICIENCY CAPITAL – JURUPA VALLEY PROJECT

26th STREET AND AVALON STREET

CITY OF JURUPA VALLEY, CALIFORNIA

Project No. 213625-1

April 15, 2021

Prepared for:

TGR Geotechnical, Inc.
3037 S. Harbor Boulevard
Santa Ana, CA 92704

TGR Geotechnical, Inc.
3037 S. Harbor Boulevard
Santa Ana, CA 92704

Attention: Mr. Edward Burrows, Vice President

Regarding: Seismic Shear-Wave Survey Analysis
Proficiency Capital – Jurupa Valley Project
26th Street and Avalon Street
City of Jurupa Valley, California
TGR Project No. 21-7238

INTRODUCTION

As requested, this firm has performed a seismic shear-wave survey using the multi-channel analysis of surface waves (MASW) and microtremor array measurements (MAM) methods for the above-referenced site. The purpose of this survey was to assess the one-dimensional average shear-wave velocity structure beneath the subject survey area to a depth of at least 100 feet. Surficial geologic mapping by Morton (2003) indicates the site to be mantled by late to middle Pleistocene age, mainly indurated, tan to brown, sandy to pebbly and cobbly, clay-bearing older alluvial-fan deposits, in turn underlain by Cretaceous age granitic bedrock at depth, generally described as being a medium-to coarse-grained equigranular gray biotite-hornblende tonalite. The location of the seismic traverse has been approximated on a partial copy of the 60-scale Conceptual Utility Plan (Sheet 7 of 13), prepared by Thienes Engineering, Inc., dated 12/20/18, which is presented as the Seismic Line Location Map, Plate 1, for reference. Additionally, photographic views of the survey traverse are presented on Plate 2 for visual and reference purposes. As authorized by you, the following services were performed during this study:

- ***Review of available pertinent published and unpublished geologic and geophysical data in our files pertaining to the site.***
- ***Performing a seismic surface-wave survey by a licensed State of California Professional Geophysicist that included one traverse for shear-wave velocity analysis purposes.***
- ***Preparation of this report, presenting the results of our findings with respect to the shear-wave velocities of the subsurface earth materials.***

Accompanying Map, Illustrations, and Appendices

Plate 1 - Seismic Line Location Map
Plate 2 - Site Photographs
Appendix A - Shear-Wave Model and Data
Appendix B - References

SUMMARY OF SHEAR-WAVE SURVEY

Methodology

The fundamental premise of this survey uses the fact that the Earth is always in motion at various seismic frequencies. These relatively constant vibrations of the Earth's surface are called microtremors, which are very small with respect to amplitude and are generally referred to as background "noise" that contain abundant surface waves. These microtremors are caused by both human activity (i.e., cultural noise, traffic, factories, etc.) and natural phenomenon (i.e., wind, wave motion, rain, atmospheric pressure, etc.) which have now become regarded as useful signal information. Although these signals are generally very weak, the recording, amplification, and processing of these surface waves has greatly improved by the use of technologically improved seismic recording instrumentation and recently developed computer software. For this application, we are mainly concerned with the Rayleigh wave portion of the seismic signals, which is also referred to as "ground roll" since the Rayleigh wave is the dominant component of ground roll.

For the purposes of this study, there are two ways that the surface waves were recorded, one being "active" and the other being "passive." Active means that seismic energy is intentionally generated at a specific location relative to the survey spread and recording begins when the source energy is imparted into the ground (i.e., MASW survey technique). Passive surveying, also called "microtremor surveying," is where the seismograph records ambient background vibrations (i.e., MAM survey technique), with the ideal vibration sources being at a constant level. Longer wavelength surface waves (longer-period and lower-frequency) travel deeper and thus contain more information about deeper velocity structure and are generally obtained with passive survey information. Shorter wavelength (shorter-period and higher-frequency) surface waves travel shallower and thus contain more information about shallower velocity structure and are generally collected with the use of active sources. For the most part, higher frequency active source surface waves will resolve the shallower velocity structure and lower frequency passive source surface waves will better resolve the deeper velocity structure. Therefore, the combination of both of these surveying techniques provides a more accurate depiction of the subsurface velocity structure.

The assemblage of the data that is gathered from these surface wave surveys results in development of a dispersion curve. Dispersion, or the change in phase velocity of the seismic waves with frequency, is the fundamental property utilized in the analysis of surface wave methods. The fundamental assumption of these survey methods is that the signal wavefront is planar, stable, and isotropic (coming from all directions) making it independent of source locations and for analytical purposes uses the spatial autocorrelation method (SPAC). The SPAC method is based on theories that are able to detect "signals" from background "noise" (Okada, 2003). The shear wave velocity (V_s) can then be calculated by mathematical inversion of the dispersive phase velocity of the surface waves which can be significant in the presence of velocity layering, which is common in the near-surface environment.

Field Procedures

One seismic shear-wave survey traverse (Seismic Line SW-1) was performed, which has been approximated on the Seismic Line Location Map, Plate 1. The traverse was located in the field by use of Google™ Earth imagery (2021) and GPS coordinates. For data collection, the field survey employed a twenty-four channel Geometrics StrataVisor™ NZXP model signal-enhancement refraction seismograph. This survey employed both active (MASW) and passive (MAM) source methods to ensure that both quality shallow and deeper shear-wave velocity information was recorded (Park et al., 2005).

Both the MASW and MAM surveys used the same linear geometry array that consisted of a 184-foot-long spread using a series of twenty-four 4.5-Hz geophones that were spaced at regular seven-foot intervals. For the MASW survey, the ground vibrations were recorded using a one second record length at a sampling rate of 0.5-milliseconds. Two seismic records were obtained using a 30-foot offset from the beginning and end of the survey line, utilizing a 16-pound sledge-hammer as the energy source to produce the seismic waves. Each of these shot points used multiple hammer impacts (stacking) to improve the signal to noise ratio of the data.

The MAM survey did not require the introduction of any artificial seismic sources and only background ambient noise was recorded. The ambient ground vibrations were recorded using a thirty-two second record length at a two-millisecond sampling rate with 22 separate seismic records being obtained for quality control purposes. The seismic-wave forms and associated frequency spectrum that were displayed on the seismograph screen were used to assess the recorded seismic wave data for quality control purposes in the field. The acceptable records were digitally recorded on the in-board seismograph computer and subsequently transferred to a flash drive so that they could be subsequently transferred to our office computer for analysis.

Data Reduction

For analysis and presentation of the shear-wave profile and supportive illustrations, this study used the SeisImager/SW™ computer software program developed by Geometrics, Inc. (2009 & 2016). Both the active (MASW) and passive (MAM) survey results were combined for this analysis (Park et al., 2005). The combined results maximize the resolution and overall depth range in order to obtain one high resolution V_s curve over the entire sampled depth range. These methods economically and efficiently estimate one-dimensional subsurface shear-wave velocities using data collected from standard primary-wave (P-wave) refraction surveys, however, it should be noted that surface waves by their physical nature cannot resolve relatively abrupt or small-scale velocity anomalies. Processing of the data proceeded by calculating the dispersion curve from the input data which subsequently created an initial shear-wave model based on the observed data. This initial model was then inverted in order to converge on the best fit of the initial model and the observed data, creating the final shear-wave model (Seismic Line SW-1) as presented within Appendix A.

Summary of Data Analysis

Data acquisition went very smoothly and the quality was considered to be good. Analysis revealed that the average shear-wave velocity ("weighted average") in the upper 100 feet of the subject survey area is **1,640.8** feet per second as shown on the Shear-Wave Model SW-1, as presented within Appendix A. This average velocity classifies the underlying soils to that of Site Class "**C**" (Very Dense Soil and Soft Rock), which has a velocity range from 1,200 to 2,500 ft/sec (ASCE, 2017; Table 20.3-1).

The "weighted average" velocity is computed from a formula that is used by the ASCE (2010; Section 20.4, Equation 20.4-1) to determine the average shear-wave velocity for the upper 100 feet of the subsurface (V100). This formula is as follows:

$$V100' = 100/[(T1/V1) + (T2/V2) + ...+ (TN/VN)]$$

Where t1, t2, t3,...,tn, are the thicknesses for layers 1, 2, 3,...n, up to 100 feet, and v1, v2, v3,...,vn, are the seismic velocities (feet/second) for layers 1, 2, 3,...n.

The shear-wave model displays these calculated layers and associated velocities (feet/second) to the maximum obtained depth of 204 feet, where locally sampled (dark gray shaded area on shear-wave model represents the constrained data). The associated Dispersion Curves (for both the active and passive methods) which show the data quality and picks, along with the resultant combined dispersion curve model, are also included within Appendix A for visual and reference purposes.

It should be noted that when compared with traditional borehole shear-wave surveys, which use vertical body waves, the sources of error (if present) using horizontal surface waves for this project are not believed to be greater than 15 percent.

CLOSURE

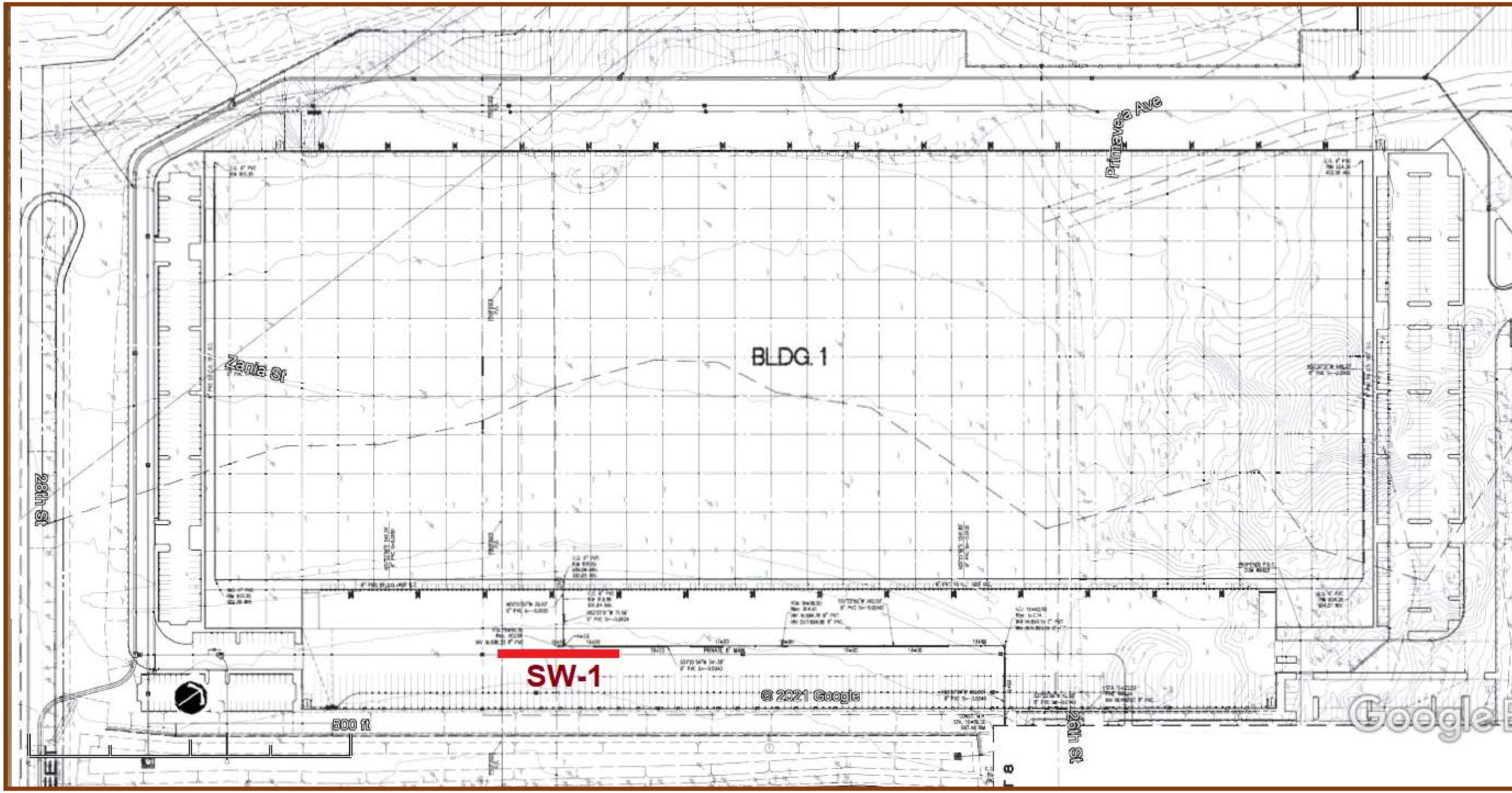
The field survey was performed by the undersigned on April 14, 2021, using "state of the art" geophysical equipment and techniques along the selected portion of the subject study area as directed by you. It is important to note that the fundamental limitation for seismic surveys is known as nonuniqueness, wherein a specific seismic data set does not provide sufficient information to determine a single "true" earth model. Therefore, the interpretation of any seismic data set uses "best-fit" approximations along with the geologic models that appear to be most reasonable for the local area being surveyed. Client should also understand that when using the theoretical geophysical principles and techniques discussed in this report, sources of error are possible in both the data obtained and, in the interpretation, and that the results of this survey may not represent actual subsurface conditions.

These are all factors beyond **Terra Geosciences** control and no guarantees as to the results of this survey can be made. We make no warranty, either expressed or implied. If the client does not understand the limitations of this geophysical survey, additional input should be sought from the consultant.

Respectfully submitted,
TERRA GEOSCIENCES

Donn C. Schwartzkopf
Principal Geophysicist
PGP 1002

SEISMIC LINE LOCATION MAP



BASE MAP: Site Plan prepared by Thienes Engineering, Inc. (partial copy, Conceptual Utility Plan, Sheet 7 of 13); Seismic shear-wave traverse SW-1 shown as red line.

SITE PHOTOGRAPHS

View looking southwest along Seismic Line SW-1.

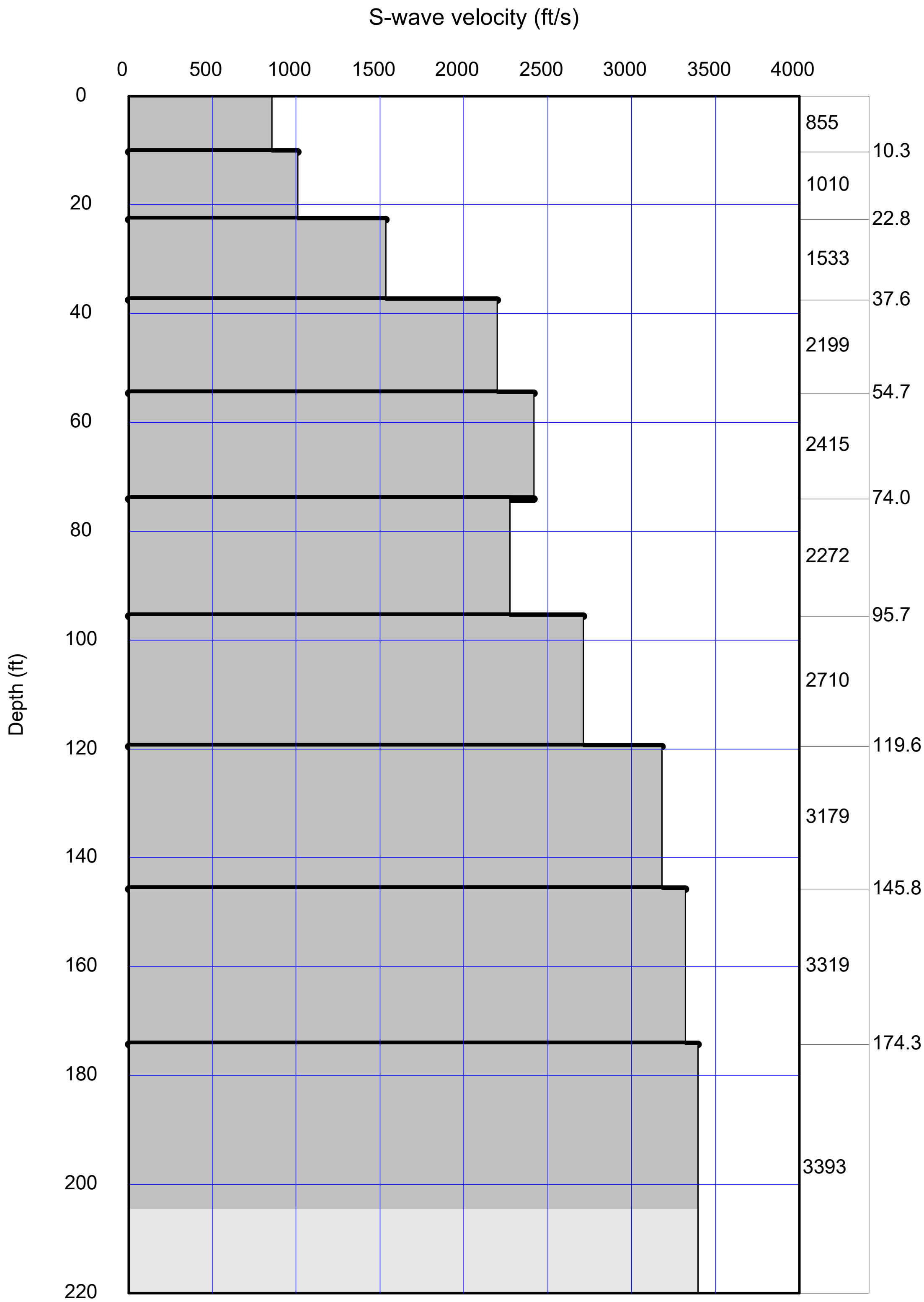
View looking northeast along Seismic Line SW-1.

APPENDIX A

SHEAR-WAVE MODEL AND DATA

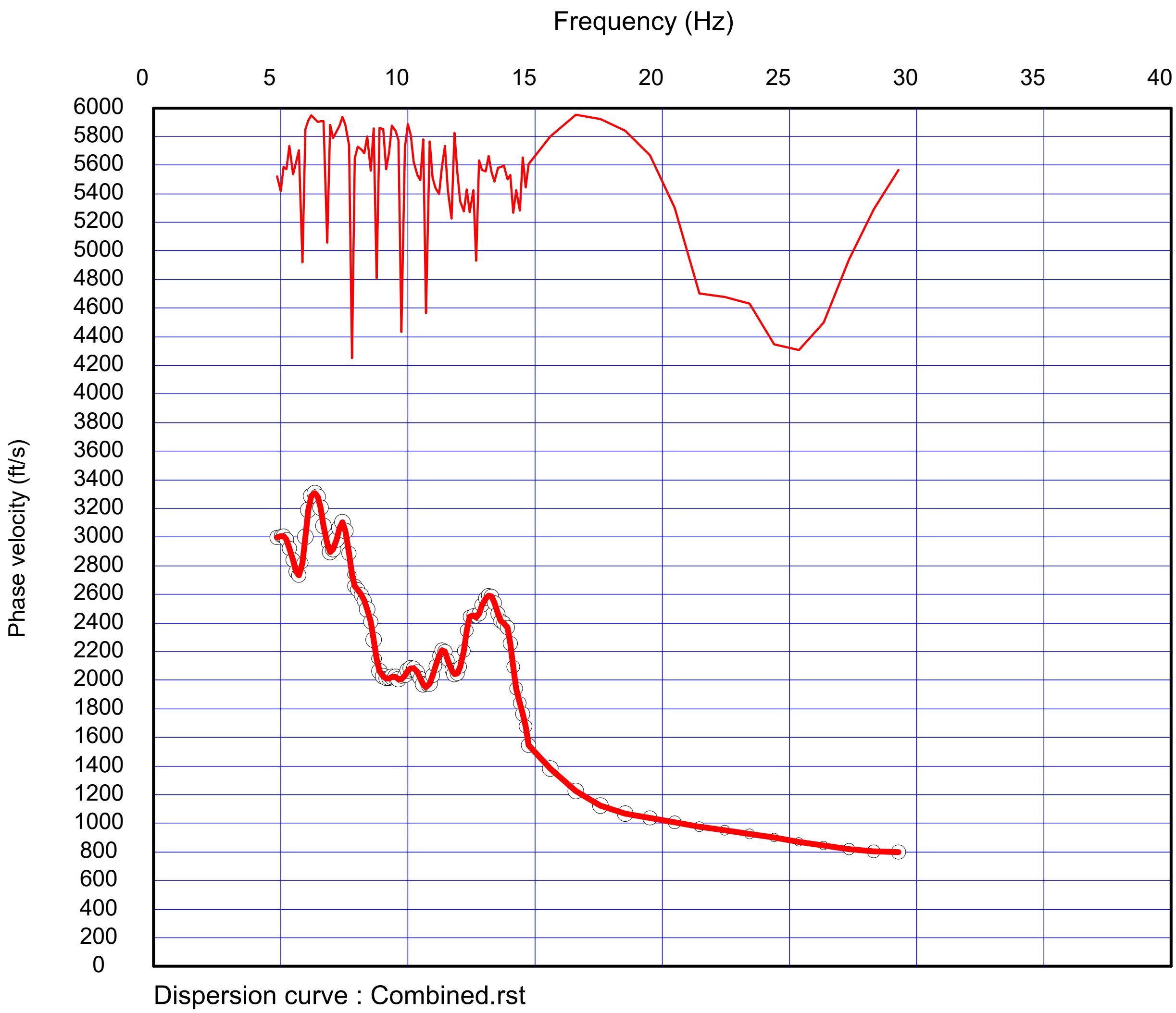
SEISMIC LINE SW-1

SHEAR-WAVE MODEL



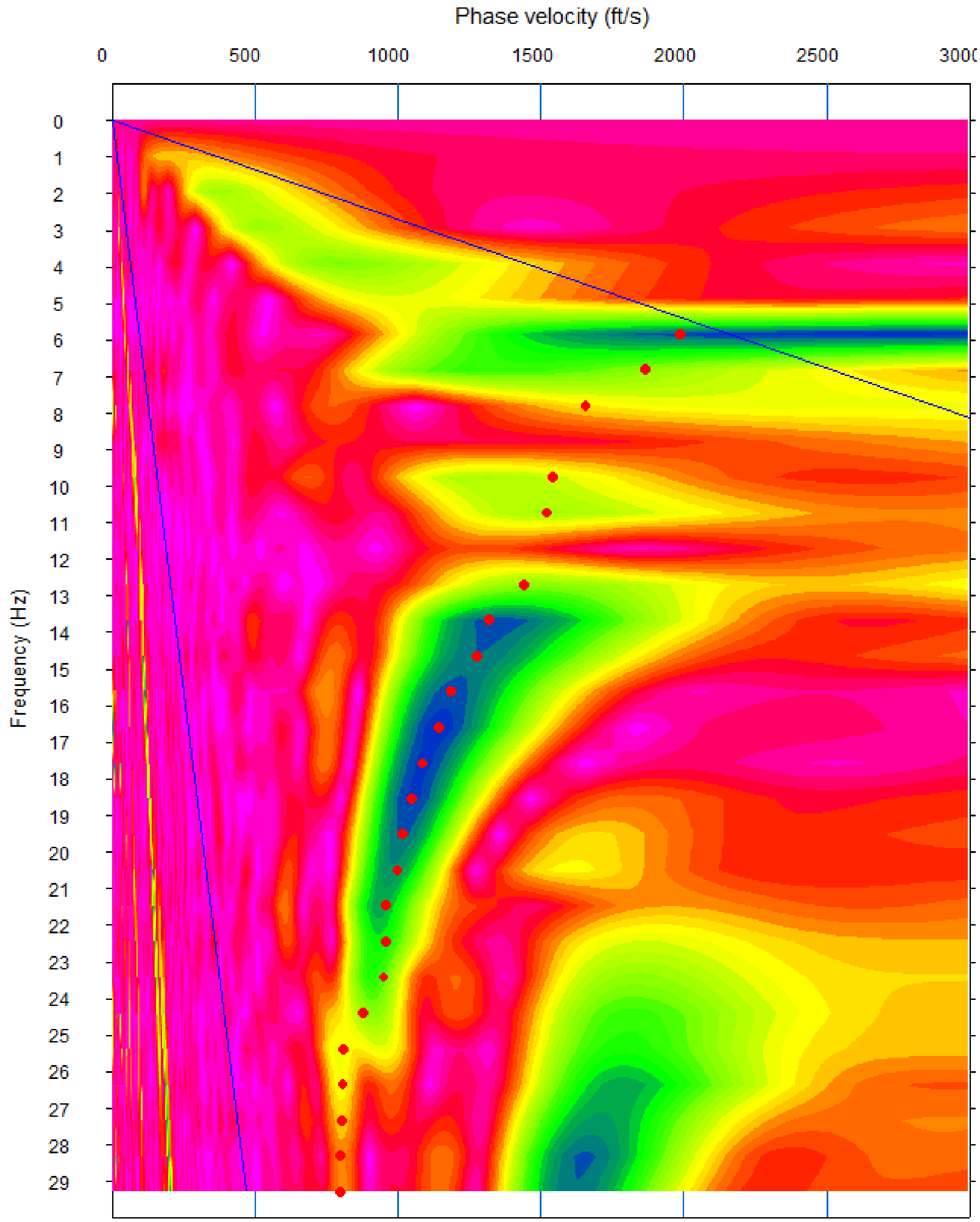
S-wave velocity model (inverted): Final.rst **Average Vs 100ft = 1640.8 ft/sec**

SHEAR-WAVE MODEL SW-1



COMBINED DISPERSION CURVE

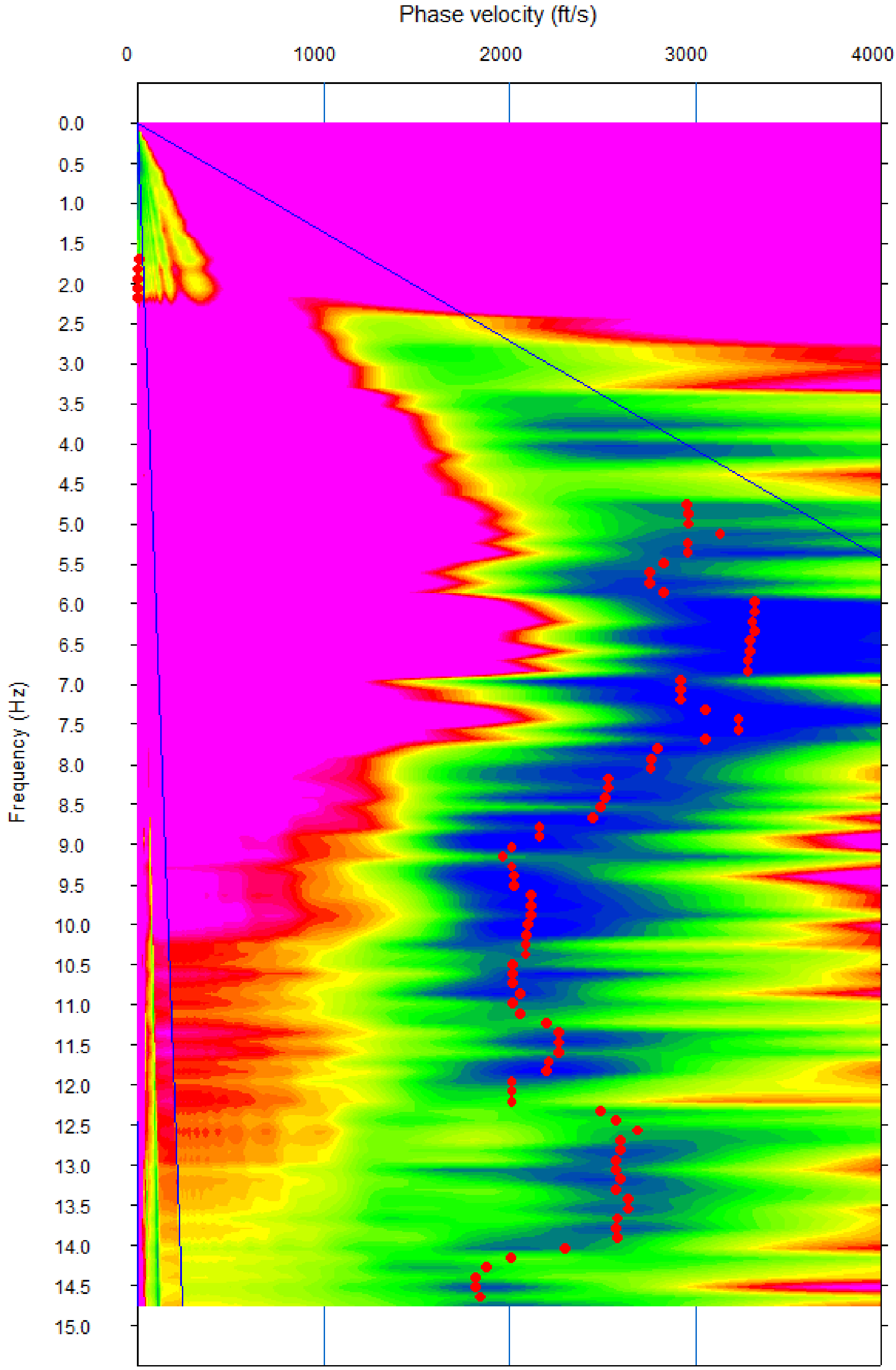
SEISMIC LINE SW-1



Dispersion Curve: Active.dat

ACTIVE DISPERSION CURVE

SEISMIC LINE SW-1



Dispersion Curve: Passive.dat

PASSIVE DISPERSION CURVE

APPENDIX B

REFERENCES

REFERENCES

American Society of Civil Engineers (ASCE), 2017, Minimum Design Loads and Associated Criteria for Buildings and other Structures, ASCE Standard 7-16, 889pp.

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Park, C.B, Milner, R.D., Rynden, N., Xia, J., and Ivanov, J., 2005, Combined use of Active and Passive Surface Waves, *in*, Journal of Environmental and Engineering Geophysics, Volume 10, Issue 3, pp. 323-334.

APPENDIX G
STANDARD GRADING GUIDELINES

TGR GEOTECHNICAL
DBE & 8(a) firm
3037 S. HARBOR BLVD
SANTA ANA, CA 92704
P 714.641.7189 F 714.641.7190
www.tgrgeotech.com

STANDARD GRADING SPECIFICATIONS

These specifications present the usual and minimum requirements for grading operations performed under the observation and testing of TGR Geotechnical, Inc.

No deviation from these specifications will be allowed, except where specifically superseded in the Preliminary Geotechnical Investigation report, or in other written communication signed by the Soils Engineer or Engineering Geologist.

1.0 GENERAL

- The Soils Engineer and Engineering Geologist are the Owner's or Builder's representatives on the project. For the purpose of these specifications, observation and testing by the Soils Engineer includes that observation and testing performed by any person or persons employed by, and responsible to, the licensed Geotechnical Engineer or Geologist signing the grading report.

- All clearing, site preparation or earthwork performed on the project shall be conducted by the Contractor under the observation of the Geotechnical Engineer.

- It is the Contractor's responsibility to prepare the ground surface to receive the fills to the satisfaction of the Geotechnical Engineer and to place, spread, mix, water and compact the fill in accordance with the specifications of the Geotechnical Engineer. The Contractor shall also remove all material considered unsatisfactory by the Geotechnical Engineer.

- It is also the Contractor's responsibility to have suitable and sufficient compaction equipment on the job site to handle the amount of fill being placed. If necessary, excavation equipment will be shut down to permit completion of Compaction. Sufficient watering apparatus will also be provided by the Contractor, with due consideration for the fill material, rate of placement and time of year.

- A final report will be issued by the Geotechnical Engineer and Engineering Geologist attesting to the Contractor's conformance with these specifications.

2.0 SITE PREPARATION

- All vegetation and deleterious material such as rubbish shall be disposed of off-site. The removal must be concluded prior to placing fill.

- The Civil Engineer shall locate all houses, sheds, sewage disposal systems, large trees or structures on the site, or on the grading plan to the best of his knowledge prior to preparing the ground surface.

- Soil, alluvium or rock materials determined by the Geotechnical Engineer as being unsuitable for placement in compacted fills shall be removed and wasted from the site. Any material incorporated as part of a compacted fill must be approved by the Geotechnical Engineer.

- After the ground surface to receive fill has been cleared, it shall be scarified, disced or bladed by the Contractor until it is uniform and free from ruts, hollows, hummocks or other uneven features which may prevent uniform compaction.

  The scarified ground surface shall then be brought to optimum moisture content, mixed as required, and compacted as specified. If the scarified zone is greater than twelve inches in depth, the excess shall be removed and placed in lifts restricted to six inches. Prior to placing fill, the ground surface to receive fill shall be inspected, tested and approved by the Geotechnical Engineer.

- Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipe lines or others not located prior to grading are to be removed or treated in a manner prescribed by the Geotechnical Engineer.

3.0 COMPACTED FILLS

- Any material imported or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable by the Geotechnical Engineer. Roots, tree branches and other matter missed during clearing shall be removed from the fill as directed by the Geotechnical Engineer.
- Rock fragments less than six inches in diameter may be utilized in the fill, provided:

  - ■ They are not placed in concentrated pockets.
  - ■ There is a sufficient percentage of fine-grained material to surround the rocks.
  - ■ The distribution of the rocks is observed by the Geotechnical Engineer.

- Rocks greater than six inches in diameter shall be taken off-site, or placed in accordance with the recommendations of the Geotechnical Engineer in areas designated as suitable for rock disposal. Details for rock disposal such as location, moisture control, percentage of the rock placed, etc., will be referred to in the "Conclusions and Recommendations" section of the Geotechnical Report, if applicable.

  If rocks greater than six inches in diameter were not anticipated in the Preliminary Geotechnical report, rock disposal recommendations may not have been made in the "Conclusions and Recommendations" section. In this case, the Contractor shall notify the Geotechnical Engineer if rocks greater than six inches in diameter are encountered. The Geotechnical Engineer will then prepare a rock disposal recommendation or request that such rocks be taken off-site.

- Material that is spongy, subject to decay, or otherwise considered unsuitable shall not be used in the compacted fill.

- Representative samples of materials to be utilized as compacted fill shall be analyzed in the laboratory by the Geotechnical Engineer to determine their physical properties. If any material other than that previously tested is encountered during grading, the appropriate analysis of this material shall be conducted by the Geotechnical Engineer as soon as possible.

- Material used in the compacting process shall be evenly spread, watered or dried, processed and compacted in thin lifts not to exceed six inches in thickness to obtain a uniformly dense layer. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer.

- If the moisture content or relative compaction varies from that required by the Geotechnical Engineer, the Contractor shall rework the fill until it is approved by the Geotechnical Engineer.

- Each layer shall be compacted to 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency; (in general, ASTM D1557 will be used.)

  If compaction to a lesser percentage is authorized by the controlling governmental agency because of a specific land use of expansive soil conditions, the area to receive fill compacted to less than 90 percent shall either be delineated on the grading plan or appropriate reference made to the area in the grading report.

- All fill shall be keyed and benched through all topsoil, colluvium, alluvium or creep material, into sound bedrock or firm material where the slope receiving fill exceeds a ratio of five horizontal to one vertical, in accordance with the recommendations of the Geotechnical Engineer.

- The key for side hill fills shall be a minimum of 15 feet within bedrock or firm materials, unless otherwise specified in the Preliminary report. (See details)

- Drainage terraces and subdrainage devices shall be constructed in compliance with the ordinances of the controlling governmental agency, or with the recommendation of the Geotechnical Engineer and Engineer Geologist.

- The Contractor will be required to obtain a minimum relative compaction of 90 percent out to the finish slope face of fill slopes, buttresses and stabilization fills. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment, or by any other procedure which produces the required compaction.

The Contractor shall prepare a written detailed description of the method or methods he will employ to obtain the required slope compaction. Such documents shall be submitted to the Geotechnical Engineer for review and comments prior to the start of grading.

If a method other than overbuilding and cutting back to the compacted core is to be employed, slope tests will be made by the Geotechnical Engineer during construction of the slopes to determine if the required compaction is being achieved. Where failing tests occur or other field problems arise, the contractor will be notified by the Geotechnical Engineer.

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

- All fill slopes should be planted or protected from erosion by methods specified in the preliminary report or by means approved by the governing authorities.

- Fill-over-cut slopes shall be properly keyed through topsoil, colluvium or creep material into rock or firm materials; and the transition shall be stripped of all soil prior to placing fill. (See detail)

4.0 CUT SLOPES

- The Engineering Geologist shall inspect all cut slopes excavated in rock, lithified or formation material at vertical intervals not exceeding ten feet.

- If any conditions not anticipated in the preliminary report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or fault planes are encountered during grading, these conditions shall be analyzed by the Engineering Geologist and Geotechnical Engineer; and recommendations shall be made to treat these problems.

- Cut slopes that face in the same direction as the prevailing drainage shall be protected from slope wash by a non-erosive interceptor swale placed at the top of the slope.

- Unless otherwise specified in the soils and geological report, no cut slopes shall be excavated higher or steeper than that allowed by the ordinances of controlling governmental agencies.

- Drainage terraces shall be constructed in compliance with the ordinances of controlling governmental agencies, or with the recommendations of the Geotechnical Engineer or Engineering Geologist.

5.0 GRADING CONTROL

- Inspection of the fill placement shall be provided by the Geotechnical Engineer during the progress of grading.

- In general, density tests should be made at intervals not exceeding two feet of fill height or every 500 cubic yards of fill placed. This criteria will vary depending on soil conditions and the size of the job. In any event, an adequate number of field density tests shall be made to verify that the required compaction of being achieved.
- Density tests should be made on the surface material to receive fill as required by the Geotechnical Engineer.

- All cleanout, processed ground to receive fill, key excavations, subdrains and rock disposal must be inspected and approved by the Geotechnical Engineer (and often by the governing authorities) prior to placing any fill. It shall be the Contractor's responsibility to notify the Geotechnical Engineer and governing authorities when such areas are ready for inspection.

6.0 CONSTRUCTION CONSIDERATIONS

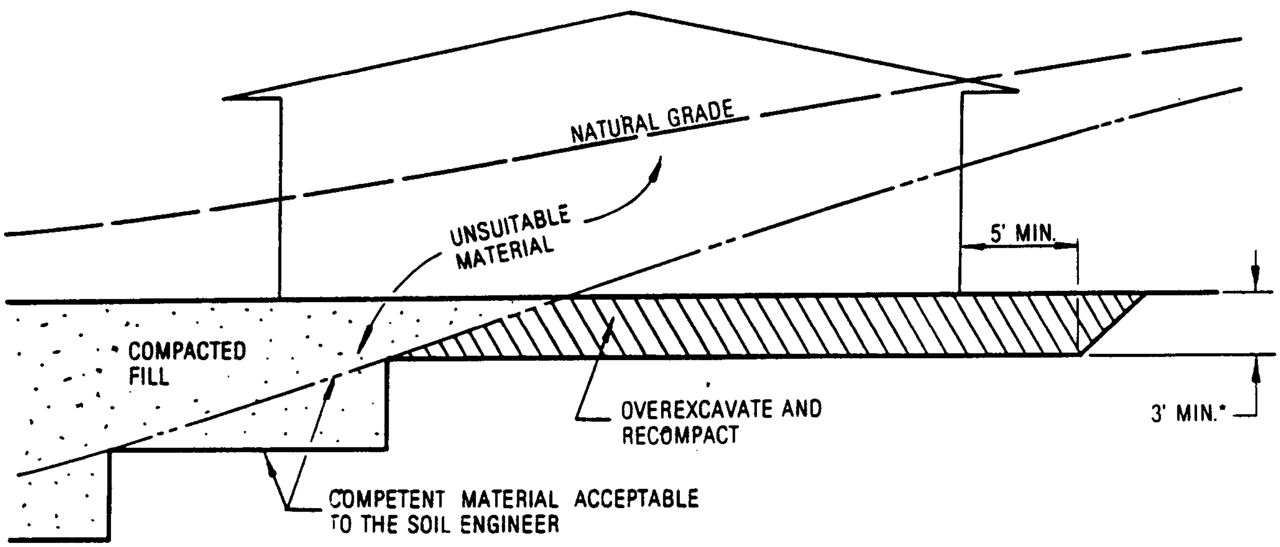
- Erosion control measures, when necessary, shall be provided by the Contractor during grading and prior to the completion and construction of permanent drainage controls.

- Upon completion of grading and termination of observations by the Geotechnical Engineer, no further filling or excavating, including that necessary for footings, foundations, large tree wells, retaining walls, or other features shall be performed without the approval of the Geotechnical Engineer or Engineering Geologist.

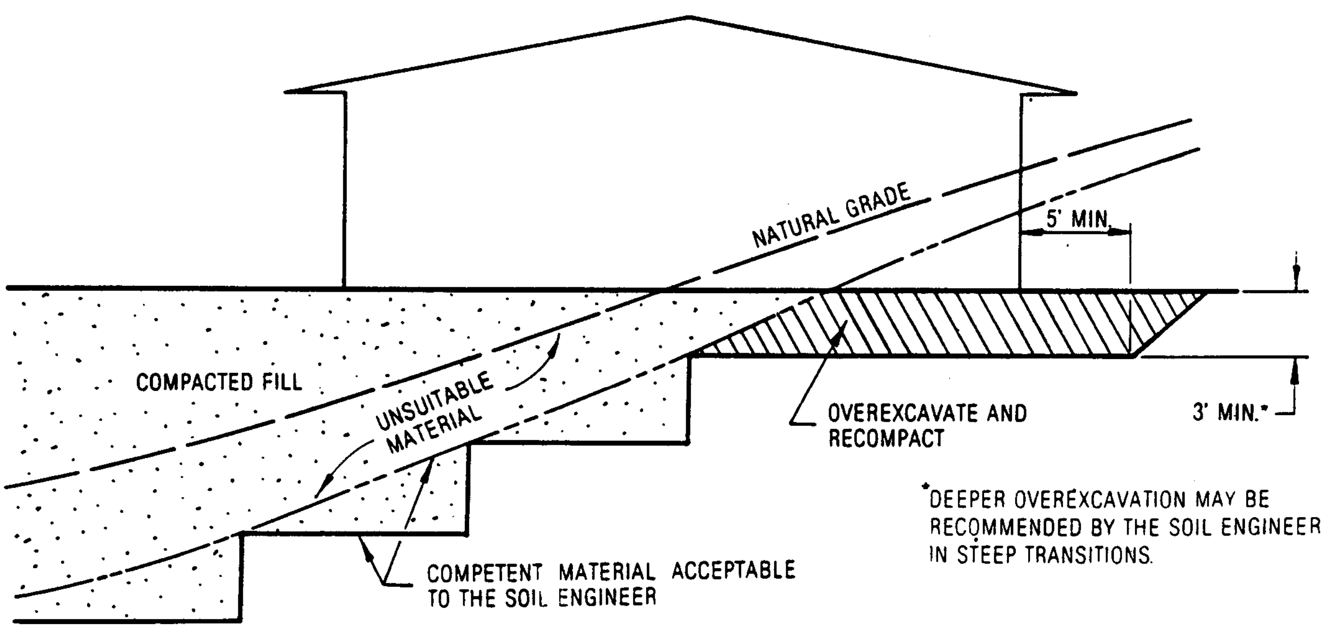
- Care shall be taken by the Contractor during final grading to preserve any berms, drainage terraces, interceptor swales, or other devices of a permanent nature on or adjacent to the property.

TYPICAL OVEREXCAVATION OF DAYLIGHT LINE

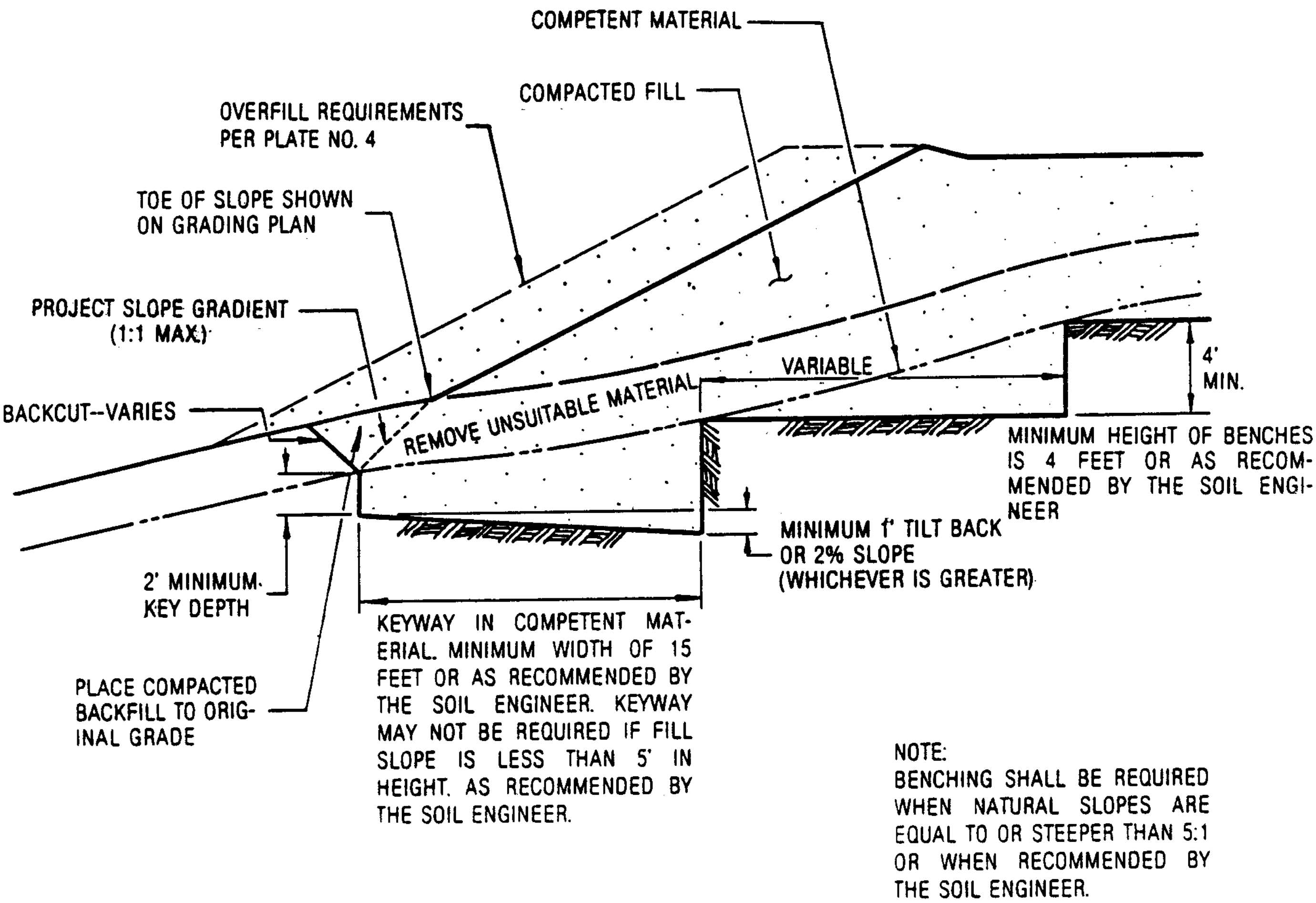
CUT LOT



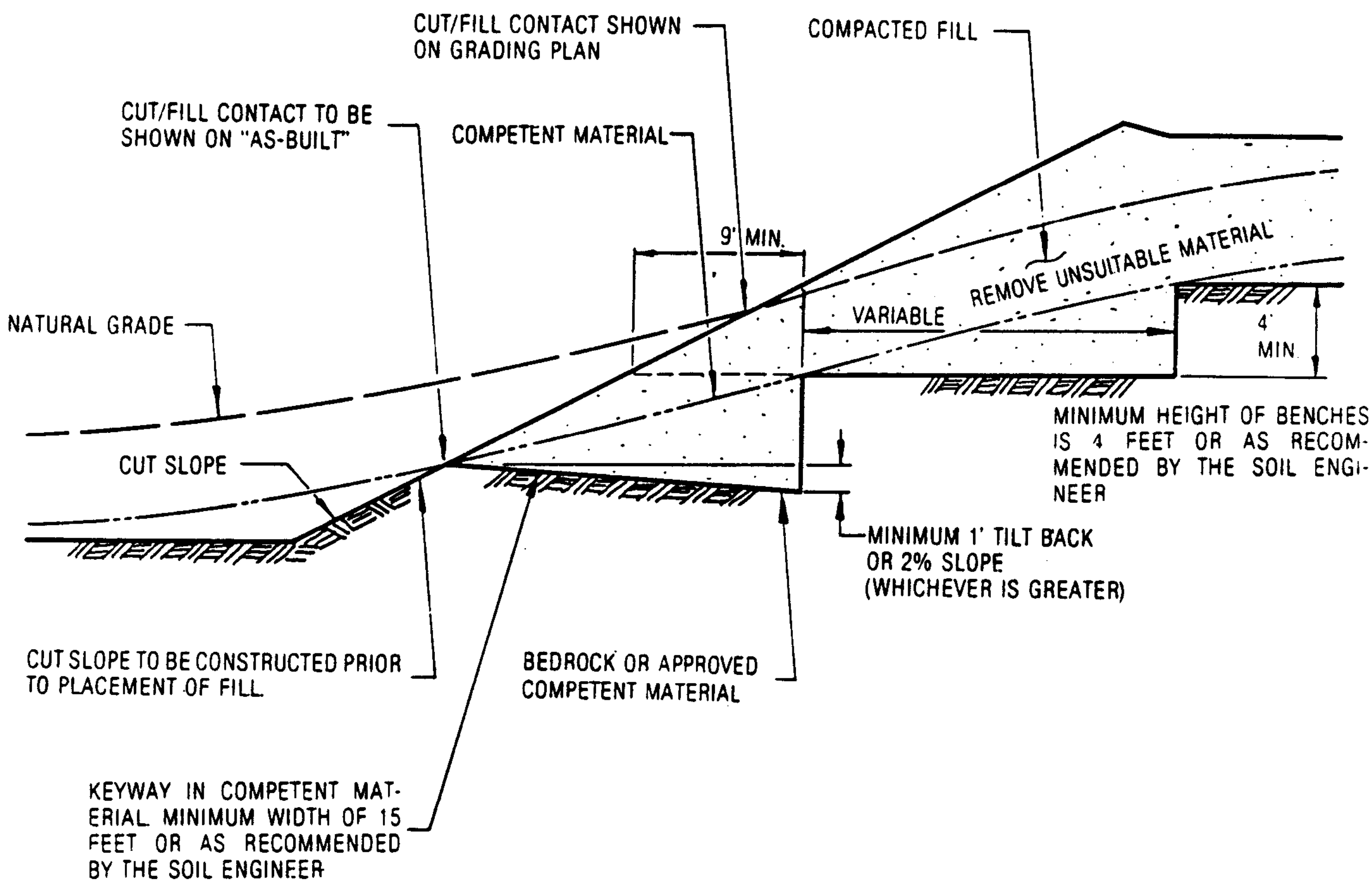
CUT FILL LOT (TRANSITION)



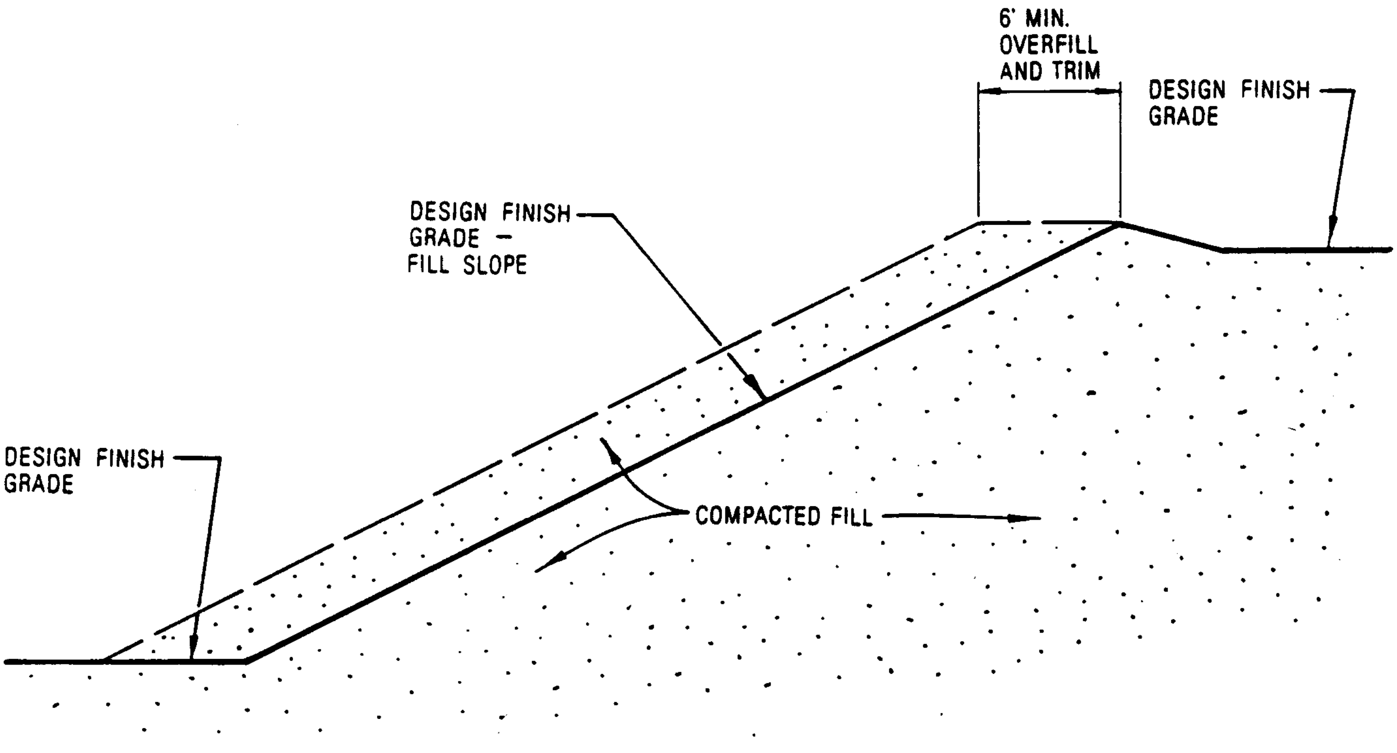
TYPICAL FILL OVER NATURAL SLOPE



TYPICAL FILL-OVER-CUT SLOPE



TYPICAL FILL SLOPE CONSTRUCTION



NOTES:

1. ALL FILL SLOPES, INCLUDING BUTTRESS AND STABILIZATION FILLS, SHALL BE OVERFILLED A MINIMUM OF SIX FEET HORIZONTALLY WITH COMPACTED FILL AND TRIMMED TO THE DESIGN FINISH GRADE.

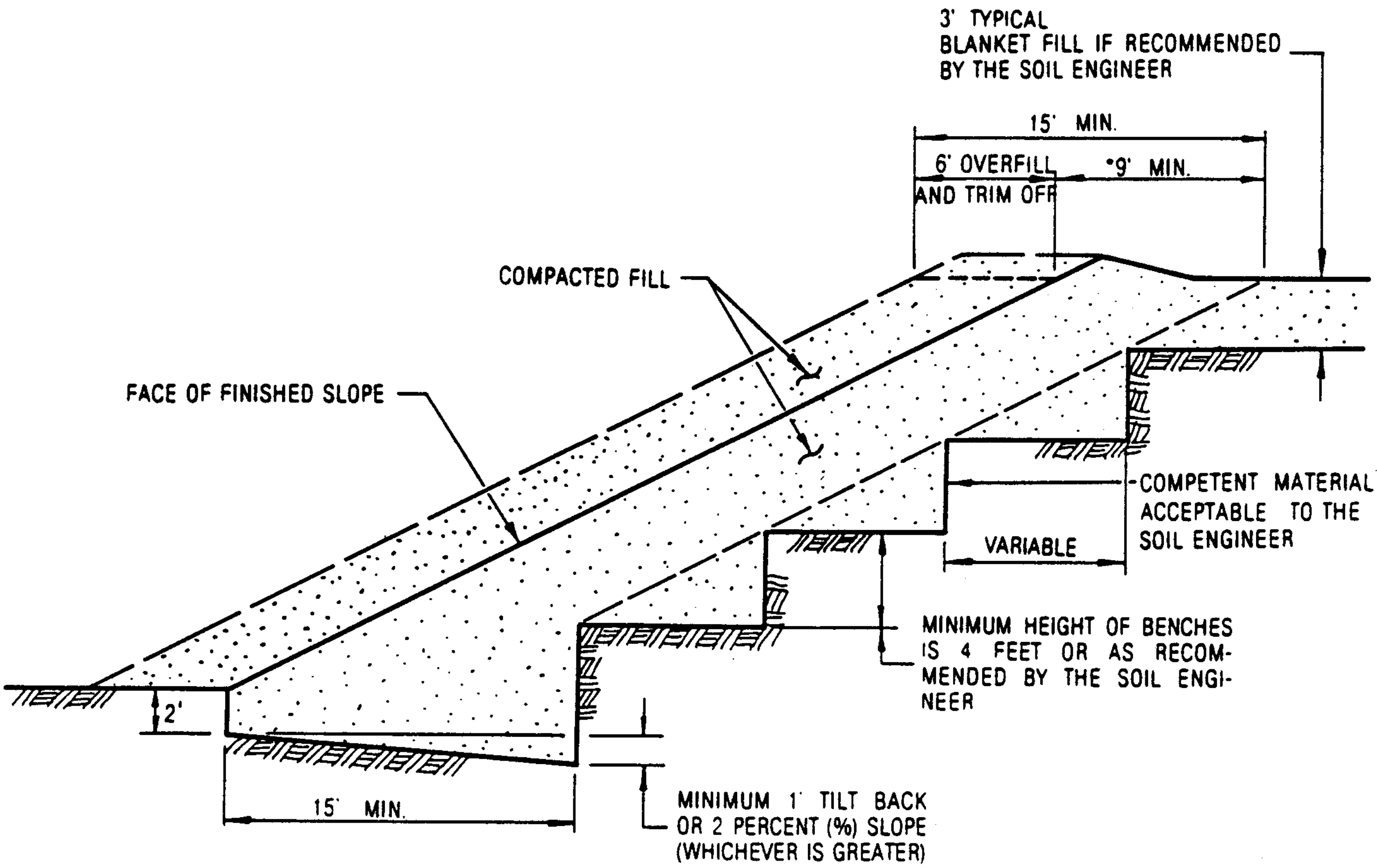
   EXCEPTIONS:

   A. FILL SLOPE OVER CUT SLOPE.

   B. FILL SLOPE ADJACENT TO EXISTING IMPROVEMENTS.

2. THE EXCEPTIONS ABOVE WHICH DO NOT HAVE THE 6 FOOT SLOPE OVERFILL AND TRIM SHALL BE COMPACTED AS STATED IN THE PROJECT SPECIFICATIONS.

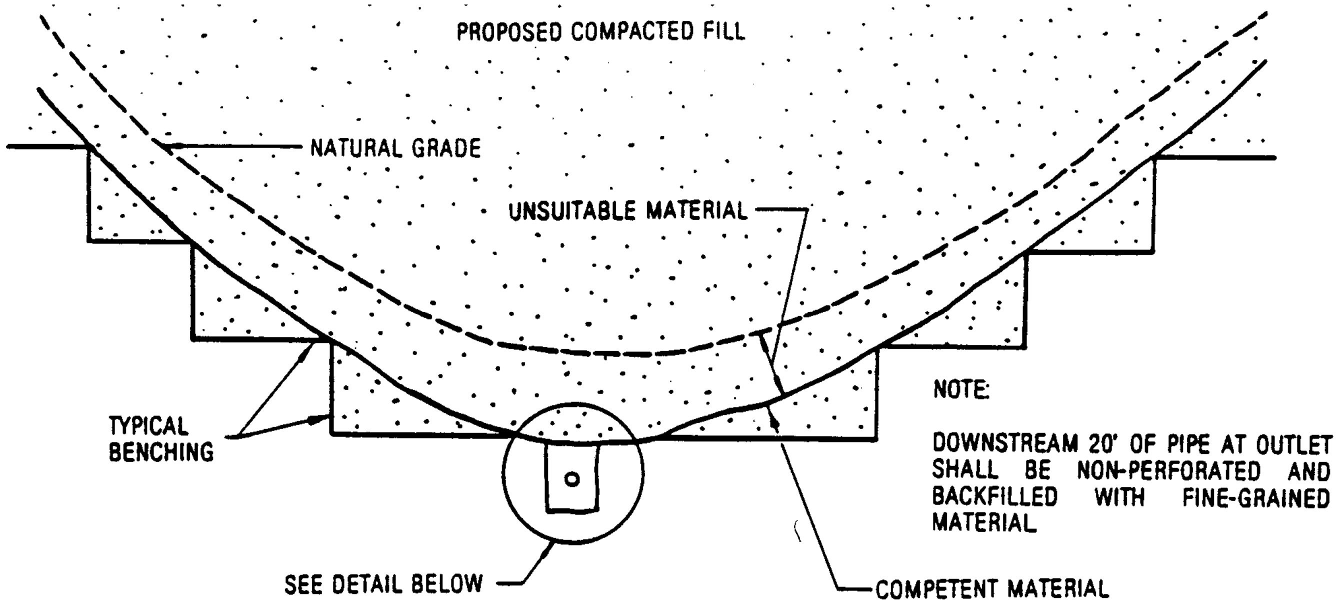
TYPICAL STABILIZATION FILL



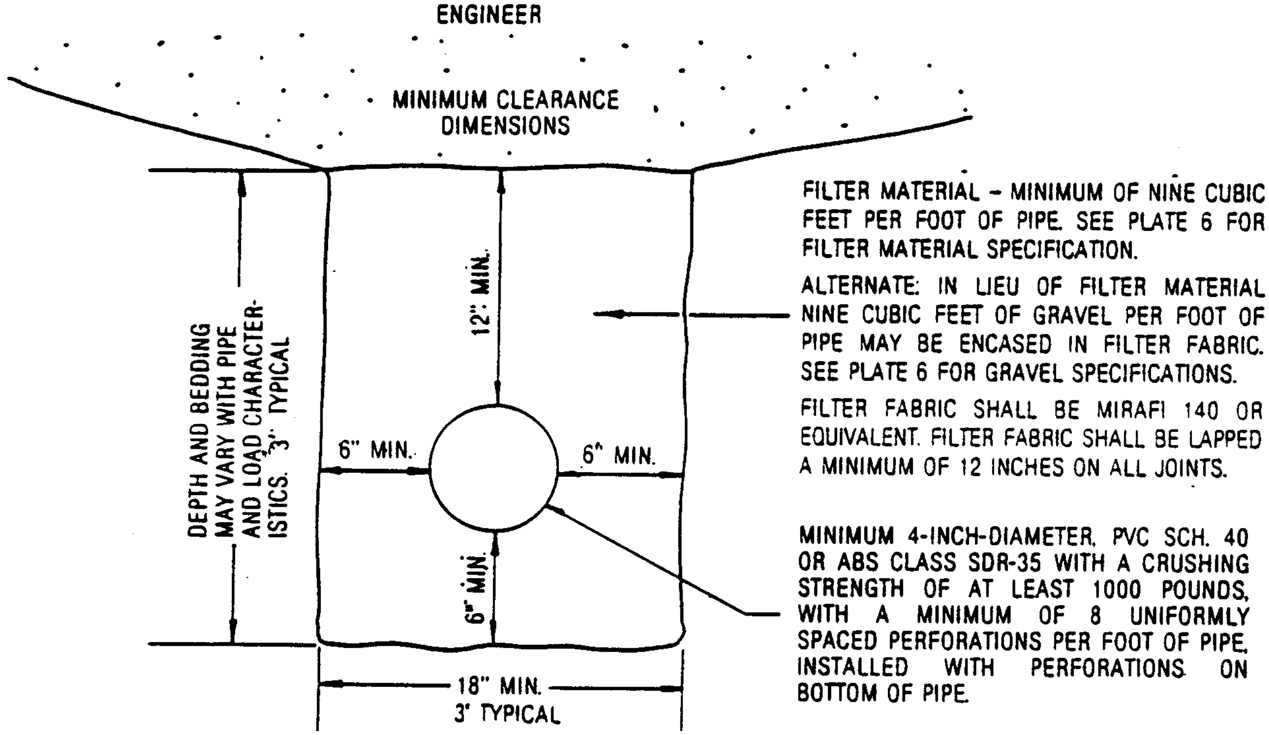
NOTE:
SEE PLATE 6 FOR TYPICAL SUBDRAIN DETAILS FOR STABILIZATION FILLS, IF RECOMMENDED BY THE SOIL ENGINEER.

*GREATER THAN 9' IF RECOMMENDED BY THE SOIL ENGINEER: 15' WHERE NO 6' OVERFILL

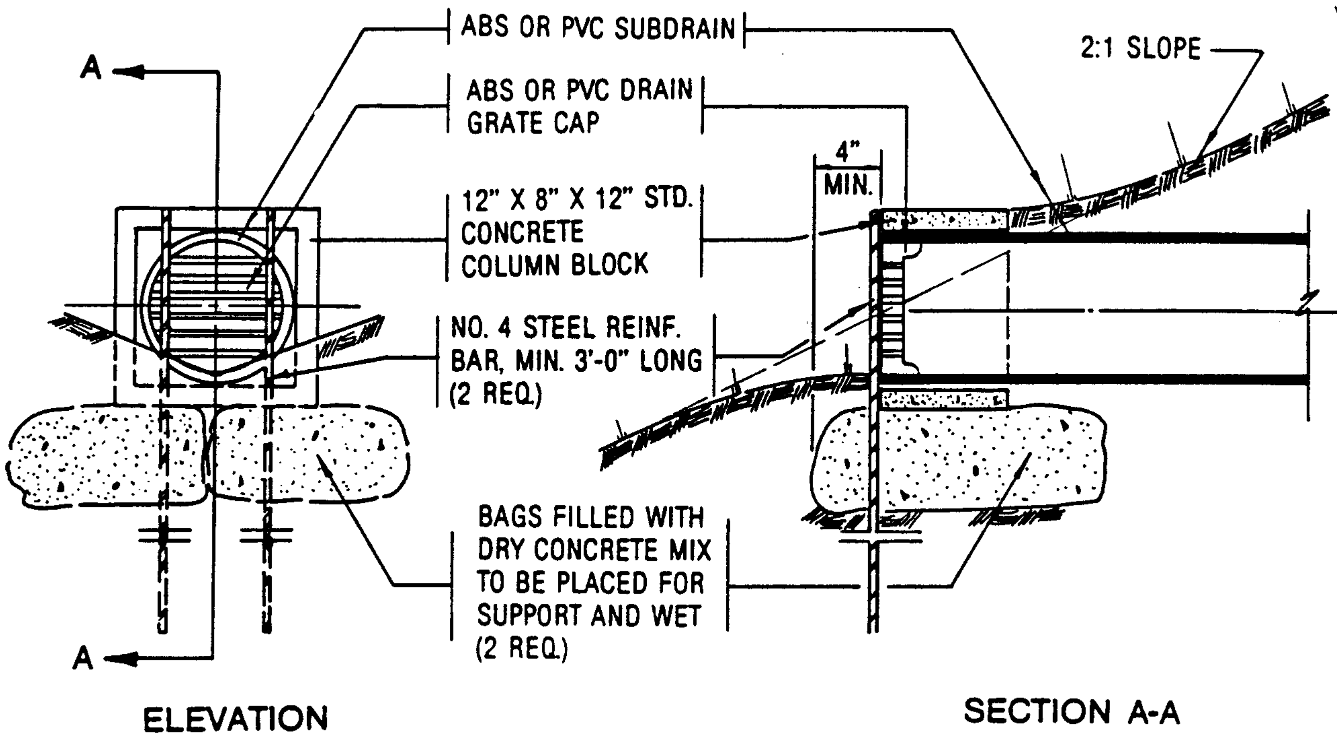
TYPICAL CANYON SUBDRAIN



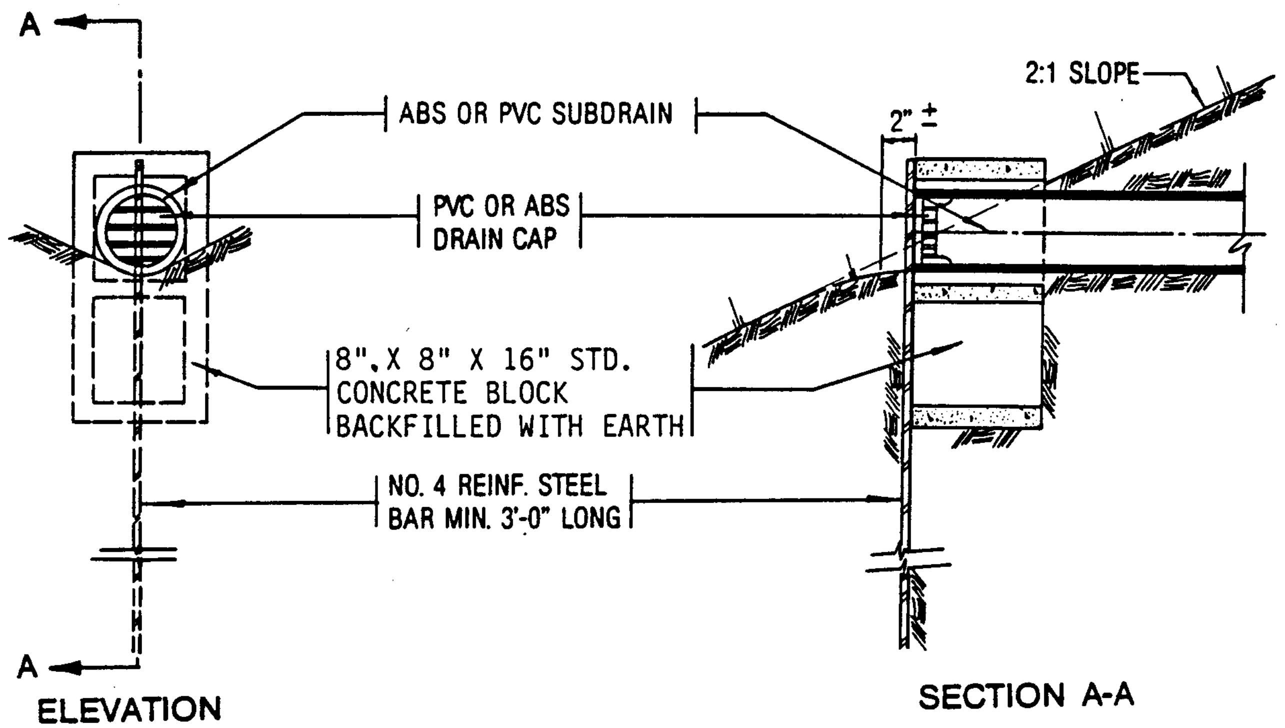
NOTES:
PIPE SHALL BE A MINIMUM OF 4 INCHES DIAMETER AND RUNS OF 500 FEET OR MORE USE 6-INCH DIAMETER PIPE, OR AS RECOMMENDED BY THE SOIL ENGINEER



SUBDRAIN OUTLET MARKER

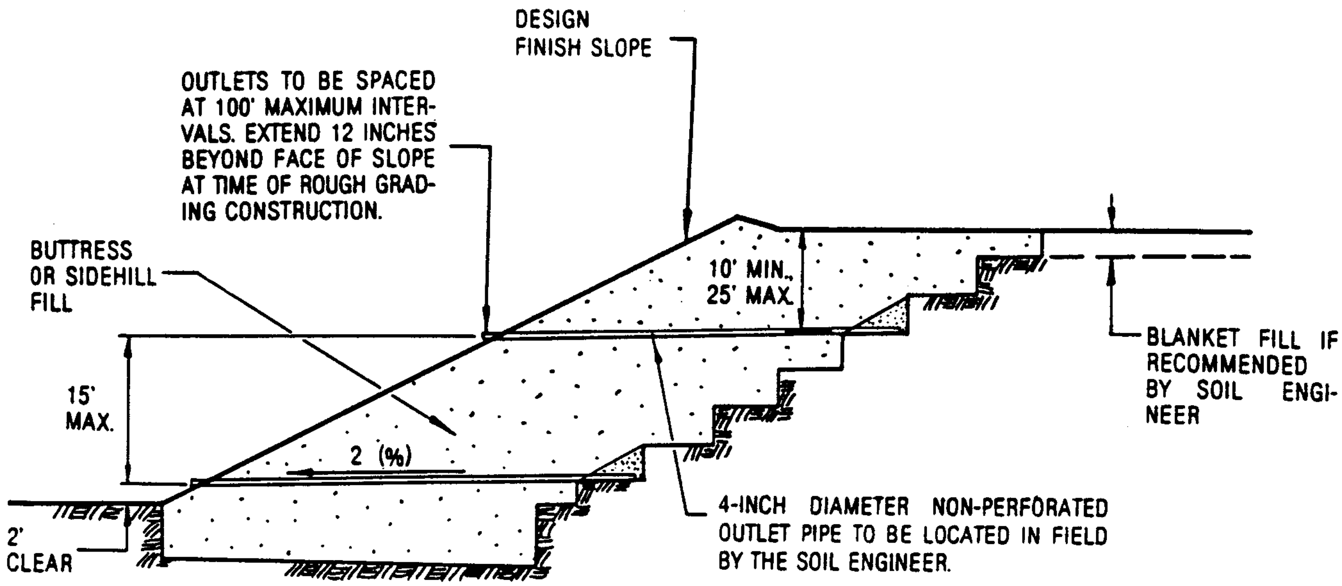


SUBDRAIN OUTLET MARKER FOR 6" AND 8" PIPES



SUBDRAIN OUTLET MARKER – 4" PIPE

TYPICAL STABILIZATION AND BUTTRESS FILL SUBDRAIN



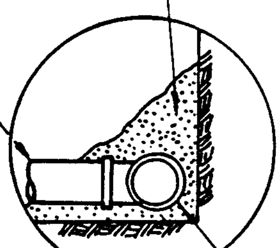
FILTER MATERIAL" TO MEET FOLLOWING SPECIFI-
ATION OR APPROVED EQUIVALENT: (CONFORMS TO
MA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR
APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1½"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

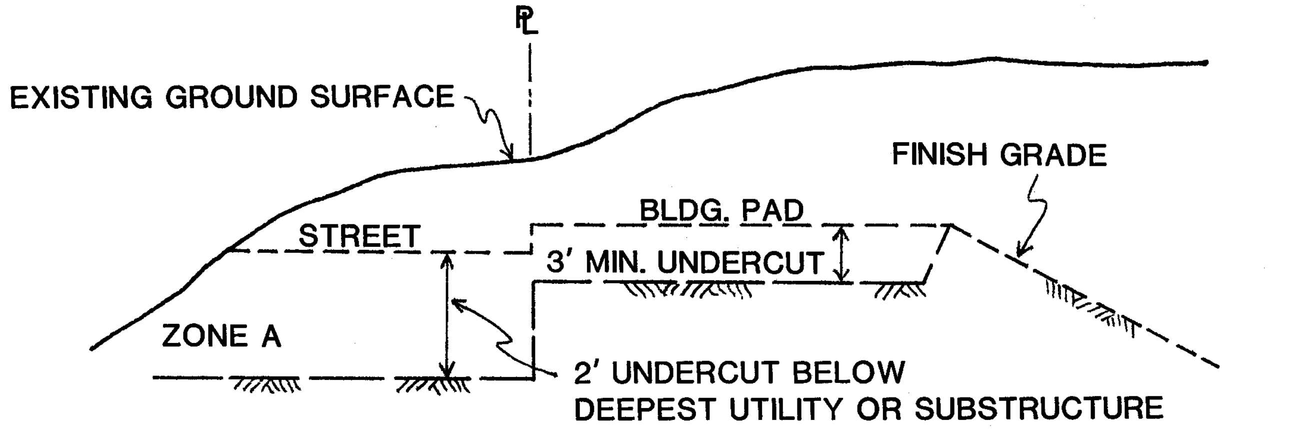


NOTES:

1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

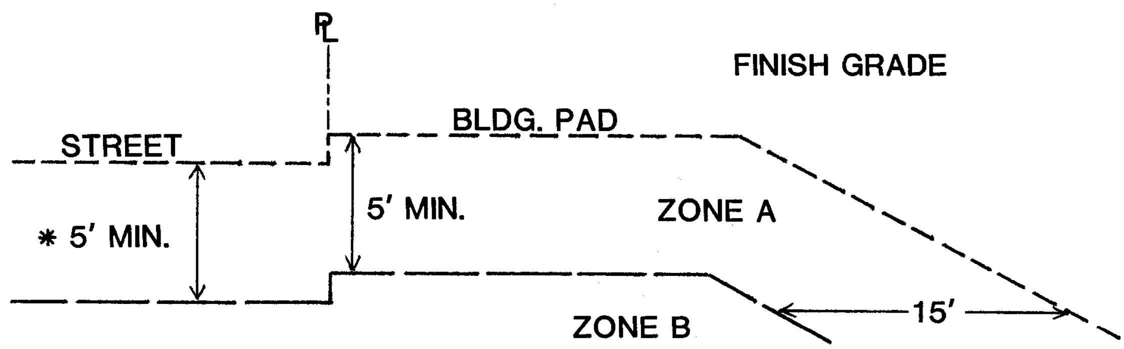
TYPICAL CUT AND FILL GRADING DETAILS

TYPICAL GRADING WITHIN PROPOSED DEEP BEDROCK CUT AREAS



NO SCALE

TYPICAL GRADING WITHIN PROPOSED FILL AREAS



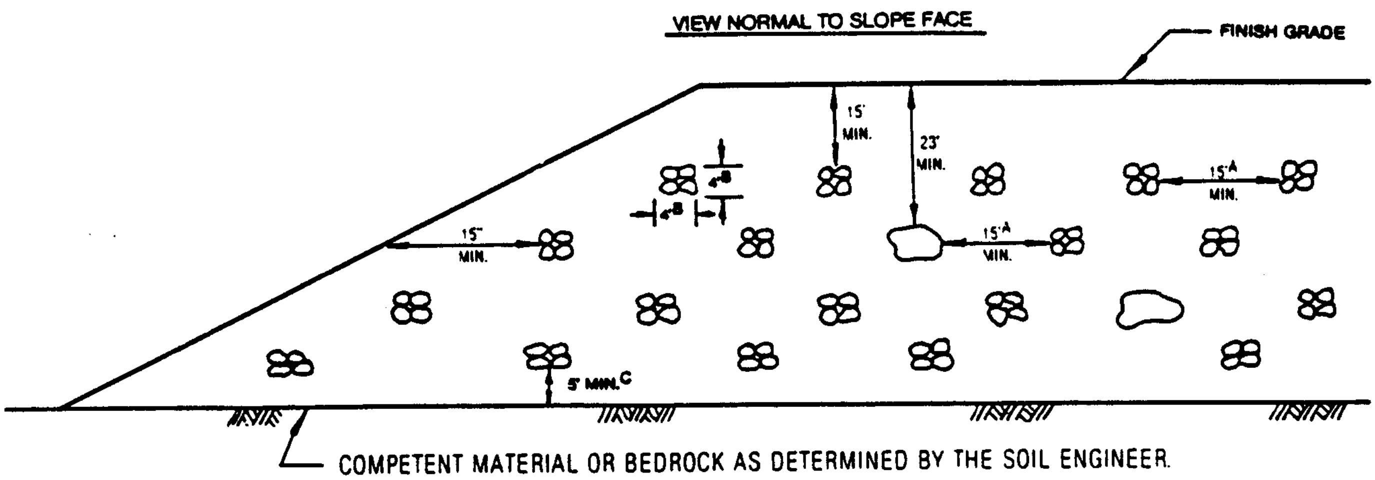
LEGEND

ZONE A ......"SOIL" FILL PLACED IN ACCORDANCE WITH THE RECOMMENDATIONS PRESENTED IN SECTION 11.2.3 OF THIS REPORT

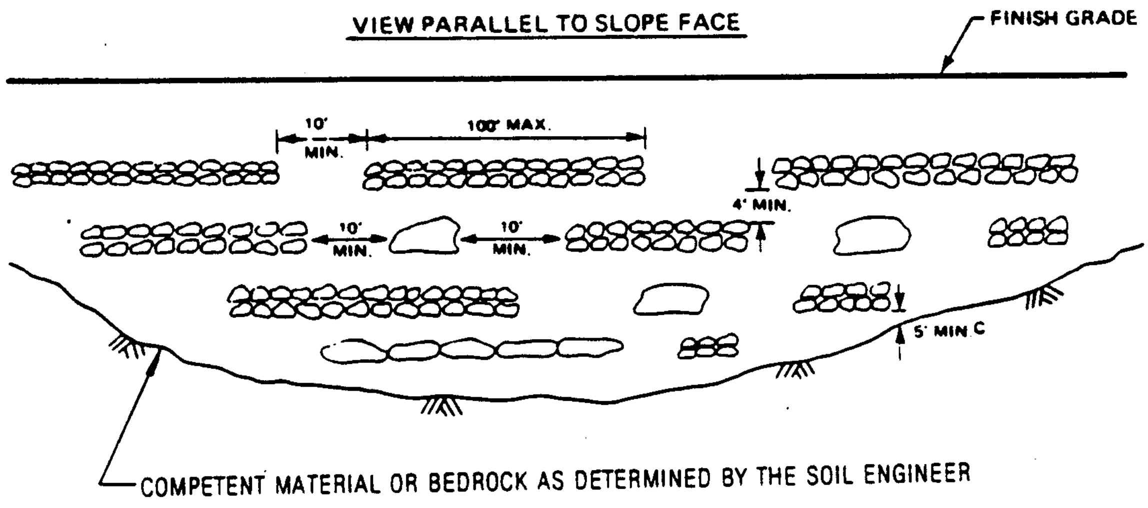
ZONE B ......"SOIL-ROCK" AND/OR "ROCK" FILL PLACED IN ACCORDANCE WITH THE RECOMMENDATIONS PRESENTED IN SECTION 11.2.3 OF THIS REPORT

* 5' OR 1' BELOW DEEPEST UTILITY, WHICHEVER IS GREATER

TYPICAL OVERSIZE ROCK DISPOSAL – "SOIL-ROCK" FILL



NOTE:
ORIENTATION OF WINDROWS MAY VARY BUT SHALL BE AS RECOMMENDED BY SOIL ENGINEER.



NOTES:

A. ONE EQUIPMENT WIDTH OR A MINIMUM OF 15 FEET.
B. HEIGHT AND WIDTH MAY VARY DEPENDING ON ROCK SIZE AND TYPE OF EQUIPMENT.
C. IF APPROVED BY THE SOIL ENGINEER, WINDROWS MAY BE PLACED DIRECTLY ON COMPETENT MATERIALS OR BEDROCK PROVIDING ADEQUATE SPACE IS AVAILABLE FOR COMPACTION.
D. VOIDS IN WINDROW TO BE FILLED BY FLOODING GRANULAR SOIL INTO PLACE. GRANULAR SOIL SHALL MEAN ANY SOIL WHICH HAS A UNIFIED SOIL CLASSIFICATION SYSTEM (UBC 29-1) DESIGNATION OF SM, SP, SW, GM, GP, OR GW.
E. AFTER FILL BETWEEN WINDROWS IS PLACED AND COMPACTED WITH THE LIFT OF FILL COVERING WINDROW, WINDROW SHALL BE PROOF-ROLLED WITH D-9 DOZER OR EQUIVALENT.
F. OVERSIZED ROCK IS DEFINED AS LARGER THAN 12" IN SIZE.