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SALEM
engineering group, inc.

LIMITED GEOTECHNICAL ENGINEERING EVALUATION

PROPOSED PERFORMING ARTS CENTER
HISTORIC TOWN CENTER PARK
SAN JUAN CAPISTRANO, CALIFORNIA

SALEM PROJECT NO. 3-222-0086
JANUARY 31, 2022

PREPARED FOR:

MS. LOU MOORE
SAN JUAN CAPISTRANO PERFORMING ARTS CENTER
31791 LOS RIOS STREET
SAN JUAN CAPISTRANO, CA 92675

PREPARED BY:

SALEM ENGINEERING GROUP, INC.
8711 MONROE COURT, SUITE A
RANCHO CUCAMONGA, CA 91730
P: (909) 980-6455
F: (909) 980-6435
www.salem.net

SALEM engineering group, inc.

8711 Monroe Court, Suite A
Rancho Cucamonga, CA 91730
Phone (909) 980-6455
Fax (909) 980-6435

January 31, 2022 Project No. 3-222-0086

Ms. Lou Moore
San Juan Capistrano Performing Arts Center
31791 Los Rios Street
San Juan Capistrano, CA 92675

SUBJECT: LIMITED GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED PERFORMING ARTS CENTER
HISTORIC TOWN CENTER PARK
SAN JUAN CAPISTRANO, CALIFORNIA

Dear Ms. Moore:

At your request and authorization, SALEM Engineering Group, Inc. (SALEM) has prepared this Limited Geotechnical Engineering Evaluation report for the Proposed Performing Arts Center to be located at the subject site.

The accompanying report presents our limited geotechnical engineering evaluation of the site based on the geotechnical engineering investigation reports adjacent to the subject site without any field exploration or testing. The evaluation report cannot be used for design or construction of the proposed development.

We appreciate the opportunity to assist you with this project. Should you have questions regarding this report or need additional information, please contact the undersigned at (909) 980-6455.

Respectfully Submitted,

SALEM ENGINEERING GROUP, INC.

Clarence Jiang, GE
Senior Geotechnical Engineer
RGE 2477

R. Sammy Salem, MS, PE, GE
Principal Engineer
RCE 52762 / RGE 2549

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SALEM engineering group, inc.

8711 Monroe Court, Suite A
Rancho Cucamonga, CA 91730
Phone (909) 980-6455
Fax (909) 980-6435

LIMITED GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED PERFORMING ARTS CENTER
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SAN JUAN CAPISTRANO, CALIFORNIA

1. PURPOSE AND SCOPE

This report presents the results of our Limited Geotechnical Engineering Evaluation for the Proposed Performing Arts Center to be located in the City of San Juan Capistrano, California (see Figure 1, Vicinity Map). The purpose of our Limited Geotechnical Engineering Evaluation was to provide preliminary conclusions and recommendations relative to the geotechnical aspects of constructing the project as presently proposed based on the geotechnical reports prepared for the adjacent sites. A complete geotechnical investigation with field exploration, laboratory testing and data analysis should be performed for the final design and construction of the proposed development.

The subject site is located between the Forster project (SALEM Project # 3-220-514) and Ortega project (SALEM Project # 3-220-0906). The Foster project is located at the southeast corner of Camino Capistrano and Forster Street in the City of San Juan Capistrano and the addresses are 31872, 31878, 31882 Camino Capistrano. The Foster project was drilled on July 9, 2020 and included nine (9) small-diameter soil borings to a maximum depth of 36½ feet at the site.

The Ortega project is located at the southeast corner of the intersection of El Camino Real and Ortega Highway in the City of San Juan Capistrano, California. The address of the site is 31776 El Camino Real. The Ortega project was drilled on October 23, 2020 and included nine (9) small-diameter soil borings to a maximum depth of 14 feet at the site.

The locations of the soil borings (18 borings) are depicted on Figure 2, Site Plan. The exploratory boring logs from Foster and Ortega projects are presented in Appendix A. Laboratory tests from Foster and Ortega projects are presented in Appendix B. The recommendations presented herein are based on the data obtained from the adjacent sites and our experience with similar soil and geologic conditions. If project details vary significantly from those described herein, SALEM should be contacted to determine the necessity for review and possible revision of this report. Earthwork and Pavement Specifications are presented in Appendix C. If text of the report conflict with the specifications in Appendix C, the recommendations in the text of the report have precedence.

2. PROJECT DESCRIPTION

Based on the information provided to us, we understand that the proposed development of the site will include construction of a Performing Arts Center within the eastern portion of the Historic Town Center Park. Maximum wall load is expected to be on the order of 4 kips per linear foot. Maximum column load is expected to be on the order of 80 kips. Floor slab soil bearing pressure is expected to be on the order of 150 psf. On-site parking and landscaping are planned to be associated with the development.

A grading plan was not available at the time of preparation of this report. As the site was relatively flat, we anticipate that cuts and fills during the earthwork will be minimal and limited to providing level building pads and positive site drainage. In the event that changes occur in the nature or design of the project, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions of our report are modified. The site configuration and locations of proposed improvements are shown on the Site Plan, Figure 2.

3. SITE LOCATION AND DESCRIPTION

The subject site is rectangular in shape and located at 31852 El Camino Real in the City of San Juan Capistrano, California (see Vicinity Plan, Figure 1). The site is currently a community park with grass, trees and limited amenities. The site relatively flat with no significant changes in grade. The average elevation of the site is approximately 112 feet above mean sea level (AMSL) based on Google Earth imagery.

4. FIELD EXPLORATION OF ADJACENT SITES

The exploratory test boring locations from the Forest site (B-1 through B-9) and Ortega site (B-1 through B-9) are shown on the Site Plan, Figure 2. For a more detailed description of the materials encountered, the Boring Logs in Appendix "A" should be consulted.

5. LABORATORY TESTING OF ADJACENTE SITES

The results of laboratory test from the Foster and Ortega projects are summarized in Appendix "B." This information, along with the field observations, was used to prepare the final boring logs in Appendix "A."

6. GEOLOGIC SETTING

The site is located within the Peninsular Ranges Geomorphic Province along the coastal strip of southern Orange County. The site is in the San Joaquin Hills which are comprised primarily of fine-grained sedimentary rocks of the Capistrano Formation and Monterey Formation and coarse grained rocks of the San Onofre Breccia and Topanga Formation. The site is located near the confluence of the Trabuco Creek and San Juan Creek. The earth materials onsite are comprised primarily of artificial fill and Quaternary age alluvium deposits. The alluvium deposits from the Trabuco Creek and San Juan Creek extend to a depth of up to 200 feet in the site vicinity.

7. GEOLOGIC HAZARDS

7.1 Faulting and Seismicity

Based on the proximity of several dominant active faults and seismogenic structures, as well as the historic seismic record, the area of the subject site is considered subject to relatively high seismicity. The seismic hazard most likely to impact the site is ground-shaking due to a large earthquake on one of the major active regional faults. Moderate to large earthquakes have affected the area of the subject site within historic time.

There are no known active fault traces in the project vicinity. The project area is not within an Alquist-Priolo Earthquake Fault (Special Studies) Zone and will not require a special site investigation by an Engineering Geologist. Soils on site are classified as Site Class D in accordance with Chapter 16 of the California Building Code. The proposed structures are determined to be in Seismic Design Category D.

To determine the distance of known active faults within 100 miles of the site, we used the United States Geological Survey (USGS) web-based application *2008 National Seismic Hazard Maps - Fault Parameters*. Site latitude is 33.4997° North; site longitude is 117.6614° West. The ten closest active faults are summarized below in Table 7.1.

TABLE 7.1
REGIONAL FAULT SUMMARY

Fault Name	Distance to Site (miles)	Maximum Earthquake Magnitude, M_w
Newport Inglewood Connected alt 1	5.7	7.5
San Joaquin Hills	6.7	7.1
Newport-Inglewood, alt 1	17.6	7.2
Elsinore; T+J+CM	19.4	7.6
Elsinore; W+GI+T+J+CM	20.2	7.9
Palos Verdes Connected	20.6	7.7
Coronado Bank	21.2	7.4
Chino, alt 2	23.0	6.8
Elsinore; W	23.0	7.0
Chino, alt 1	24.5	6.7

The faults tabulated above and numerous other faults in the region are sources of potential ground motion. However, earthquakes that might occur on other faults throughout California are also potential generators of significant ground motion and could subject the site to intense ground shaking.

7.2 Surface Fault Rupture

The site is not within a currently established State of California Earthquake Fault Zone for surface fault rupture hazards. No active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low.

7.3 Ground Shaking

Seismic coefficients and spectral response acceleration values were developed based on the 2019 California Building Code (CBC). The CBC methodology for determining design ground motion values is based on the Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps, which incorporate both probabilistic and deterministic seismic ground motion.

Based on the 2019 CBC, a Site Class D represents the on-site soil conditions with standard penetration resistance, N-values, averaging greater than 15 blow per foot but less than 50 blows per foot in the upper 100 feet below site grade. A table providing the recommended design acceleration parameters for the project site, based on a Site Class D designation, is included in Section 9.2.1 of this report. Based on the Office of Statewide Health Planning and Development (OHSPD) Seismic Design Maps, the estimated design peak ground acceleration adjusted for site class effects (PGA_M) was determined to be 0.553g (based on both probabilistic and deterministic seismic ground motion).

7.4 Liquefaction

The potential for soil liquefactions for the Foster and Ortega sites during a seismic event were calculated using LiqIT computer program (version 4.7.5) developed by GeoLogismiki of Greece. The liquefaction analyses are included in Appendix A.

7.5 Lateral Spreading

Lateral spreading is a phenomenon in which soils move laterally during seismic shaking and is often associated with liquefaction. The amount of movement depends on the soil strength, duration and intensity of seismic shaking, topography, and free face geometry. Due to the relatively flat site topography, we judge the likelihood of lateral spreading to be low.

7.6 Landslides

There are no known landslides at the site, nor is the site in the path of any known or potential landslides. We do not consider the potential for a landslide to be a hazard to this project.

7.7 Tsunamis and Seiches

The site is not located within a coastal area. Therefore, tsunamis (seismic sea waves) are not considered a significant hazard at the site. Seiches are large waves generated in enclosed bodies of water in response to ground shaking. No major water-retaining structures are located immediately up gradient from the project site. Flooding from a seismically-induced seiche is considered unlikely.

8. SOIL AND GROUNDWATER CONDITIONS

8.1 Subsurface Conditions

Based on the geotechnical reports of the adjacent sites, the soils may consisted of fill soils underlain by alluvium consisting of loose to very dense clayey sand with various amounts of gravel, and silty gravel with sand; and firm to hard sandy clay, clay with sand, clayey silt with sand, and silt with sand. The thickness of fill soils is unknown and should be determined based on a proper site investigation

8.2 Groundwater

Based on the State of California Hazard Zone Report 049, Dana Point Quadrangle, Plate 1.2, the historically highest groundwater is at a depth of approximately 5 feet below ground surface. It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, localized pumping, and climatic conditions as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

9. PREPLIMINARY CONCLUSIONS AND RECOMMENDATIONS

9.1 General

9.1.1 Based upon the data collected from the Foster and Ortega sites, and from a geotechnical engineering standpoint, it is our opinion that the site is suitable for the proposed construction of improvements at the site as planned, provided the preliminary recommendations contained in this report are incorporated into the project design and construction. A complete geotechnical investigation with drilling, soil sampling, laboratory testing, and engineering analysis should be performed prior to finalize the recommendations provided herein.

9.1.2 Site demolition activities shall include removal of all surface obstructions not intended to be incorporated into final site design. In addition, underground buried structures and/or utility lines encountered during demolition and construction should be properly removed and the resulting excavations backfilled with Engineered Fill. It is suspected that possible demolition activities of the existing structures may disturb the upper soils. After demolition activities, it is recommended that disturbed soils be removed and/or recompacted.

9.1.3 The clayey soils exhibit a slightly moderate swell potential and are subject to volumetric changes if moisture contents vary. The clayey soil, in its present condition, possess hazards to construction in terms of possible post-construction movement of the foundations and floor systems if no mitigation measures are employed. The estimated swell pressures of the clayey material may cause movement affecting slabs and brittle exterior finishes. Accordingly, measures are considered necessary to reduce anticipated soil movement.

9.1.4 To minimize the potential soil movement due to expansive soil conditions, it is recommended that the upper 18 inches of soil beneath the required granular aggregate subbase within slab on grade and exterior flatwork areas be removed and replaced with Non-Expansive Engineered Fill meeting the requirements of section 9.4. Other than complete soil replacement, mitigation measures will not eliminate post-construction soil movement, but will reduce the soil movement. Success of the mitigation measures will depend on the thoroughness of the contractor and developer in dealing with the soil conditions. In any event, the developer should be aware that some soil movement is to be expected.

9.1.5 Based on the subsurface conditions at the site and the anticipated structural loading, we anticipate that the proposed buildings may be supported using conventional shallow foundations provided that the recommendations presented herein are incorporated in the design and construction of the project.

9.2 Seismic Design Criteria

9.2.1 For seismic design of the structures, and in accordance with the seismic provisions of the 2019 CBC, our recommended parameters are shown below. These parameters are based on Probabilistic Ground Motion of 2% Probability of Exceedance in 50 years. The Site Class was determined based on the results of our field exploration.

TABLE 9.2.1
SEISMIC DESIGN PARAMETERS

Seismic Item	Symbol	Value	ASCE 7-16 or 2019 CBC Reference
Site Coordinates (Datum = NAD 83)		33.5002 Lat -117.6609 Lon	
Site Class	--	D	ASCE 7 Table 20.3-1
Soil Profile Name	--	Stiff Soil	ASCE 7 Table 20.3-1
Risk Category	--	II	Table 1604.5
Site Coefficient for PGA	F_{PGA}	1.1	ASCE 7 Table 11.8-1
Peak Ground Acceleration (adjusted for Site Class effects)	PGA_M	0.553g	ASCE 7 Equation 11.8-1
Seismic Design Category	SDC	D	Table 1613.2.5
Mapped Spectral Acceleration (Short period - 0.2 sec)	S_S	1.174 g	Figure 1613.2.1(1-8)
Mapped Spectral Acceleration (1.0 sec. period)	S_1	0.422 g	Figure 1613.2.1(1-8)
Site Class Modified Site Coefficient	F_a	1.03	Table 1613.2.3(1)
Site Class Modified Site Coefficient	F_v	*1.878	Table 1613.2.3(2)
MCE Spectral Response Acceleration (Short period - 0.2 sec) $S_{MS} = F_a S_S$	S_{MS}	1.21 g	Equation 16-36
MCE Spectral Response Acceleration (1.0 sec. period) $S_{M1} = F_v S_1$	S_{M1}	*0.793 g	Equation 16-37
Design Spectral Response Acceleration $S_{DS}=⅔S_{MS}$ (short period - 0.2 sec)	S_{DS}	0.807 g	Equation 16-38
Design Spectral Response Acceleration $S_{D1}=⅔S_{M1}$ (1.0 sec. period)	S_{D1}	*0.528 g	Equation 16-39
Short Term Transition Period (S_{D1}/S_{DS}), Seconds	T_S	0.655	ASCE 7-16, Section 11.4.6
Long Period Transition Period (seconds)	T_L	8	ASCE 7-16, Figure 22-14

*** Determined per ASCE Table 11.4-2 for use in calculating T_S only.**

9.2.2 A Site Specific Ground Motion Analysis was not included in the scope of this investigation. Per ASCE 11.4.8, structures on Site Class D with S_1 greater than or equal to 0.2 may require Site Specific Ground Motion Analysis. However, a site specific motion analysis may not be required based on Exceptions listed in ASCE 11.4.8. The Structural Engineer should verify whether

Exception No. 2 of ASCE 7-16, Section 11.4.8 is valid for the site. In the event that a site specific ground motion analysis is required, SALEM should be contacted for these services.

9.2.3 Conformance to the criteria in the above table for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

9.3 Soil and Excavation Characteristics

9.3.1 Based on the soil conditions from the adjacent soil borings, the onsite soils can be excavated with moderate to laborious effort using conventional heavy-duty or special excavation and earthmoving equipment.

9.3.2 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable Occupational Safety and Health Administration (OSHA) rules and regulations to maintain safety and maintain the stability of adjacent existing improvements.

9.3.3 The near surface soils are, generally, moist to very moist due to the absorption characteristics of the soil. Earthwork operations may encounter very moist unstable soils which may require removal to a stable bottom. Exposed native soils exposed as part of site grading operations shall not be allowed to dry out and should be kept continuously moist prior to placement of subsequent fill.

9.4 Materials for Fill

9.4.1 Excavated soils generated from cut operations at the site are suitable for use as general Engineered Fill in structural areas, provided they do not contain deleterious matter, organic material, or rock material larger than 3 inches in maximum dimension.

9.4.2 The upper soils are predominately silty gravel, clayey gravel, clayey sand, and sandy clay. The clayey soils are expected to have a moderate expansion potential. It is recommended the upper 18 inches of soil within building pad and exterior flatwork areas be replaced with Non-Expansive Fill ($EI \leq 20$). The replacement soils should extend 5 feet beyond the perimeter of the building.

9.4.3 The soils with an EI greater than 20 and less than 50 ($20 < EI \leq 70$) may be placed below a depth of 18 inches within building pad and exterior flatwork areas or in the parking and non-structural areas.

9.4.4 Import soil shall be well-graded, slightly cohesive silty fine sand or sandy silt, with relatively impervious characteristics when compacted. A clean sand or very sandy soil is not acceptable for this purpose. This material should be approved by the Engineer prior to use and should typically possess the soil characteristics summarized below in Table 9.4.4.

TABLE 9.4.4
IMPORT FILL REQUIREMENTS

Minimum Percent Passing No. 200 Sieve	15
Maximum Percent Passing No. 200 Sieve	50
Minimum Percent Passing No. 4 Sieve	70
Maximum Particle Size	3"
Maximum Plasticity Index	12
Maximum CBC Expansion Index	20

9.4.5 The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since they have complete control of the project site.

9.4.6 Environmental characteristics and corrosion potential of import soil materials should also be considered.

9.4.7 Proposed import materials should be sampled, tested, and approved by SALEM prior to its transportation to the site.

9.5 Grading

9.5.1 A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Geotechnical Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section as well as other portions of this report.

9.5.2 A preconstruction conference should be held at the site prior to the beginning of grading operations with the owner, contractor, civil engineer and geotechnical engineer in attendance.

9.5.3 Site preparation should begin with removal of existing surface/subsurface structures, underground utilities (as required), any existing uncertified fill, and debris. Excavations or depressions resulting from site clearing operations, or other existing excavations or depressions, should be restored with Engineered Fill in accordance with the recommendations of this report.

9.5.4 Surface vegetation consisting of grasses and other similar vegetation should be removed by stripping to a sufficient depth to remove organic-rich topsoil. The upper 2 to 4 inches of the soils containing, vegetation, roots and other objectionable organic matter encountered at the time of grading should be stripped and removed from the surface. Deeper stripping may be required in localized areas. In addition, existing concrete and asphalt materials shall be removed from areas of proposed improvements and stockpiled separately from excavated soil material. The stripped vegetation, asphalt and concrete materials will not be suitable for use as Engineered Fill or within 5 feet of building pads or within pavement areas. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas or exported from the site.

9.5.5 Any undocumented and uncertified fill materials encountered during grading should be removed and replaced with engineered fill. The actual depth of the overexcavation and recompaction should be determined by our field representative during construction.

9.5.6 Structural building pad areas should be considered as areas extending a minimum of 5 feet horizontally beyond the outside dimensions of building, including footings and non-cantilevered overhangs carrying structural loads.

9.5.7 It is recommended overexcavation and recompaction within the proposed building areas be performed to a minimum depth of **five (5) feet** below existing grade or **three (3) feet** below proposed footing bottom, whichever is deeper. The overexcavation and recompaction should also extend laterally to a minimum of 5 feet beyond the outer edges of the proposed footings.

9.5.8 To minimize the potential soil movement, it is recommended that the upper 18 inches of soil beneath the required granular aggregate subbase within slab on grade and exterior flatwork areas be removed and replaced with Non-Expansive Engineered Fill meeting the requirements of section 9.4.

9.5.9 Within pavement areas, overexcavation and recompaction should be performed to a minimum depth of 2 feet below existing grade or proposed grade, whichever is deeper. The overexcavation and recompaction should also extend laterally to a minimum of 2 feet beyond the pavement edges.

9.5.10 Prior to placement of fill soils, the upper 10 to 12 inches of native subgrade soils should be scarified, moisture-conditioned to no less than the optimum moisture content and recompacted to a minimum of 90% (95% for granular non-expansive soils) of the maximum dry density based on ASTM D1557 Test Method.

9.5.11 All Engineered Fill (including scarified ground surfaces and backfill) should be placed in thin lifts to allow for adequate bonding and compaction (typically 6 to 8 inches in loose thickness).

9.5.12 Engineered Fill soils should be placed, moisture conditioned to near optimum moisture content, and compacted to at least 90% (95% for granular non-expansive soils) relative compaction.

9.5.13 An integral part of satisfactory fill placement is the stability of the placed lift of soil. If placed materials exhibit excessive instability as determined by a SALEM field representative, the lift will be considered unacceptable and shall be remedied prior to placement of additional fill

material. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

9.5.14 Final pavement subgrade should be finished to a smooth, unyielding surface. We further recommend proof-rolling the subgrade with a loaded water truck (or similar equipment with high contact pressure) to verify the stability of the subgrade prior to placing aggregate base.

9.5.15 The most effective site preparation alternatives will depend on site conditions prior to grading. We should evaluate site conditions and provide supplemental recommendations immediately prior to grading, if necessary.

9.5.16 We do not anticipate groundwater or seepage to adversely affect construction if conducted during the drier months of the year (typically summer and fall). However, groundwater and soil moisture conditions could be significantly different during the wet season (typically winter and spring) as surface soil becomes wet; perched groundwater conditions may develop. Grading during this time period will likely encounter wet materials resulting in possible excavation and fill placement difficulties. Project site winterization consisting of placement of aggregate base and protecting exposed soils during construction should be performed. If the construction schedule requires grading operations during the wet season, we can provide additional recommendations as conditions warrant.

9.5.17 Wet soils may become non conducive to site grading as the upper soils yield under the weight of the construction equipment. Therefore, mitigation measures should be performed for stabilization. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material or placement of slurry, crushed rocks or aggregate base material; or mixing the soil with an approved lime or cement product.

The most common remedial measure of stabilizing the bottom of the excavation due to wet soil condition is to reduce the moisture of the soil to near the optimum moisture content by having the subgrade soils scarified and aerated or mixed with drier soils prior to compacting. However, the drying process may require an extended period of time and delay the construction operation.

To expedite the stabilizing process, slurry or crushed rock may be utilized for stabilization provided this method is approved by the owner for the cost purpose. If the use of slurry, crushed rock is considered, it is recommended that the upper soft and wet soils be replaced by 6 to 24 inches of 2-sack slurry or ¾-inch to 1-inch crushed rocks. The thickness of the slurry or rock layer depends on the severity of the soil instability. The recommended 6 to 24 inches of crushed rock material will provide a stable platform.

It is further recommended that lighter compaction equipment be utilized for compacting the crushed rock. A layer of geofabric is recommended to be placed on top of the compacted crushed rock to minimize migration of soil particles into the voids of the crushed rock, resulting in soil movement. Although it is not required, the use of geogrid (e.g. Tensar TX7) below the slurry or crushed rock will enhance stability and reduce the required thickness of crushed rock necessary for stabilization. Our firm should be consulted prior to implementing remedial measures to provide appropriate recommendations.

9.6 Shallow Foundations

9.6.1 The site is suitable for use of conventional shallow foundations consisting of continuous footings and isolated pad footings bearing in properly compacted Engineered Fill.

9.6.2 The bearing wall footings considered for the structure should be continuous with a minimum width of 15 inches and extend to a minimum depth of 18 inches below the lowest adjacent grade. Isolated column footings should have a minimum width of 24 inches and extend a minimum depth of 18 inches below the lowest adjacent grade.

9.6.3 The bottom of footing excavations should be maintained free of loose and disturbed soil. Footing concrete should be placed into a neat excavation.

9.6.4 Footings proportioned as recommended above may be designed for the maximum allowable soil bearing pressures shown in the table below.

Loading Condition	Allowable Bearing
Dead Load Only	2,000 psf
Dead-Plus-Live Load	2,500 psf
Total Load, Including Wind or Seismic Loads	3,325 psf

9.6.5 For design purposes, total settlement due to static and seismic loading on the order of 1½ inches may be assumed for shallow footings. Differential settlement due to static and seismic loading, along a 40-foot exterior wall footing or between adjoining column footings, should be 1 inch, producing an angular distortion of 0.002. Most of the settlement is expected to occur during construction as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. The footing excavations should not be allowed to dry out any time prior to pouring concrete.

9.6.6 Resistance to lateral footing displacement can be computed using an allowable coefficient of friction factor of 0.25 acting between the base of foundations and the supporting subgrade.

9.6.7 Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 250 pounds per cubic foot acting against the appropriate vertical native footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. An increase of one-third is permitted when using the alternate load combination that includes wind or earthquake loads.

9.6.8 Underground utilities running parallel to footings should not be constructed in the zone of influence of footings. The zone of influence may be taken to be the area beneath the footing and within a 1:1 plane extending out and down from the bottom edge of the footing.

9.6.9 The foundation subgrade should be sprinkled as necessary to maintain a moist condition without significant shrinkage cracks as would be expected in any concrete placement. Prior to placing

rebar reinforcement, foundation excavations should be evaluated by a representative of SALEM for appropriate support characteristics and moisture content. Moisture conditioning may be required for the materials exposed at footing bottom, particularly if foundation excavations are left open for an extended period.

9.7 Concrete Slabs-on-Grade

9.7.1 Slab thickness and reinforcement should be determined by the structural engineer based on the anticipated loading. We recommend that non-structural slabs-on-grade be at least 4 inches thick and underlain by six (6) inches of compacted clean granular aggregate subbase material compacted to at least 95% relative compaction.

9.7.2 Granular aggregate subbase material shall conform to ASTM D-2940, Latest Edition (Table 1, bases) with at least 95 percent passing a 1½-inch sieve and not more than 8% passing a No. 200 sieve or its approved equivalent to prevent capillary moisture rise.

9.7.3 We recommend reinforcing slabs, at a minimum, with No. 4 reinforcing bars placed 18 inches on center, each way.

9.7.4 Slabs subject to structural loading may be designed utilizing a modulus of subgrade reaction K of 120 pounds per square inch per inch. The K value was approximated based on inter-relationship of soil classification and bearing values (Portland Cement Association, Rocky Mountain Northwest).

9.7.5 The spacing of crack control joints should be designed by the project structural engineer. In order to regulate cracking of the slabs, we recommend that construction joints or control joints be provided at a maximum spacing of 15 feet in each direction for 5-inch thick slabs and 12 feet for 4-inch thick slabs.

9.7.6 Crack control joints should extend a minimum depth of one-fourth the slab thickness and should be constructed using saw-cuts or other methods as soon as practical after concrete placement. The exterior floors should be poured separately in order to act independently of the walls and foundation system.

9.7.7 It is recommended that the utility trenches within the structure be compacted, as specified in our report, to minimize the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the structures is recommended.

9.7.8 Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To minimize moisture vapor intrusion, it is recommended that a vapor retarder be installed in accordance with manufacturer's recommendations and/or ASTM guidelines, whichever is more stringent. In addition, ventilation of the structure is recommended to reduce the accumulation of interior moisture.

9.7.9 In areas where it is desired to reduce floor dampness where moisture-sensitive coverings are anticipated, construction should have a suitable waterproof vapor retarder (a minimum of 15 mils

thick polyethylene vapor retarder sheeting, Raven Industries "VaporBlock 15, Stego Industries 15 mil "StegoWrap" or W.R. Meadows Sealtight 15 mil "Perminator") incorporated into the floor slab design. The water vapor retarder should be decay resistant material complying with ASTM E96 not exceeding 0.04 perms, ASTM E154 and ASTM E1745 Class A. The vapor barrier should be placed between the concrete slab and the compacted granular aggregate subbase material. The water vapor retarder (vapor barrier) should be installed in accordance with ASTM Specification E 1643-94.

9.7.10 The concrete maybe placed directly on vapor retarder. The vapor retarder should be inspected prior to concrete placement. Cut or punctured retarder should be repaired using vapor retarder material lapped 6 inches beyond damaged areas and taped.

9.7.11 The recommendations of this report are intended to reduce the potential for cracking of slabs due to soil movement. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade may exhibit some cracking due to soil movement. This is common for project areas that contain expansive soils since designing to eliminate potential soil movement is cost prohibitive. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

9.7.12 Proper finishing and curing should be performed in accordance with the latest guidelines provided by the American Concrete Institute, Portland Cement Association, and ASTM.

9.8 Lateral Earth Pressures and Frictional Resistance

9.8.1 Active, at-rest and passive unit lateral earth pressures against footings and walls are summarized in the table below:

Lateral Pressure Conditions	Equivalent Fluid Pressure, pcf
Active Pressure, Drained	545
At-Rest Pressure, Drained	75
Passive Pressure	250
Related Parameters	
Allowable Coefficient of Friction	0.25
In-Place Soil Density (lbs/ft^3)	120

9.8.2 Active pressure applies to walls, which are free to rotate. At-rest pressure applies to walls, which are restrained against rotation. The preceding lateral earth pressures assume sufficient drainage behind retaining walls to prevent the build-up of hydrostatic pressure.

9.8.3 The top one-foot of adjacent subgrade should be deleted from the passive pressure computation.

9.8.4 The foregoing values of lateral earth pressures represent allowable soil values and a safety factor consistent with the design conditions should be included in their usage.

9.8.5 For stability against lateral sliding, which is resisted solely by the passive pressure, we recommend a minimum safety factor of 1.5.

9.8.6 For stability against lateral sliding, which is resisted by the combined passive and frictional resistance, a minimum safety factor of 2.0 is recommended.

9.8.7 For lateral stability against seismic loading conditions, we recommend a minimum safety factor of 1.1.

9.8.8 For dynamic seismic lateral loading the following equation shall be used:

Dynamic Seismic Lateral Loading Equation
Dynamic Seismic Lateral Load = $\frac{3}{8}\gamma K_h H^2$
Where: γ = In-Place Soil Density
K_h = Horizontal Acceleration = $\frac{2}{3}PGA_M$
H = Wall Height

9.9 Retaining Walls

9.9.1 Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have a minimum width of 12 inches wide and should extend upward to within 12 inches of the top of the wall. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic-concrete or other suitable backfill to minimize surface drainage into the wall drain system. The gravel should conform to Class II permeable materials graded in accordance with the current CalTrans Standard Specifications.

9.9.2 Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel provided they are installed in accordance with the manufacturer's recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.

9.9.3 Drainage pipes should be placed with perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The top of the perforated pipe should be placed at or below the bottom of the adjacent floor slab or pavements. The pipe should be placed in the center line of the drainage blanket and should have a minimum diameter of 4 inches. Slots should be no wider than 1/8-inch in diameter, while perforations should be no more than ¼-inch in diameter.

9.9.4 If retaining walls are less than 5 feet in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 2-inch minimum diameter

holes (concrete walls) or unmortared head joints (masonry walls) and placed no higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to the CalTrans Standard Specifications for "edge drains") should be affixed to the rear wall opening of each weep hole to retard soil piping.

9.9.5 During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers," vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

9.10 Temporary Excavations

9.10.1 We anticipate that the majority of the sandy site soils will be classified as Cal-OSHA "Type C" soil when encountered in excavations during site development and construction. Excavation sloping, benching, the use of trench shields, and the placement of trench spoils should conform to the latest applicable Cal-OSHA standards. The contractor should have a Cal-OSHA-approved "competent person" onsite during excavation to evaluate trench conditions and make appropriate recommendations where necessary.

9.10.2 It is the contractor's responsibility to provide sufficient and safe excavation support as well as protecting nearby utilities, structures, and other improvements which may be damaged by earth movements. All onsite excavations must be conducted in such a manner that potential surcharges from existing structures, construction equipment, and vehicle loads are resisted. The surcharge area may be defined by a 1:1 projection down and away from the bottom of an existing foundation or vehicle load.

9.10.3 Temporary excavations and slope faces should be protected from rainfall and erosion. Surface runoff should be directed away from excavations and slopes.

9.10.4 Open, unbraced excavations in undisturbed soils should be made according to the slopes presented in the following table:

RECOMMENDED EXCAVATION SLOPES

Depth of Excavation (ft)	Slope (Horizontal : Vertical)
0-5	1:1
5-10	2:1

9.10.5 If, due to space limitation, excavations near property lines or existing structures are performed in a vertical position, slot cuts, braced shorings or shields may be used for supporting vertical excavations. Therefore, in order to comply with the local and state safety regulations, a properly designed and installed shoring system would be required to accomplish planned excavations and installation. A Specialty Shoring Contractor should be responsible for the design and installation of such a shoring system during construction.

9.10.6 Braced shorings should be designed for a maximum pressure distribution of 30H, (where H is the depth of the excavation in feet). The foregoing does not include excess hydrostatic pressure or surcharge loading. Fifty percent of any surcharge load, such as construction equipment weight, should be added to the lateral load given herein. Equipment traffic should concurrently be limited to an area at least 3 feet from the shoring face or edge of the slope.

9.10.7 The excavation and shoring recommendations provided herein are based on soil characteristics derived from the borings within the area. Variations in soil conditions will likely be encountered during the excavations. SALEM Engineering Group, Inc. should be afforded the opportunity to provide field review to evaluate the actual conditions and account for field condition variations not otherwise anticipated in the preparation of this recommendation. Slope height, slope inclination, or excavation depth should in no case exceed those specified in local, state, or federal safety regulation, (e.g. OSHA) standards for excavations, 29 CFR part 1926, or Assessor's regulations.

9.11 Underground Utilities

9.11.1 Underground utility trenches should be backfilled with properly compacted material. The material excavated from the trenches should be adequate for use as backfill provided it does not contain deleterious matter, vegetation or rock larger than 3 inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding 8 inches and compacted to at least 90% (95% for granular non-expansive soils) relative compaction at slightly above the optimum moisture content.

9.11.2 Bedding and pipe zone backfill typically extends from the bottom of the trench excavations to approximately 6 to 12 inches above the crown of the pipe. Pipe bedding and backfill material should conform to the requirements of the governing utility agency.

9.11.3 It is suggested that underground utilities crossing beneath new or existing structures be plugged at entry and exit locations to the buildings or structures to prevent water migration. Trench plugs can consist of on-site clay soils, if available, or sand cement slurry. The trench plugs should extend 2 feet beyond each side of individual perimeter foundations.

9.11.4 The contractor is responsible for removing all water-sensitive soils from the trench regardless of the backfill location and compaction requirements. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

9.12 Surface Drainage

9.12.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change to important engineering properties. Proper drainage should be maintained at all times.

9.12.2 The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than 5 percent for a minimum distance of 10 feet.

9.12.3 Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2 percent away from the building and drainage gradients maintained to carry all surface water to collection facilities and off site. These grades should be maintained for the life of the project. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed.

9.12.4 Roof drains should be installed with appropriate downspout extensions out-falling on splash blocks so as to direct water a minimum of 5 feet away from the structures or be connected to the storm drain system for the development.

9.13 Pavement Design

9.13.1 Based on site soil conditions, an R-value of 15 was used for the preliminary flexible asphaltic concrete pavement design. The R-value may be verified during grading of the pavement areas.

9.13.2 The pavement design recommendations provided herein are based on the State of California Department of Transportation (CALTRANS) design manual. The following table shows the recommended pavement sections for various traffic indices.

TABLE 9.13.2
ASPHALT CONCRETE PAVEMENT

Traffic Index	Asphaltic Concrete	Clean Aggregate Base*	Compacted Subgrade**
5.0 (Vehicle Parking and Drive Areas)	4.0"	5.5"	12.0"
6.0 (Heavy Truck Areas)	4.0"	9.5"	12.0"

95% compaction based on ASTM D1557 Test Method
****90% (95% for granular non-expansive soils) compaction based on ASTM D1557 Test Method***

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

TABLE 9.13.3
PORTLAND CEMENT CONCRETE PAVEMENT

Traffic Index	Portland Cement Concrete*	Clean Aggregate Base**	Compacted Subgrade***
5.0 (Light Duty)	5.0"	6.0"	12.0"
6.0 (Heavy Duty)	6.0"	8.0"	12.0"

*** Minimum Compressive Strength of 4,000 psi, No. 4 bars at 15 inches o.c. each way***
****95% compaction based on ASTM D1557 Test Method***
*****90% (95% for granular non-expansive soils) compaction based on ASTM D1557 Test Method***

10. PLAN REVIEW, CONSTRUCTION OBSERVATION AND TESTING

10.1 Plan and Specification Review

10.1.1 SALEM should review the project plans and specifications prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required.

10.2 Construction Observation and Testing Services

10.2.1 The recommendations provided in this report are based on the assumption that we will continue as Geotechnical Engineer of Record throughout the construction phase. It is important to maintain continuity of geotechnical interpretation and confirm that field conditions encountered are similar to those anticipated during design. If we are not retained for these services, we cannot assume any responsibility for others interpretation of our recommendations, and therefore the future performance of the project.

10.2.2 SALEM should be present at the site during site preparation to observe site clearing, preparation of exposed surfaces after clearing, and placement, treatment and compaction of fill material.

10.2.3 SALEM's observations should be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. Moisture content of footings and slab subgrade should be tested immediately prior to concrete placement. SALEM should observe foundation excavations prior to placement of reinforcing steel or concrete to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report.

11. LIMITATIONS AND CHANGED CONDITIONS

The analyses and recommendations submitted in this report are based upon the data obtained from the test borings drilled at the approximate locations shown on the Site Plan, Figure 2. Those borings are not within the project site. The report does not reflect variations which may occur between boring locations. The nature and extent of such variations may not become evident until construction is initiated.

If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of such variations. The findings and recommendations presented in this report are valid as of the present and for the proposed construction.

If site conditions change due to natural processes or human intervention on the property or adjacent to the site, or changes occur in the nature or design of the project, or if there is a substantial time lapse between the submission of this report and the start of the work at the site, the conclusions and recommendations contained in our report will not be considered valid unless the changes are reviewed by SALEM and the conclusions of our report are modified or verified in writing. The validity of the recommendations contained in this report is also dependent upon an adequate testing and observations program during the construction phase. Our firm assumes no responsibility for construction compliance with the design concepts or recommendations unless we have been retained to perform the on-site testing and review during

construction. SALEM has prepared this report for the exclusive use of the owner and project design consultants.

SALEM does not practice in the field of corrosion engineering. It is recommended that a qualified corrosion engineer be consulted regarding protection of buried steel or ductile iron piping and conduit or, at a minimum, that manufacturer's recommendations for corrosion protection be closely followed. Further, a corrosion engineer may be needed to incorporate the necessary precautions to avoid premature corrosion of concrete slabs and foundations in direct contact with native soil. The importation of soil and or aggregate materials to the site should be screened to determine the potential for corrosion to concrete and buried metal piping.

The report has been prepared in accordance with generally accepted geotechnical engineering practices in the area. No other warranties, either express or implied, are made as to the professional advice provided under the terms of our agreement and included in this report.

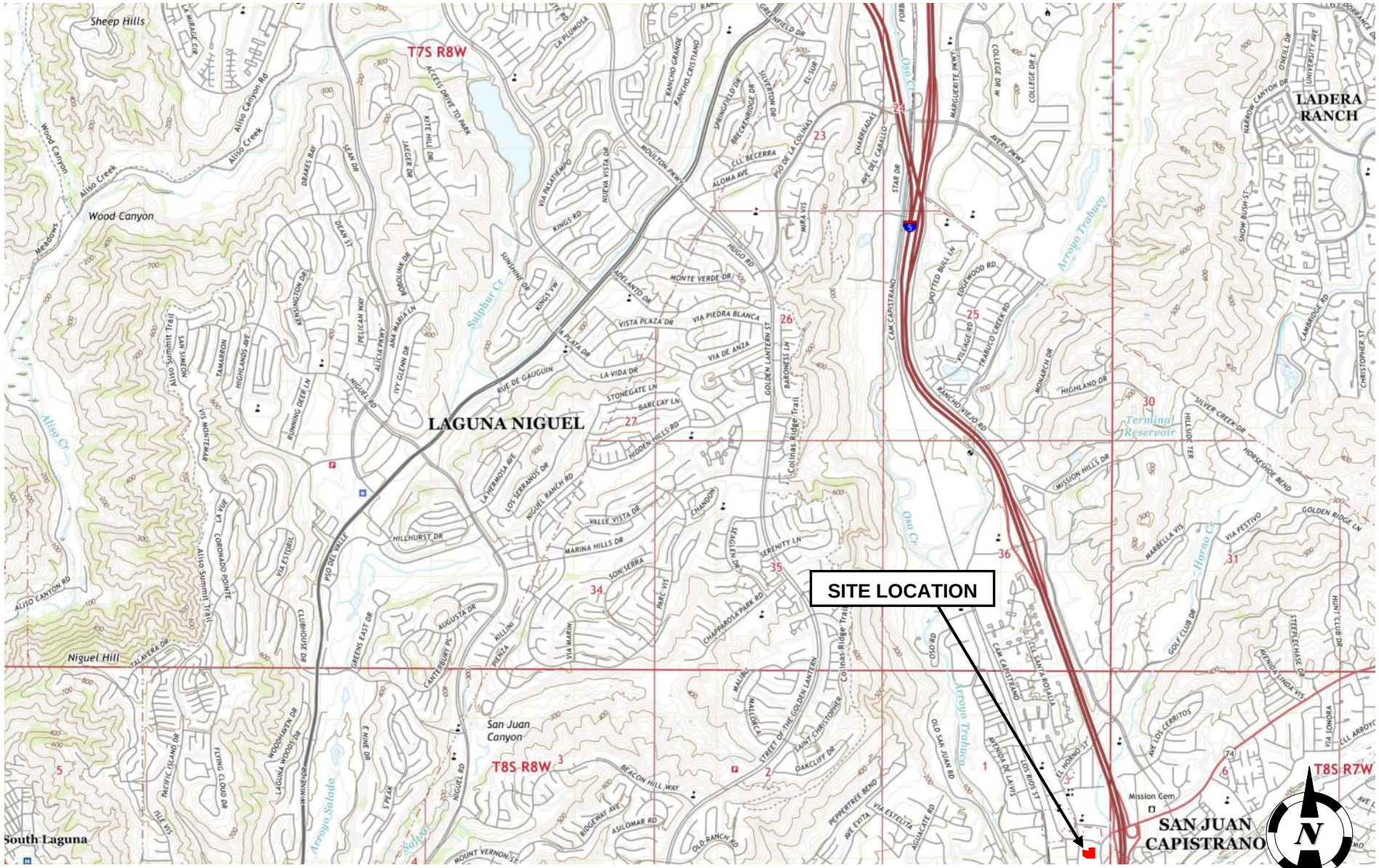
If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (909) 980-6455.

Respectfully Submitted,

SALEM ENGINEERING GROUP, INC.

Clarence Jiang, GE
Senior Geotechnical Engineer
RGE 2477

R. Sammy Salem, MS, PE, GE
Principal Engineer
RCE 52762 / RGE 2549



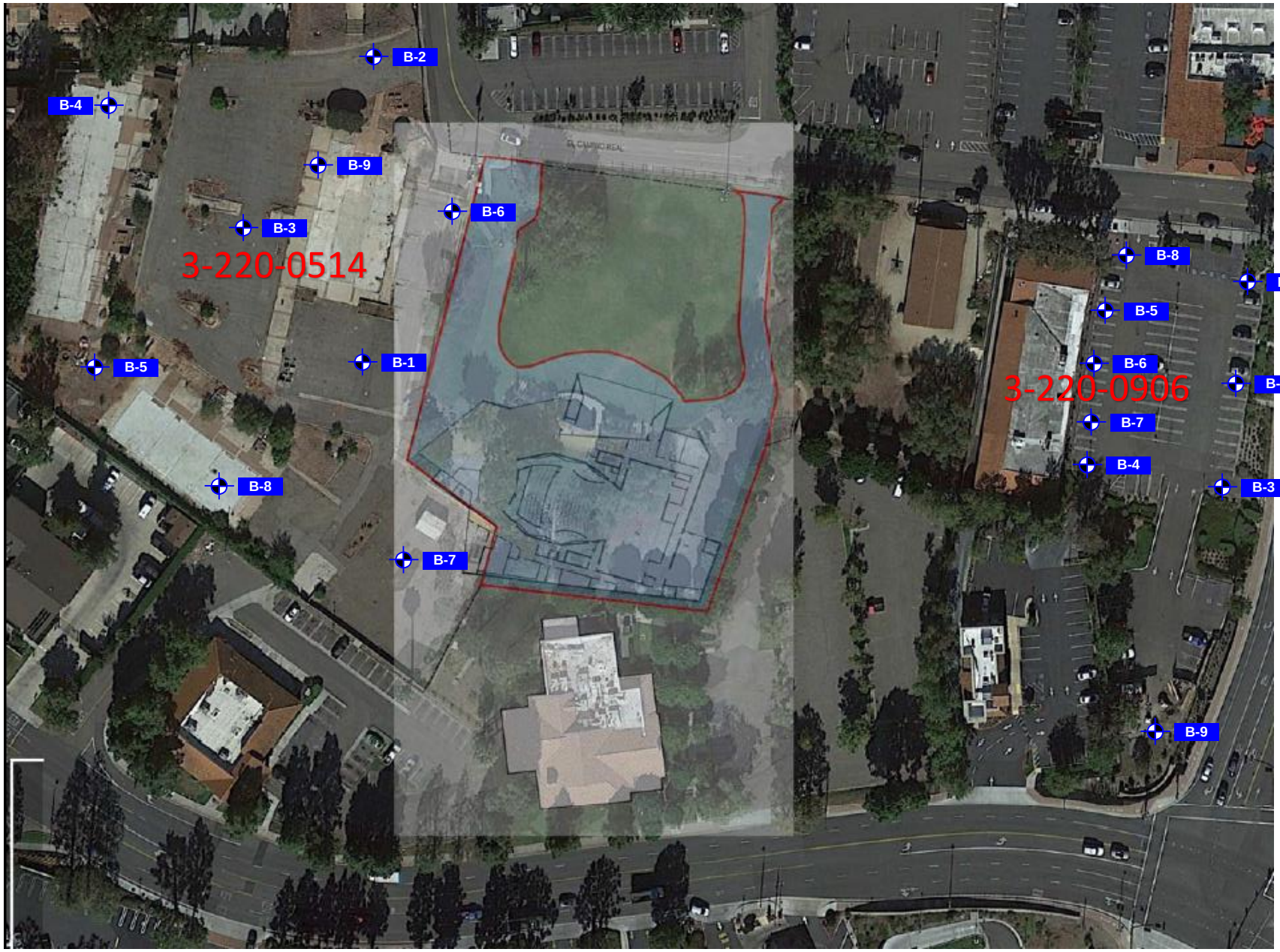
Source Image: U.S. Geological Survey, San Juan Capistrano, California, https://ngmdb.usgs.gov/topoview (2018)

VICINITY MAP

GEOTECHNICAL ENGINEERING INVESTIGATION
Proposed Performing Arts Center
Historic Town Center Park
San Juan Capistrano, California

SCALE:	DATE:
NOT TO SCALE	2/2022
DRAWN BY:	APPROVED BY:
JC	CJ
PROJECT NO.	FIGURE NO.
3-222-086	1

SALEM engineering group, inc.



SITE PLAN

GEOTECHNICAL ENGINEERING INVESTIGATION
Proposed Performing Arts Center
Historic Town Center Park
San Juan Capistrano, California

SCALE: NOT TO SCALE	DATE: 02/2022
DRAWN BY: JC	APPROVED BY: CJ
PROJECT NO. 3-222-0086	FIGURE NO. 2

LEGEND:

B-1 Soil Boring Locations

All Locations Approximate

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APPENDIX

A

APPENDIX A
FIELD EXPLORATION OF ADJACENT SITES

The locations of the exploratory borings are shown on the Site Plan, Figure 2. Boring logs for our exploration are presented in figures following the text in this appendix. Borings were located in the field using existing reference points. Therefore, actual boring locations may deviate slightly.

In general, our borings were performed using a truck-mounted CME 55 and CME 45C drill rig equipped with 6-inch diameter solid flight augers. Sampling in the borings was accomplished using a hydraulic 140-pound hammer with a 30-inch drop. Samples were obtained with a 3-inch outside-diameter (OD), split spoon (California Modified) sampler, and a 2-inch OD, Standard Penetration Test (SPT) sampler. The number of blows required to drive the sampler the last 12 inches (or fraction thereof) of the 18-inch sampling interval were recorded on the boring logs. The blow counts shown on the boring logs should not be interpreted as standard SPT "N" values; corrections have not been applied. Upon completion, borings were backfilled with drill cuttings.

Subsurface conditions encountered in the exploratory borings were visually examined, classified and logged in general accordance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual-Manual Procedure D2488). This system uses the Unified Soil Classification System (USCS) for soil designations. The logs depict soil and geologic conditions encountered and depths at which samples were obtained. The logs also include our interpretation of the conditions between sampling intervals. Therefore, the logs contain both observed and interpreted data. We determined the lines designating the interface between soil materials on the logs using visual observations, drill rig penetration rates, excavation characteristics and other factors. The transition between materials may be abrupt or gradual. Where applicable, the field logs were revised based on subsequent laboratory testing.

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Test Boring: B-1 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

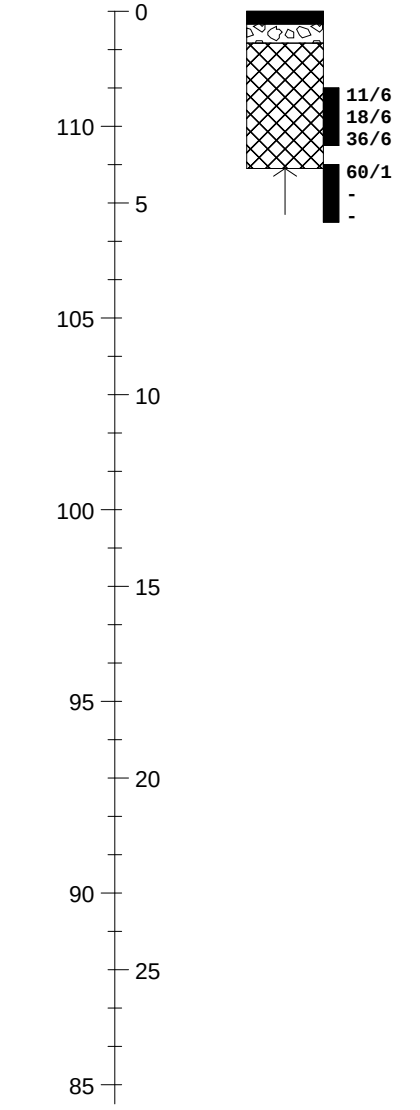
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 113'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregate Base = 6 in.				
	11/6 18/6 36/6	GM	FILL Silty GRAVEL with Sand Dense; moist; brown; fine to coarse gravel; fine to medium grain sand; trace clay. Very dense at 4'.	54	6.4	111.2	
	60/1 - -			60/1"	3.8	-	
			Auger refusal at 4 feet due to excessive gravel.				

Notes:

Figure Number A-1

Test Boring: B-2 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

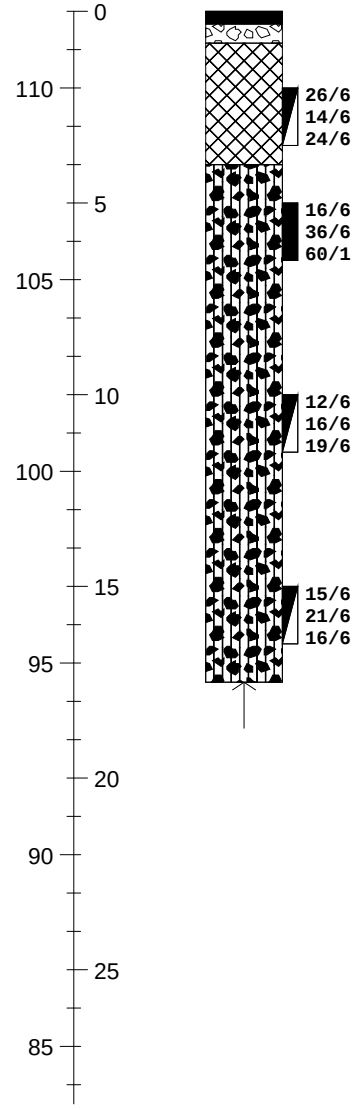
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 112'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregate Base = 6 in.				
		SC	FILL Clayey SAND Dense; moist; brown; fine to	38	9.5	-	
		GM	medium grain sand; with fine gravel.	96/7"	9.6	95.2	Partially disturbed sample.
			Silty GRAVEL with Sand Very dense; moist; brown; fine to coarse gravel; medium to coarse grain sand.				
			Grades as above; dense.	35	8.1	-	
			Grades as above.	37	10.1	-	
			Auger refusal at 17.5 feet BSG.				

Notes:

Figure Number A-2

SALEM engineering group, inc.

Test Boring: B-3 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

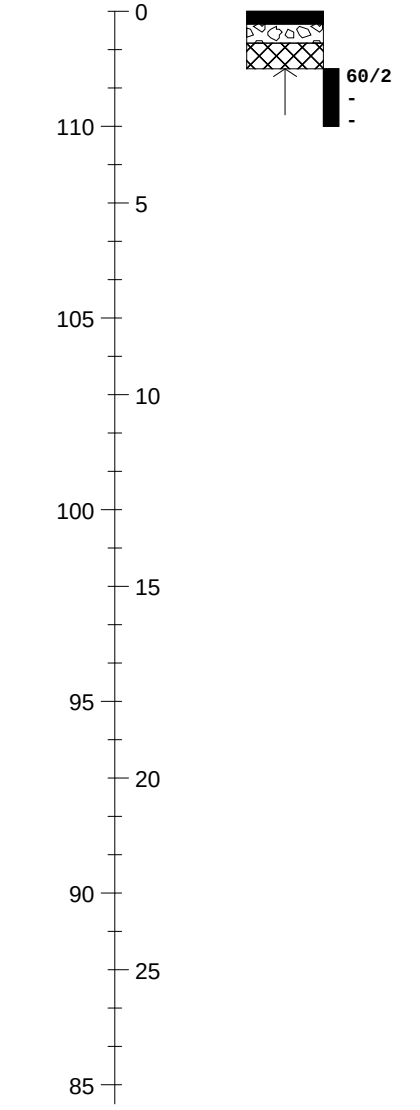
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 113'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregate Base = 6 in.				
	60/2 - -	GM	FILL Silty GRAVEL with Sand Very dense; moist; brown; fine to coarse gravel; fine to coarse grain sand.	60/2"	-	-	No recovery.
			Auger refusal at 1.5 feet BSG.				

Notes:

Figure Number A-3

SALEM engineering group, inc.

Test Boring: B-4 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

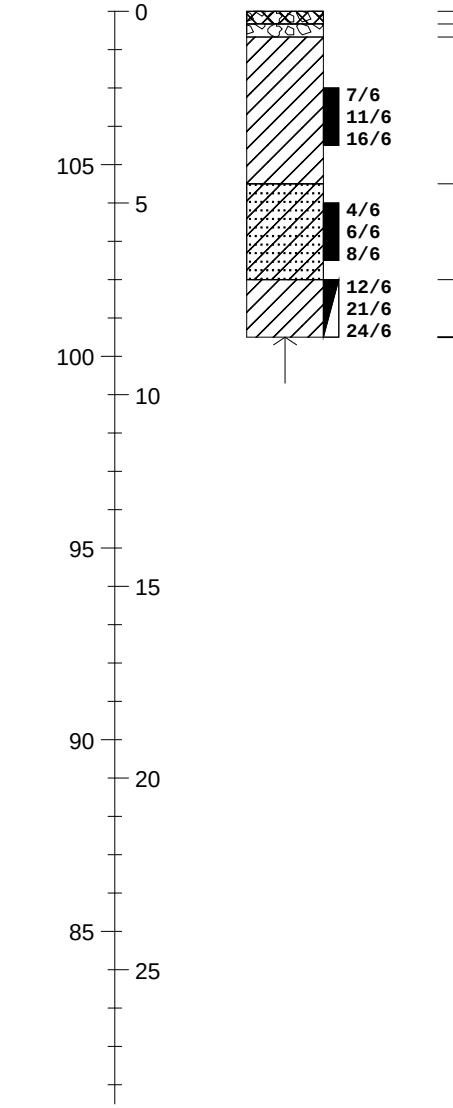
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 109'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		PCC	portland Cement Concrete = 4 in.				
		AB	Aggregate Base = 4 in.				
	7/6 11/6 16/6	CL	POTENTIAL FILL Sandy CLAY Very stiff; moist; dark brown; fine grain sand; with gravel.	27	9.8	110.8	
	4/6 6/6 8/6	SC	Clayey SAND Loose; moist; dark brown; fine to medium grain sand.	14	8.8	104.3	
	12/6 21/6 24/6	CL	Sandy CLAY Hard; moist; dark brown; fine grain sand; with gravel and cobbles. Auger refusal at 8.5 feet BSG.	45	20.7	-	

Notes:

Figure Number A-4

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Test Boring: B-5 **Page** 1 **Of:** 2

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

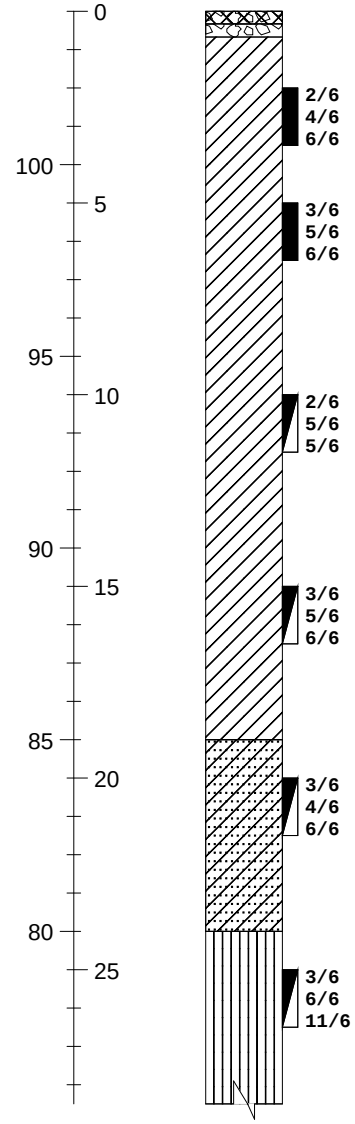
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 104'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** 29'

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** 29'



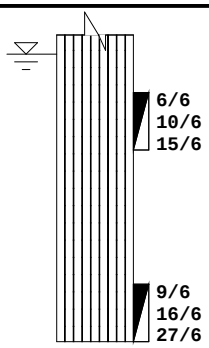
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		PCC	portland Cement Concrete = 4 in.				
		AB	Aggregate Base = 4 in.				
		CL	CLAY with Sand Firm; moist; dark brown; fine grain sand.	10	23.1	99.5	LL=36 PI=17
			Grades as above; stiff.	11	24.8	98.3	
			Grades as above.	10	23.1	-	
			Grades as above; with gravel.	11	17.8	-	
		SC	Clayey SAND Loose; very moist; brown; fine to medium grain sand; trace gravel.	10	13.8	-	
		ML	Clayey SILT with Sand Very stiff; wet; dark gray; fine grain sand.	17	36.6	-	

Notes:

Figure Number A-5

SALEM engineering group, inc.

Project Number: 3-220-0514
Date: 07/09/2020
Test Boring: B-5

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
75 / 30		ML	SILT with Sand Very stiff; saturated; dark gray; fine grain sand.	25	29.9	-	
70 / 35			Grades as above; hard.	43	27.1	-	
65 / 40			End of boring at 36.5 feet BSG.				
60 / 45							
55 / 50							
50 / 55							
45 / 60							

Notes:

Figure Number A-5

SALEM
engineering group, inc.

Test Boring: B-6 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

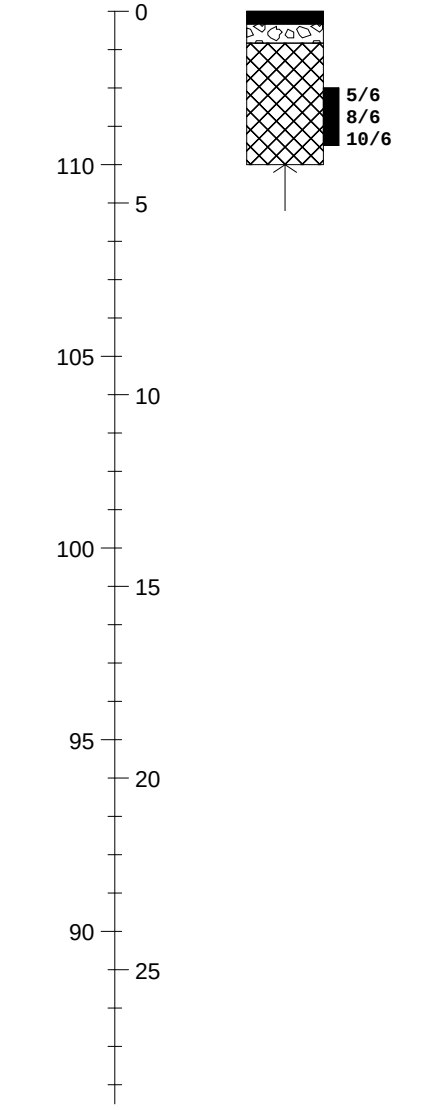
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 114'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 4 in.				
		AB	Aggregate Base = 6 in.				
	5/6 8/6 10/6	SC	FILL Gravelly Clayey SAND Medium dense; moist; brown; fine to coarse grain sand; fine to coarse gravel.	18	9.0	-	Disturbed sample.
			Auger refusal at 4 feet.				

Notes:

Figure Number A-6

SALEM engineering group, inc.

Test Boring: B-7 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

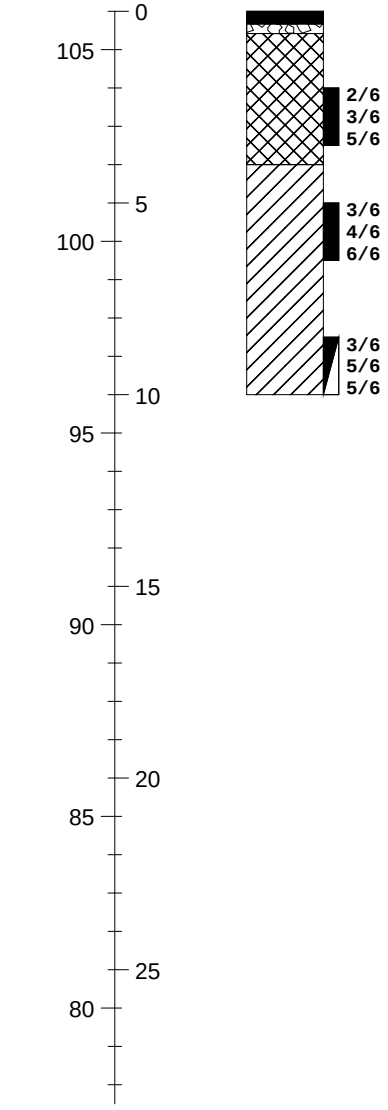
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 106'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
	AC	Asphalt Concrete = 4 in.				
	AB	Aggregete Base = 3 in.				
	CL	FILL Sandy CLAY Firm; moist; dark brown; fine to medium grain sand; with fine gravel.	8	21.7	94.4	
	CL	Sandy CLAY Firm; moist; brown; fine grain sand.	10	20.2	100.7	
		Grades as above; stiff.	10	22.0	-	
		End of boring at 10 feet BSG.				

Notes:

Figure Number A-7

SALEM
engineering group, inc.

Test Boring: B-8 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

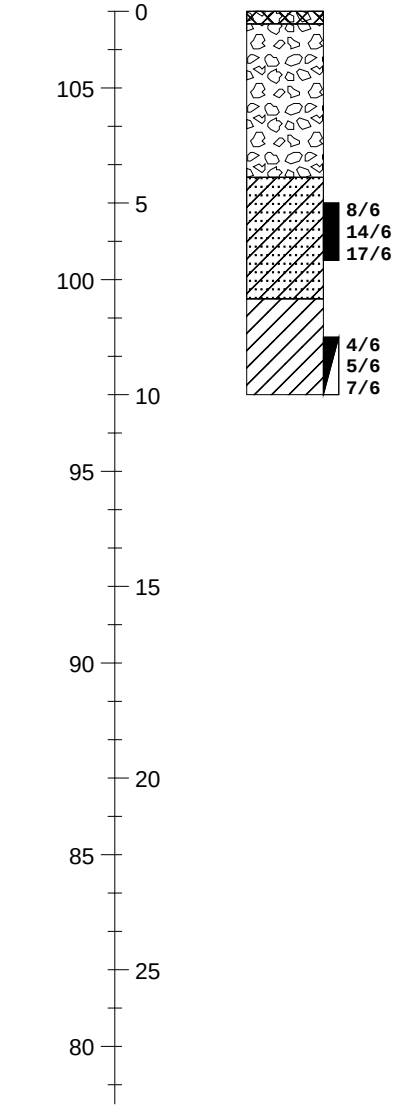
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 107'

Auger Type: 6 in Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		PCC	portland Cement Concrete = 4 in.				
		AB	Aggregate Base = 48 in.				
	8/6 14/6 17/6	SC	Clayey SAND Medium dense; moist; brown; fine grain sand; with gravel.	31	9.7	99.3	
	4/6 5/6 7/6	CL	Sandy CLAY Stiff; moist; dark gray; fine grain sand.	12	24.2	-	
			End of boring at 10 feet BSG.				

Notes:

Figure Number A-8

Test Boring: B-9 **Page** 1 **Of:** 1

Project Number: 3-220-0514

Date: 07/09/2020

Client: Frontier Real Estate Investments

Project: Proposed Apartment and Retail Development

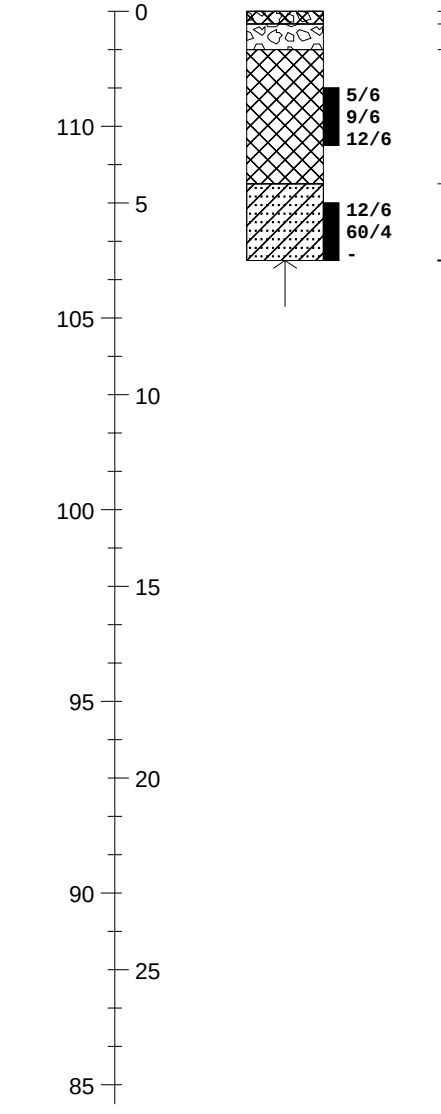
Location: 31872, 31878, 31882 Camino Capristrano, San Juan Capristrano, California

Drilled By: SALEM **Logged By:** EGR

Drill Type: CME 55 **Elevation:** 113'

Auger Type: 6 in. Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		PCC	portland Cement Concrete = 4 in.				
		AB	Aggregate Base = 8 in.				
	5/6 9/6 12/6	CL	FILL CLAY with Sand Very stiff; moist; brown; fine grain sand.	21	17.8	113.1	LL=39 PI=24
	12/6 60/4 -	SC	Clayey SAND Very dense; moist; brown; fine grain sand; with gravel and cobbles.	60/4"	6.5	111.2	
			Auger refusal at 6.5 feet BSG.				

Notes:

Figure Number A-9

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Asphaltic Concrete
	Aggregate Base
	Fill
	Silty gravel
	Portland Cement Concrete
	Lean Clay
	Clayey sand
	Silt
Misc. Symbols	
	Drill rejection
	Boring continues
	Water table during drilling

Symbol	Description
Soil Samplers	
	California sampler
	Standard penetration test

Notes:

Granular Soils
Blows Per Foot (Uncorrected)

	MCS	SPT
Very loose	<5	<4
Loose	5-15	4-10
Medium dense	16-40	11-30
Dense	41-65	31-50
Very dense	>65	>50

Cohesive Soils
Blows Per Foot (Uncorrected)

	MCS	SPT
Very soft	<3	<2
Soft	3-5	2-4
Firm	6-10	5-8
Stiff	11-20	9-15
Very Stiff	21-40	16-30
Hard	>40	>30

MCS = Modified California Sampler
SPT = Standard Penetration Test Sampler

Test Boring: B-1 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/23/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

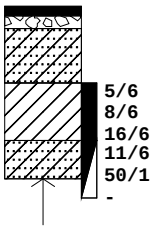
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 125'

Auger Type: 6 in. Hollow Stem Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
125 — 0	 5/6 8/6 16/6 11/6 50/1 -	AC	Asphalt Concrete = 3 in.				
		AB	Aggregate Base = 4 in.				
		SC	Clayey SAND	24	17.7	108.2	
		CL	Moist; dark brown; fine to medium grain sand; trace gravel.	50/1"	5.5	-	
120 — 5		SC	Silty CLAY with Sand Very stiff; moist; dark brown; fine grain sand.				
			Clayey SAND Very dense; moist; dark brown; fine to coarse grain sand; with gravel.				
115 — 10			Refusal at 4.5 due to gravel and cobbles.				
110 — 15							
105 — 20							
100 — 25							

Notes:

Figure Number A-1

SALEM engineering group, inc.

Test Boring: B-2 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/23/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

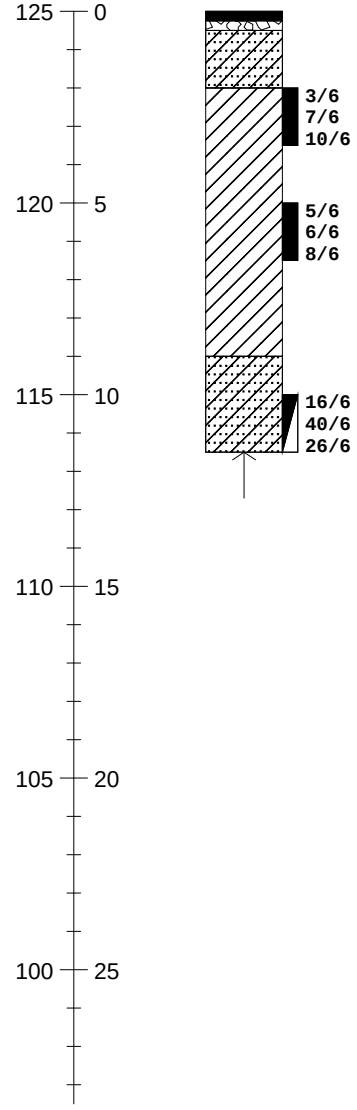
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 125'

Auger Type: 6 in. Hollow Stem Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 3 in.				
		AB	Aggregate Base = 3 in.				
		SC CL	Clayey SAND Moist; brown; fine to medium grain sand.	17	27.4	97.2	
			Silty CLAY Stiff; moist; dark brown. Grades as above; with sand.	14	13.3	114.0	
		SC	Clayey SAND Very dense; moist; brown; fine to medium grain sand; with gravel.	66	4.8	-	
			Refusal at 11.5 feet due to gravel and cobbles.				

Notes:

Figure Number A-2

SALEM
engineering group, inc.

Test Boring: B-3 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/23/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

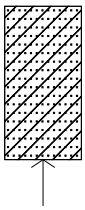
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: N/A **Elevation:** 125'

Auger Type: 3 in. Hand Auger **Initial Depth to Groundwater:** N/A

Hammer Type: N/A **Final Depth to Groundwater:** N/A

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
125 — 0		SC	Clayey SAND Moist; dark brown; fine to medium grain sand.				
120 — 5			Auger refusal at 4 feet due to gravel/cobbles.				
115 — 10							
110 — 15							
105 — 20							
100 — 25							

Notes:

Figure Number A-3

Test Boring: B-4 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/22/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

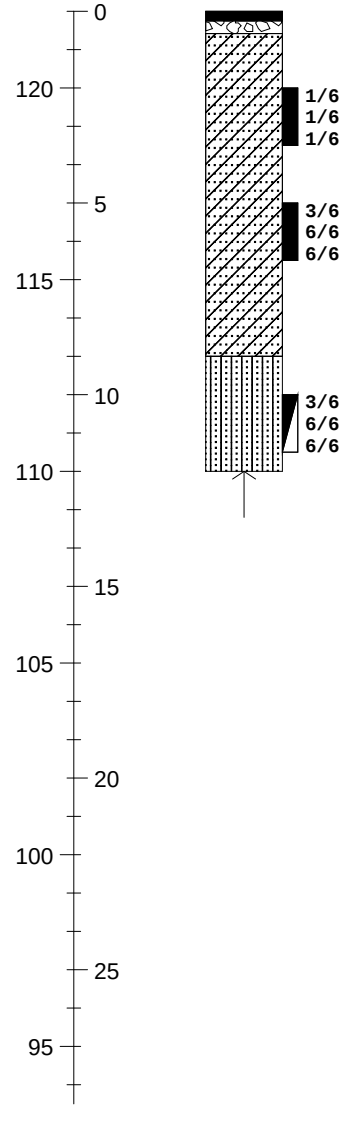
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 122'

Auger Type: 6 in. Hollow Stem Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 3 in.				
		AB	Aggregate Base = 4 in.				
		SC	Clayey SAND Very loose; moist; brown; fine to coarse grain sand; trace gravel.	2	10.5	103.7	
			Grades as above; loose.	12	11.8	113.3	
		SM	Silty SAND Medium dense; moist; brown; fine to medium grain sand; trace clay.	12	8.0	-	
			Refusal at 12 feet due to gravel/ cobbles.				

Notes:

Figure Number A-4

SALEM engineering group, inc.

Test Boring: B-5 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/23/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

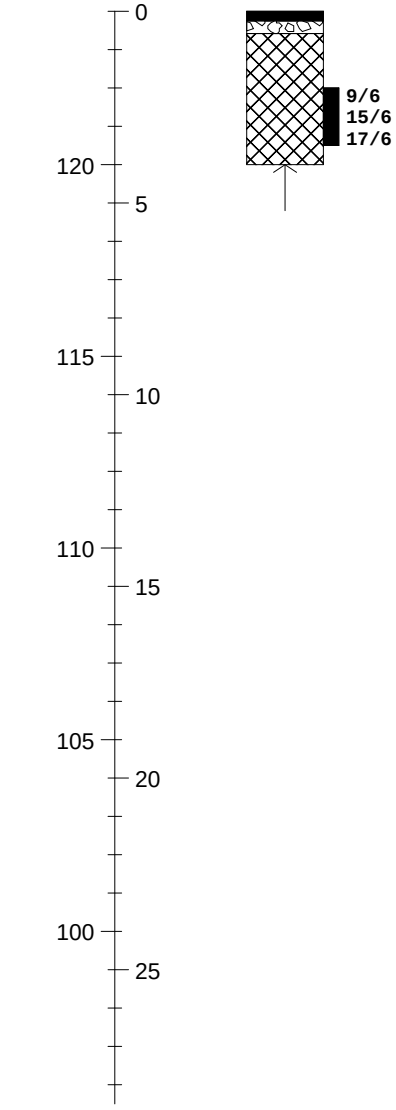
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 124'

Auger Type: 6 in. Hollow Stem Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 3 in.				
		AB	Aggregate Base = 4 in.				
	9/6 15/6 17/6	SC	FILL Clayey SAND Medium dense; moist; brown; fine to coarse grain sand; trace gravel.	32	7.4	103.4	
			Refusal at 4 feet due to gravel/ cobbles .				

Notes:

Figure Number A-5

SALEM engineering group, inc.

Test Boring: B-6 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/23/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

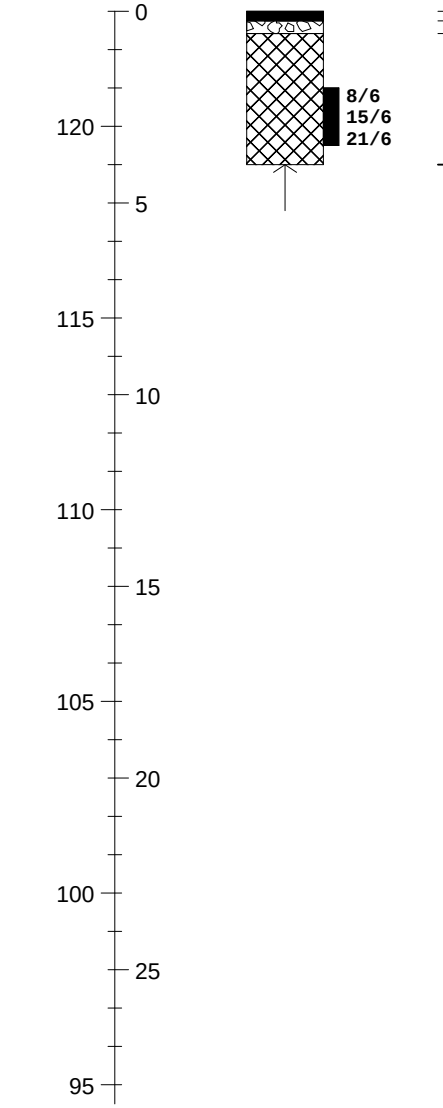
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 123'

Auger Type: 6 in. Hollow Stem Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 3 in.				Bricks in cuttings.
		AB	Aggregate Base = 4 in.				
		SC	FILL Clayey SAND Medium dense; moist; brown; fine to coarse grain sand; with gravel.	36	6.0	106.4	
			Refusal at 4 feet due to gravel/ cobbles.				

Notes:

Figure Number A-6

SALEM engineering group, inc.

Test Boring: B-7 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/22/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

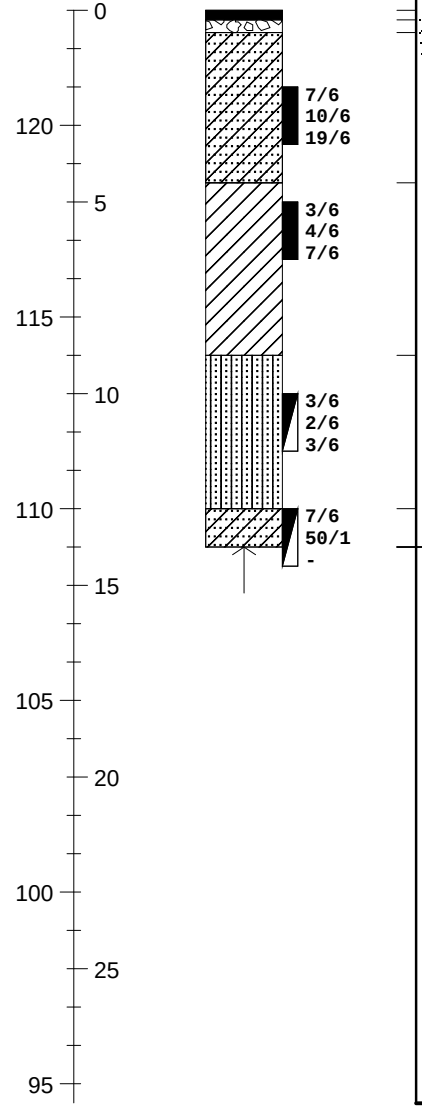
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 123'

Auger Type: 4 in. Solid Flight Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 3 in.				
		AB	Aggregate Base = 4 in.				
		SC	Clayey SAND Medium dense; moist; brown; fine to coarse grain sand; with gravel.	29	6.7	116.6	
		CL	Silty CLAY with Sand Stiff; moist; brown; fine grain sand.	11	19.5	100.5	
		SM	Silty SAND Loose; moist; brown; fine to coarse grain sand.	5	5.2	-	
		SC	Clayey SAND Very dense; moist; brown; fine to coarse grain sand; with gravel.	50/1"	4.0	-	Harder drilling at 12 feet.
			Refusal at 14 feet due to gravel/ cobbles				

Notes:

Figure Number A-7

SALEM engineering group, inc.

Test Boring: B-8 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/22/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 123'

Auger Type: 6 in. Hollow Stem Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
0 / 120		AC	Asphalt Concrete = 3 in.				
		AB	Aggregate Base = 6 in.				
	7/6 8/6 9/6	CL-ML	Silty CLAY with Sand/ Clayey SILT	17	7.7	-	
5 / 115	8/6 13/6 21/6		Very stiff; moist; brown; fine to coarse grain sand.	34	11.7	119.7	
			End of boring at 5 feet BSG.				
10 / 110							
15 / 105							
20 / 100							
25 / 95							

Notes:

Figure Number A-8

SALEM
engineering group, inc.

Test Boring: B-9 **Page** 1 **Of:** 1

Project Number: 3-220-0906

Date: 10/22/2020

Client: Frontier Real Estate Investments

Project: Proposed Multi-Tenant Buildings

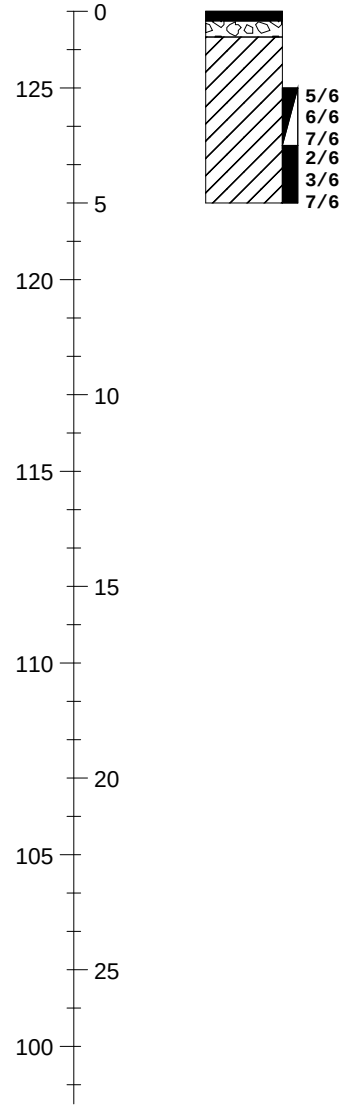
Location: 31776 El Camino Real, San Juan Capistrano, California

Drilled By: SALEM **Logged By:** ER

Drill Type: CME 45C **Elevation:** 127'

Auger Type: 6 in. Hollow Stem Auger **Initial Depth to Groundwater:** N/A

Hammer Type: Automatic Trip - 140 lb/30 in **Final Depth to Groundwater:** N/A



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	N-Values blows/ft.	Moisture Content %	Dry Density, PCF	Remarks
		AC	Asphalt Concrete = 3 in.				
		AB	Aggregate Base = 5 in.				
		CL	CLAY Stiff; moist; brown.	13	36.7	79.5	
		CL	Silty CLAY Stiff; moist; brown.	10	18.8	103.4	
			End of boring at 5 feet BSG.				

Notes:

Figure Number A-9

KEY TO SYMBOLS

Symbol Description

Strata symbols


Asphaltic Concrete


Aggregate Base


Clayey sand


Lean Clay


Silty sand


Fill


Silty low plasticity clay

Misc. Symbols


Drill rejection

Soil Samplers


California sampler


Standard penetration test

Notes:

Granular Soils
Blows Per Foot (Uncorrected)

	MCS	SPT
Very loose	<5	<4
Loose	5-15	4-10
Medium dense	16-40	11-30
Dense	41-65	31-50
Very dense	>65	>50

Cohesive Soils
Blows Per Foot (Uncorrected)

	MCS	SPT
Very soft	<3	<2
Soft	3-5	2-4
Firm	6-10	5-8
Stiff	11-20	9-15
Very Stiff	21-40	16-30
Hard	>40	>30

MCS = Modified California Sampler
SPT = Standard Penetration Test Sampler

Salem Engineering Group, Inc.
8711 Monroe Court, Suite A
Rancho Cucamonga, CA 91730
(909) 980-6455

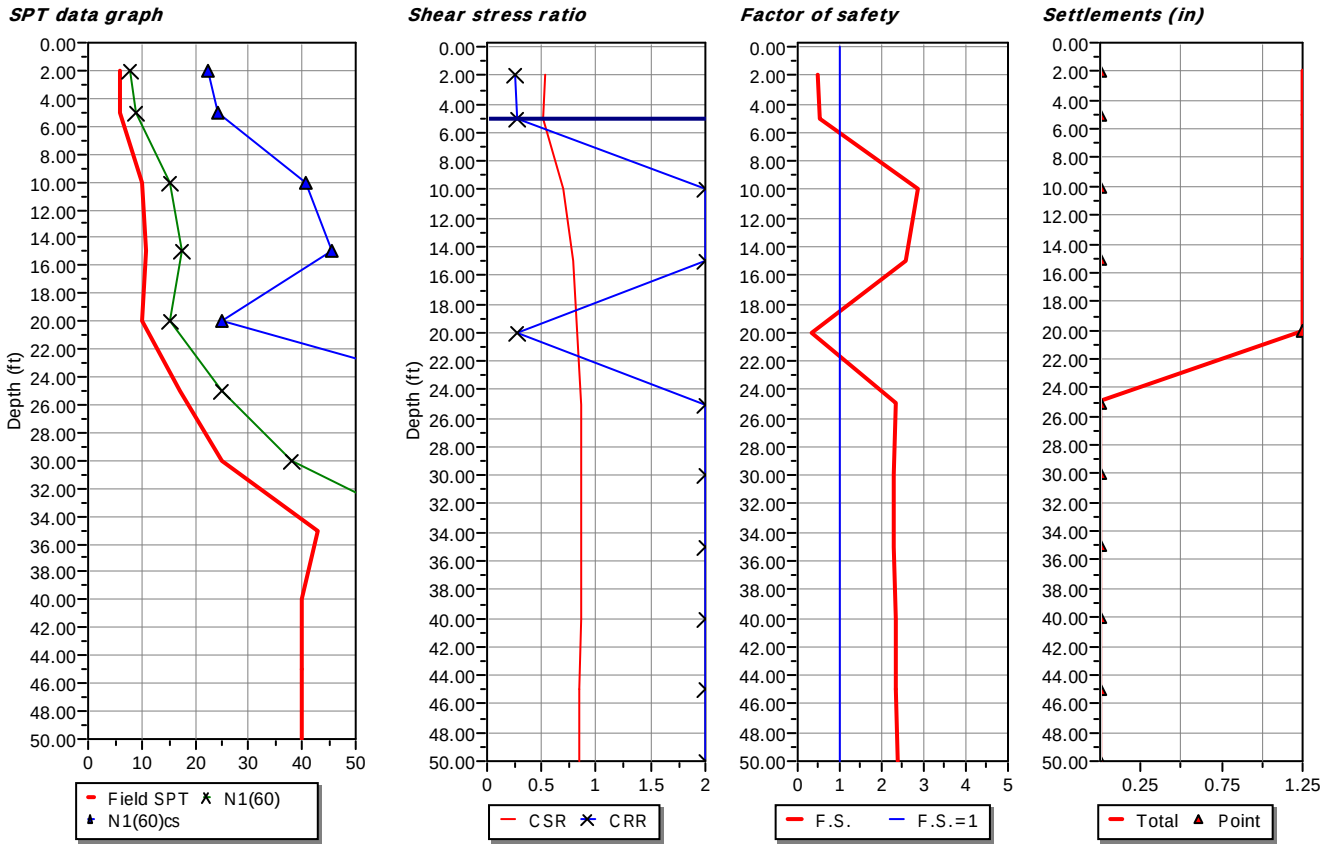
LIQUEFACTION ANALYSIS REPORT

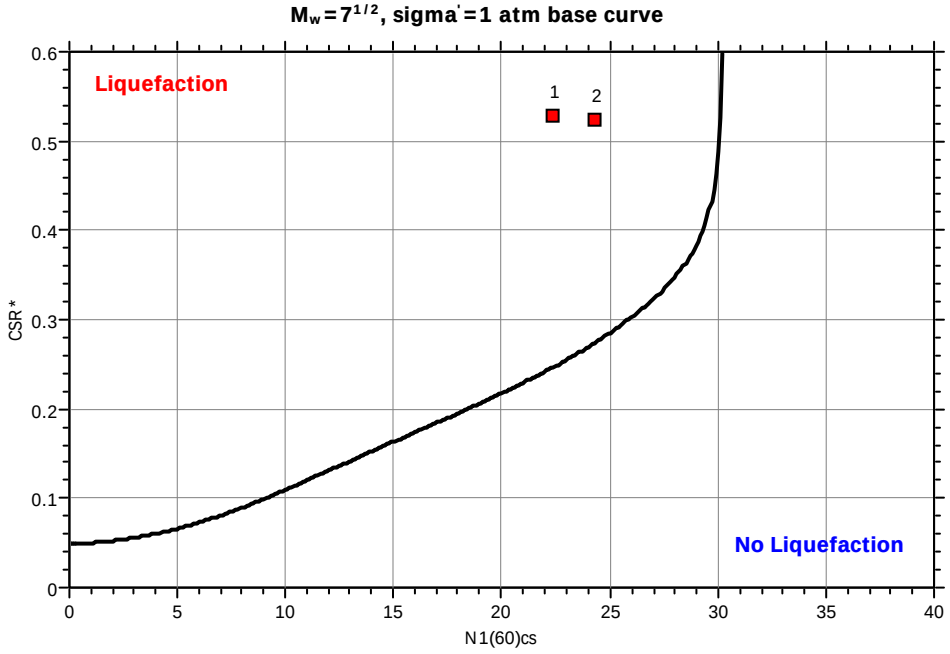
Project title : 3-220-0514

Project subtitle : San Juan Capistrano

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	5.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	7.90
Analysis method:	NCEER 1998	Peak ground accelaration:	0.55 g
Fines correction method:	Robertson & Wride	User defined F.S.:	1.30





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.00	6.00	120.00	78.00
2	5.00	6.00	120.00	75.00
3	10.00	10.00	120.00	72.00
4	15.00	11.00	120.00	70.00
5	20.00	10.00	120.00	31.00
6	25.00	17.00	120.00	80.00
7	30.00	25.00	120.00	84.00
8	35.00	43.00	120.00	79.00
9	40.00	40.00	120.00	80.00
10	45.00	40.00	120.00	80.00
11	50.00	40.00	120.00	80.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.00	0.12	0.00	0.12	1.00	0.36	0.88	0.41	1.00	0.41
2	5.00	0.30	0.00	0.30	0.99	0.35	0.88	0.40	1.00	0.40
3	10.00	0.60	0.16	0.44	0.98	0.47	0.88	0.54	1.00	0.54
4	15.00	0.90	0.31	0.59	0.97	0.53	0.88	0.60	1.00	0.60
5	20.00	1.20	0.47	0.73	0.95	0.56	0.88	0.64	1.00	0.64
6	25.00	1.50	0.62	0.88	0.94	0.58	0.88	0.66	1.00	0.66
7	30.00	1.80	0.78	1.02	0.93	0.59	0.88	0.67	1.00	0.67
8	35.00	2.10	0.94	1.16	0.89	0.57	0.88	0.66	0.98	0.67
9	40.00	2.40	1.09	1.31	0.85	0.56	0.88	0.64	0.96	0.67
10	45.00	2.70	1.25	1.45	0.81	0.54	0.88	0.61	0.94	0.66
11	50.00	3.00	1.41	1.60	0.77	0.52	0.88	0.59	0.92	0.64

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	6.00	1.70	0.86	1.00	0.75	1.20	7.90	14.43	22.33	0.25
2	6.00	1.70	0.90	1.00	0.80	1.20	8.84	15.47	24.31	0.27
3	10.00	1.53	0.97	1.00	0.85	1.20	15.20	25.47	40.67	2.00
4	11.00	1.33	1.04	1.00	0.95	1.20	17.40	28.28	45.68	2.00
5	10.00	1.19	1.11	1.00	0.95	1.20	15.12	9.83	24.95	0.28
6	17.00	1.09	1.18	1.00	0.95	1.20	24.97	46.81	71.78	2.00
7	25.00	1.01	1.25	1.00	1.00	1.20	37.92	74.89	112.82	2.00
8	43.00	0.95	1.32	1.00	1.00	1.20	64.44	119.22	183.67	2.00
9	40.00	0.89	1.33	1.00	1.00	1.20	57.20	107.25	164.45	2.00
10	40.00	0.85	1.33	1.00	1.00	1.20	54.29	101.79	156.08	2.00
11	40.00	0.81	1.33	1.00	1.00	1.20	51.78	97.09	148.88	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	22.33	18.61	0.47	2.30	0.00
2	24.31	20.25	0.52	2.13	0.00
3	40.67	33.89	2.85	0.00	0.00
4	45.68	38.07	2.55	0.00	0.00
5	24.95	20.79	0.34	2.08	1.25
6	71.78	59.82	2.33	0.00	0.00
7	112.82	94.01	2.29	0.00	0.00
8	183.67	153.05	2.29	0.00	0.00
9	164.45	137.04	2.31	0.00	0.00
10	156.08	130.07	2.34	0.00	0.00
11	148.88	124.06	2.40	0.00	0.00

Total settlement : 1.25

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.53	9.70	3.16
2	0.48	9.24	4.04
3	0.00	8.48	0.00
4	0.00	7.71	0.00
5	0.66	6.95	6.97
6	0.00	6.19	0.00
7	0.00	5.43	0.00
8	0.00	4.67	0.00
9	0.00	3.90	0.00
10	0.00	3.14	0.00
11	0.00	2.38	0.00

Overall potential I_L : 14.17

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

Salem Engineering Group, Inc.
8711 Monroe Court, Suite A
Rancho Cucamonga, CA 91730
(909) 980-6455

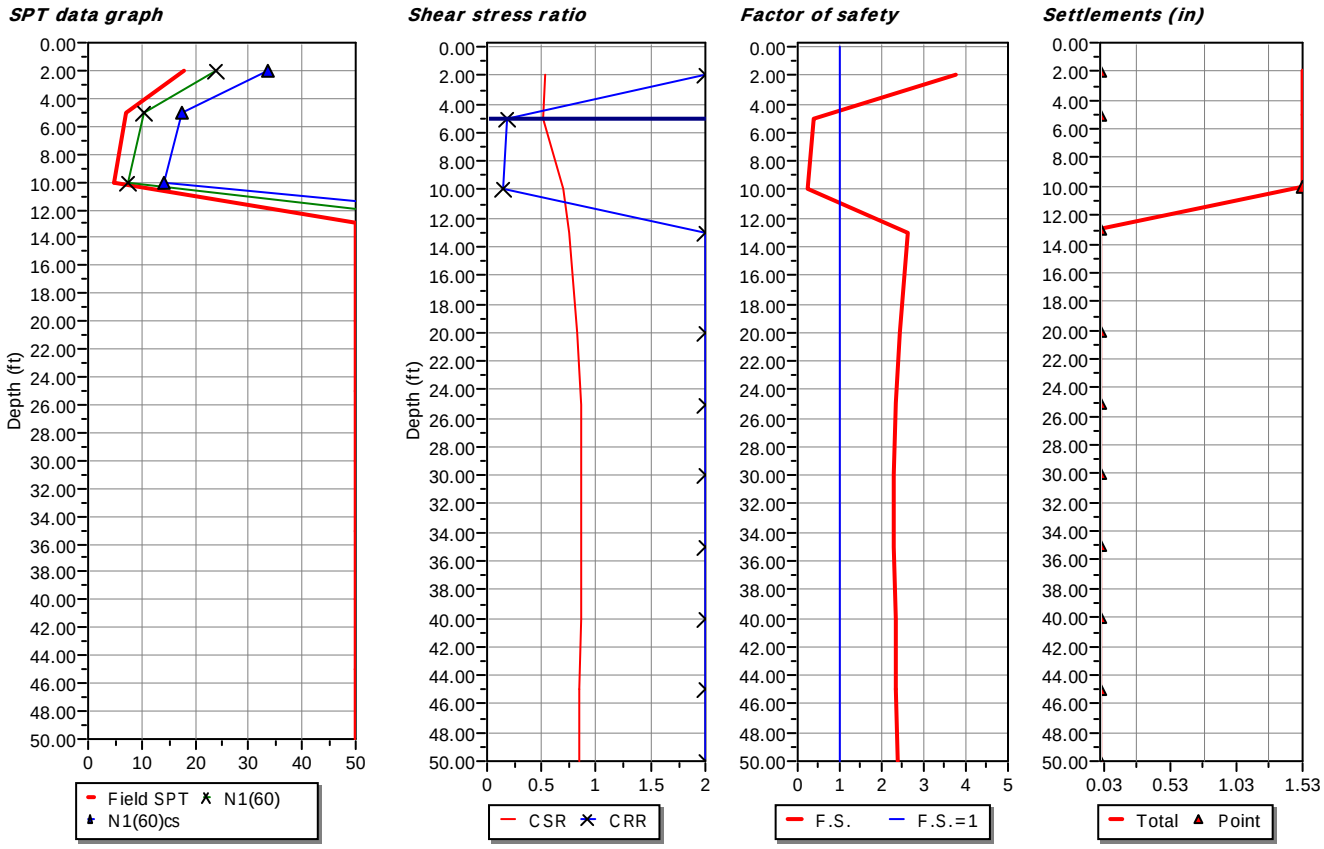
LIQUEFACTION ANALYSIS REPORT

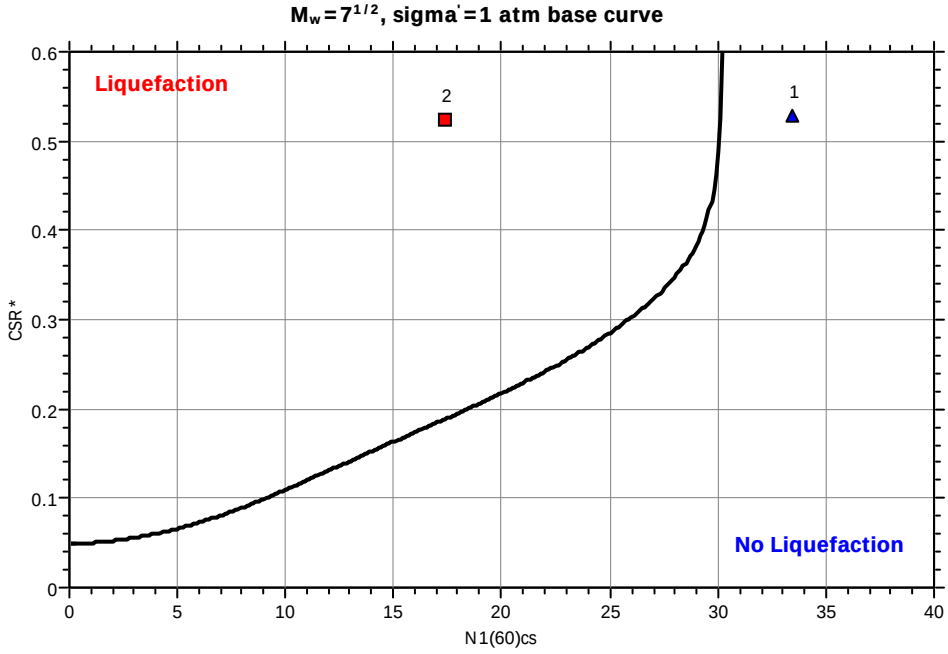
Project title : 3-220-0906

Project subtitle : B-7

Input parameters and analysis data

In-situ data type:	Standard Penetration Test	Depth to water table:	5.00 ft
Analysis type:	Deterministic	Earthquake magnitude M_w:	7.90
Analysis method:	NCEER 1998	Peak ground accelaration:	0.55 g
Fines correction method:	Idriss & Seed	User defined F.S.:	1.30





:: Field input data ::

Point ID	Depth (ft)	Field N_{SPT} (blows/feet)	Unit weight (pcf)	Fines content (%)
1	2.00	18.00	120.00	40.00
2	5.00	7.00	120.00	71.00
3	10.00	5.00	120.00	35.00
4	13.00	50.00	120.00	40.00
5	20.00	50.00	120.00	40.00
6	25.00	50.00	120.00	40.00
7	30.00	50.00	120.00	40.00
8	35.00	50.00	120.00	40.00
9	40.00	50.00	120.00	40.00
10	45.00	50.00	120.00	40.00
11	50.00	50.00	120.00	40.00

Depth : Depth from free surface, at which SPT was performed (ft)
Field SPT : SPT blows measured at field (blows/feet)
Unit weight : Bulk unit weight of soil at test depth (pcf)
Fines content : Percentage of fines in soil (%)

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Point ID	Depth (ft)	Sigma (tsf)	u (tsf)	Sigma' (tsf)	r_d	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*
1	2.00	0.12	0.00	0.12	1.00	0.36	0.88	0.41	1.00	0.41
2	5.00	0.30	0.00	0.30	0.99	0.35	0.88	0.40	1.00	0.40
3	10.00	0.60	0.16	0.44	0.98	0.47	0.88	0.54	1.00	0.54
4	13.00	0.78	0.25	0.53	0.97	0.51	0.88	0.58	1.00	0.58
5	20.00	1.20	0.47	0.73	0.95	0.56	0.88	0.64	1.00	0.64
6	25.00	1.50	0.62	0.88	0.94	0.58	0.88	0.66	1.00	0.66
7	30.00	1.80	0.78	1.02	0.93	0.59	0.88	0.67	1.00	0.67
8	35.00	2.10	0.94	1.16	0.89	0.57	0.88	0.66	0.98	0.67
9	40.00	2.40	1.09	1.31	0.85	0.56	0.88	0.64	0.96	0.67
10	45.00	2.70	1.25	1.45	0.81	0.54	0.88	0.61	0.94	0.66
11	50.00	3.00	1.41	1.60	0.77	0.52	0.88	0.59	0.92	0.64

Depth : Depth from free surface, at which SPT was performed (ft)
Sigma : Total overburden pressure at test point, during earthquake (tsf)
u : Water pressure at test point, during earthquake (tsf)
Sigma' : Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
CSR : Cyclic Stress Ratio
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$ CSR adjusted for M=7.5
K_{sigma} Effective overburden stress factor
CSR^* CSR fully adjusted

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$
1	18.00	1.70	0.86	1.00	0.75	1.20	23.71	9.74	33.46	2.00
2	7.00	1.70	0.90	1.00	0.80	1.20	10.31	7.06	17.37	0.19
3	5.00	1.53	0.97	1.00	0.85	1.20	7.60	6.48	14.08	0.15
4	50.00	1.40	1.01	1.00	0.85	1.20	72.53	19.51	92.04	2.00
5	50.00	1.19	1.11	1.00	0.95	1.20	75.61	20.12	95.74	2.00
6	50.00	1.09	1.18	1.00	0.95	1.20	73.43	19.69	93.12	2.00
7	50.00	1.01	1.25	1.00	1.00	1.20	75.84	20.17	96.01	2.00
8	50.00	0.95	1.32	1.00	1.00	1.20	74.94	19.99	94.92	2.00
9	50.00	0.89	1.33	1.00	1.00	1.20	71.50	19.30	90.80	2.00
10	50.00	0.85	1.33	1.00	1.00	1.20	67.86	18.57	86.44	2.00
11	50.00	0.81	1.33	1.00	1.00	1.20	64.73	17.95	82.68	2.00

:: Cyclic Resistance Ratio calculation $CRR_{7.5}$ ::

Point ID	Field SPT	C_n	C_e	C_b	C_r	C_s	$N_{1(60)}$	DeltaN	$N_{1(60)cs}$	$CRR_{7.5}$

C_n : Overburden corretion factor
C_e : Energy correction factor
C_b : Borehole diameter correction factor
C_r : Rod length correction factor
C_s : Liner correction factor
$N_{1(60)}$: Corrected N_{SPT}
DeltaN : Addition to corrected N_{SPT} value due to the presence of fines
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines
$CRR_{7.5)}$: Cyclic resistance ratio for M=7.5

:: Settlements calculation for saturated sands ::

Point ID	$N_{1(60)}$	N_1	FS_L	e_v (%)	Settle. (in)
1	33.46	27.88	3.78	0.00	0.00
2	17.37	14.48	0.36	2.75	0.00
3	14.08	11.73	0.22	3.20	1.53
4	92.04	76.70	2.64	0.00	0.00
5	95.74	79.78	2.41	0.00	0.00
6	93.12	77.60	2.33	0.00	0.00
7	96.01	80.01	2.29	0.00	0.00
8	94.92	79.10	2.29	0.00	0.00
9	90.80	75.67	2.31	0.00	0.00
10	86.44	72.03	2.34	0.00	0.00
11	82.68	68.90	2.40	0.00	0.00

Total settlement : 1.53

$N_{1,(60)}$: Stress normalized and corrected SPT blow count
N_1: Japanese equivalent corrected value
FS_L: Calculated factor of safety
e_v: Post-liquefaction volumentric strain (%)
Settle.: Calculated settlement (in)

:: Liquefaction potential according to Iwasaki ::

Point ID	F	w_z	I_L
1	0.00	9.70	0.00
2	0.64	9.24	5.41
3	0.78	8.48	10.09
4	0.00	8.02	0.00
5	0.00	6.95	0.00
6	0.00	6.19	0.00
7	0.00	5.43	0.00
8	0.00	4.67	0.00
9	0.00	3.90	0.00
10	0.00	3.14	0.00
11	0.00	2.38	0.00

Overall potential I_L : 15.50

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

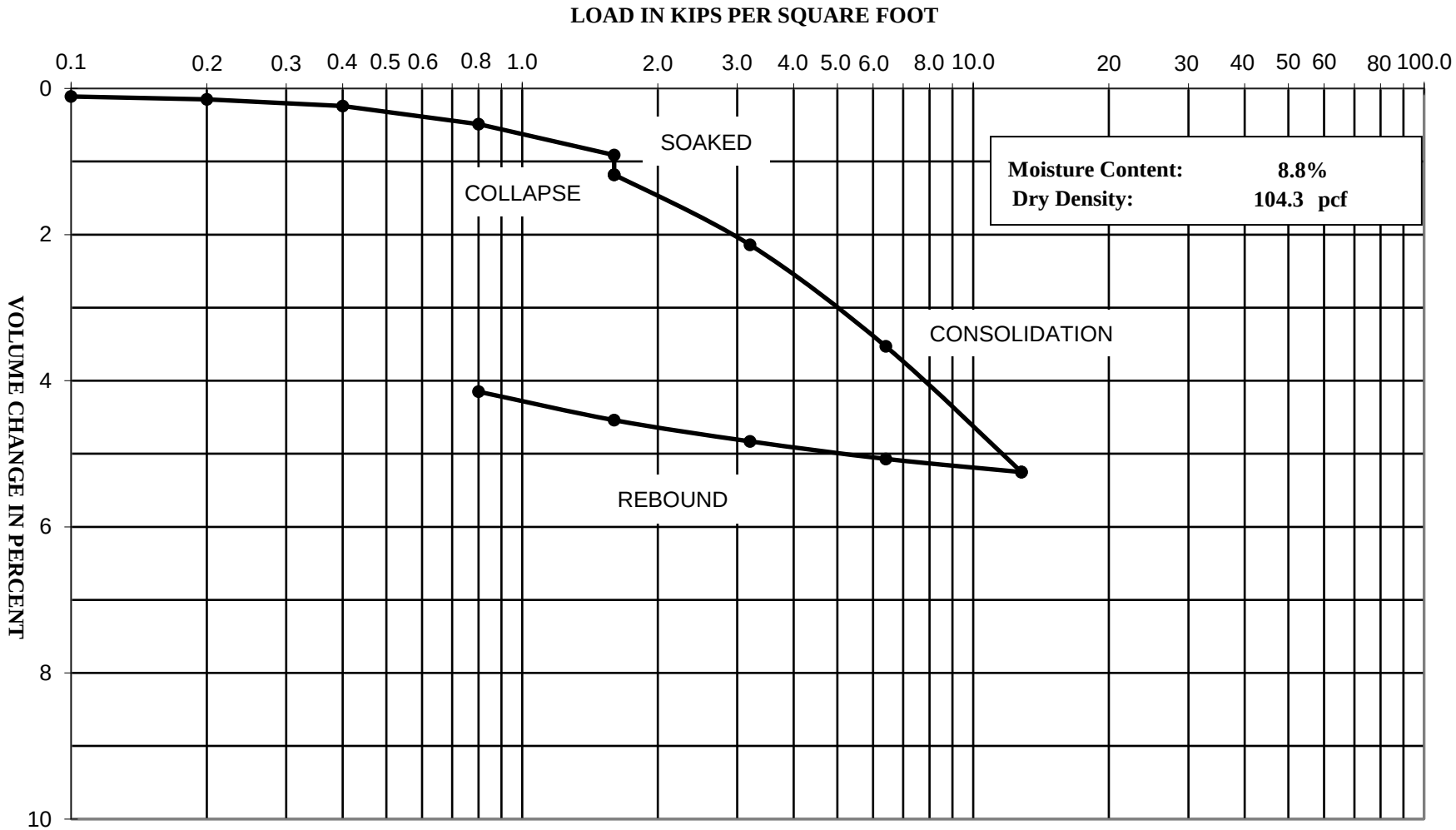
APPENDIX

B

APPENDIX B
LABORATORY TESTING Of ADJACENT SITES

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM), Caltrans, or other suggested procedures. Selected samples were tested for in-situ dry density and moisture content, corrosivity, consolidation, shear strength, expansion index, plasticity index, maximum density and optimum moisture content, and grain size distribution. The results of the laboratory tests are summarized in the following figures.

CONSOLIDATION - PRESSURE TEST DATA
ASTM D2435



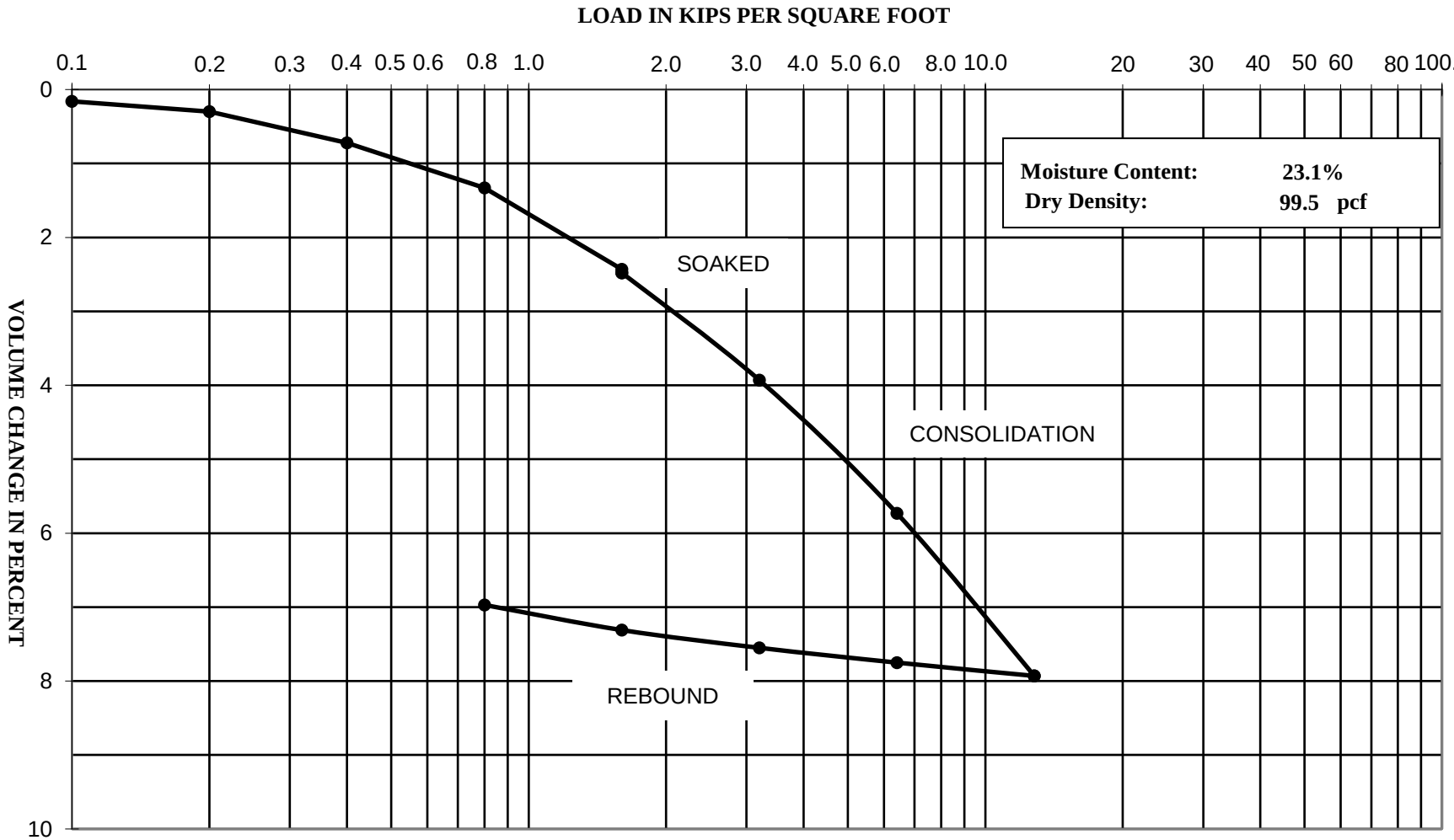
Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

Project Number: 3-220-0514

Boring: B-4 @ 5'

SALEM engineering group, inc.

CONSOLIDATION - PRESSURE TEST DATA
ASTM D2435



Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

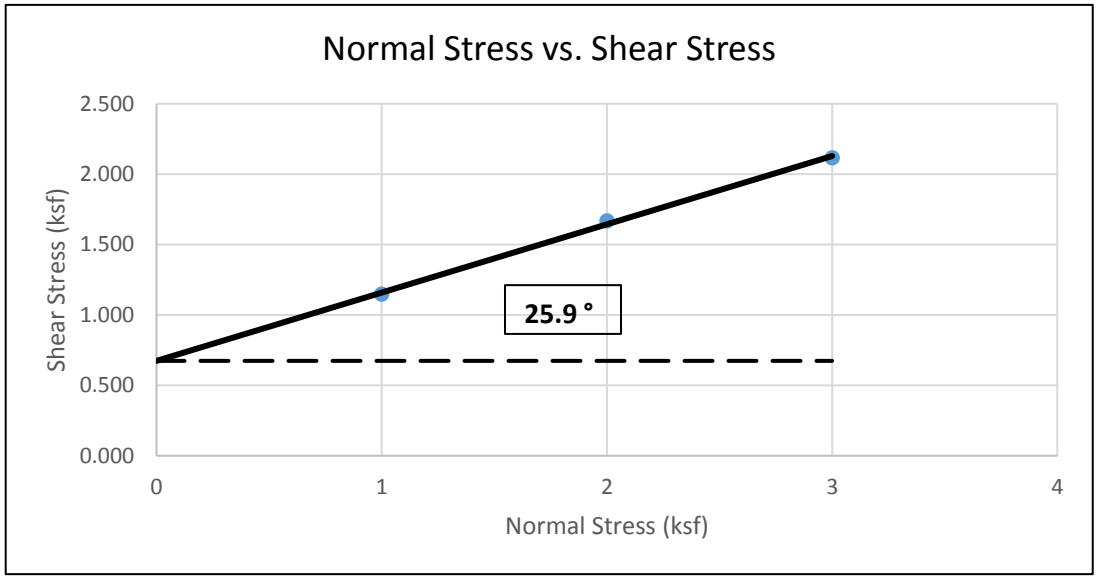
Project Number: 3-220-0514

Boring: B-5 @ 2'

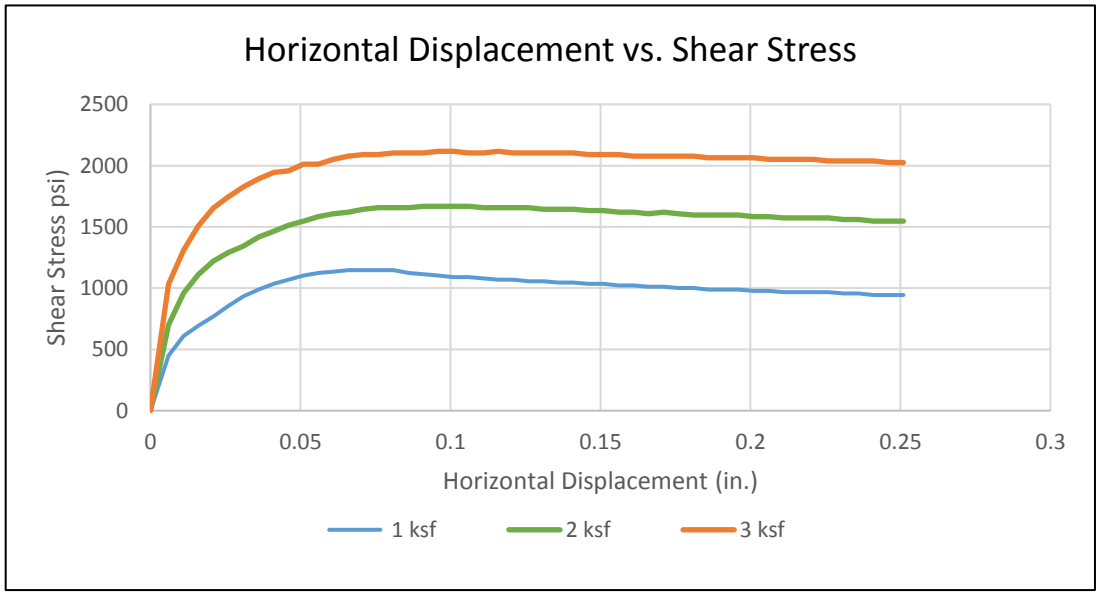
SALEM engineering group, inc.

Direct Shear Test (ASTM D3080)

Project Name:	Proposed Apartments & Retail Development - San Juan Capistrano, CA
Project Number:	3-220-0514
Client:	Frontier Real Estate Investments
Sample Location:	B-5 @ 5'
Sample Type:	Undisturbed Ring
Soil Classification:	CLAY with Sand (CL)
Tested By:	M. Noorzay
Reviewed By:	CJ
Date:	7/16/2020
Equipment Used:	Geomatic Direct Shear Machine



	Sample 1	Sample 2	Sample 3
Normal Stress (ksf)	1.000	2.000	3.000
Shear Rate (in/min)	0.003		
Peak Shear Stress (ksf)	1.147	1.668	2.117
Residual Shear Stress (ksf)	0.000	0.000	0.000



Initial Height of Sample (in)	1.000	1.000	1.000
Height of Sample before Shear (in.)	1	1	1
Diameter of Sample (in)	2.416	2.416	2.416
Initial Moisture Content (%)	23.8		
Final Moisture Content (%)	24.8	23.6	24.6
Dry Density (pcf)	97.8	100.2	98.2

Peak Shear Strength Values	
Slope	0.49
Friction Angle	25.9
Cohesion (psf)	674

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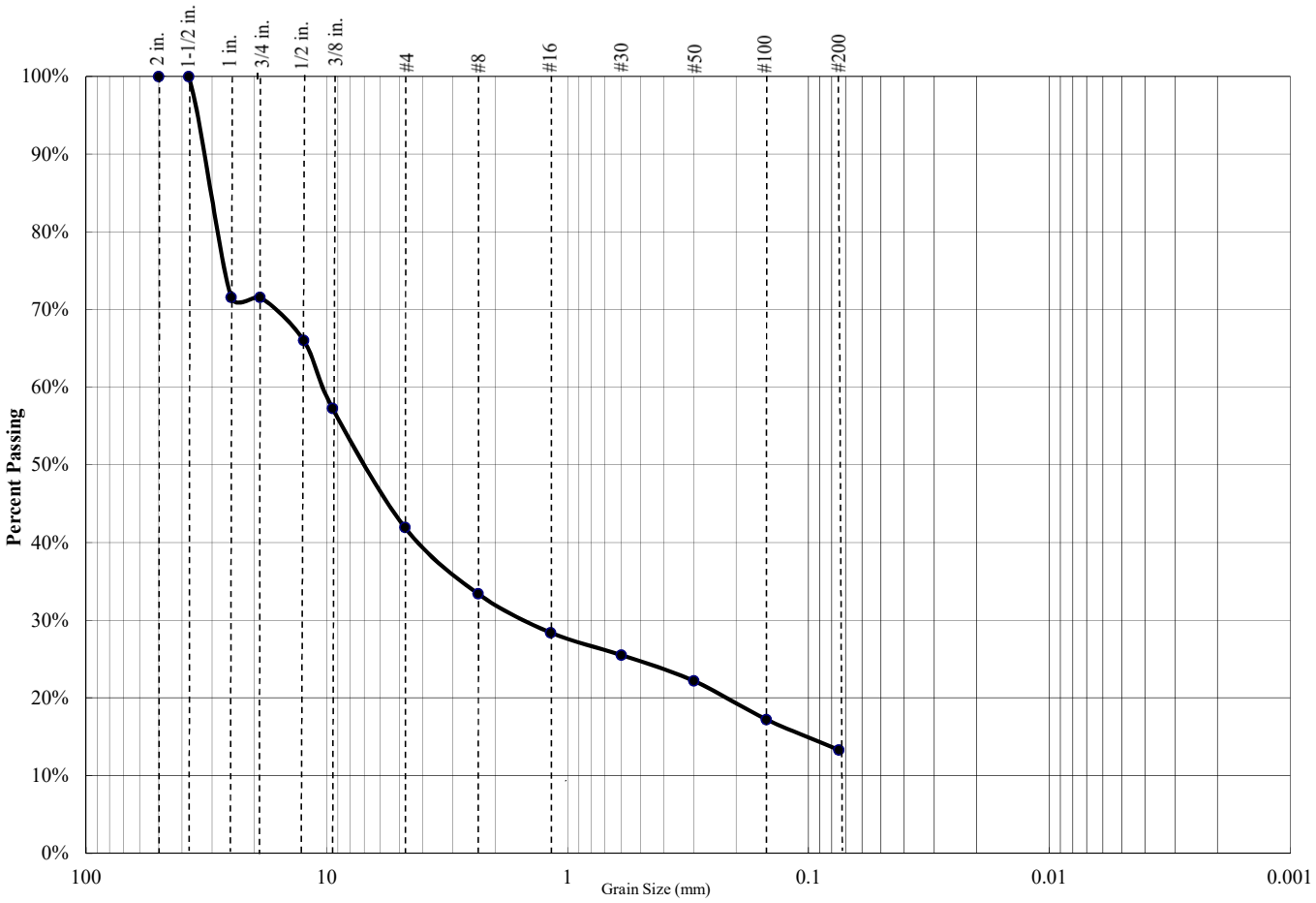
PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
58%	29%	13%

Sieve Size	Percent Passing
3/4 inch	71.6%
1/2 inch	66.0%
3/8 inch	57.3%
#4	42.0%
#8	33.4%
#16	28.4%
#30	25.5%
#50	22.2%
#100	17.2%
#200	13.3%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Silty GRAVEL with Sand (GM)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

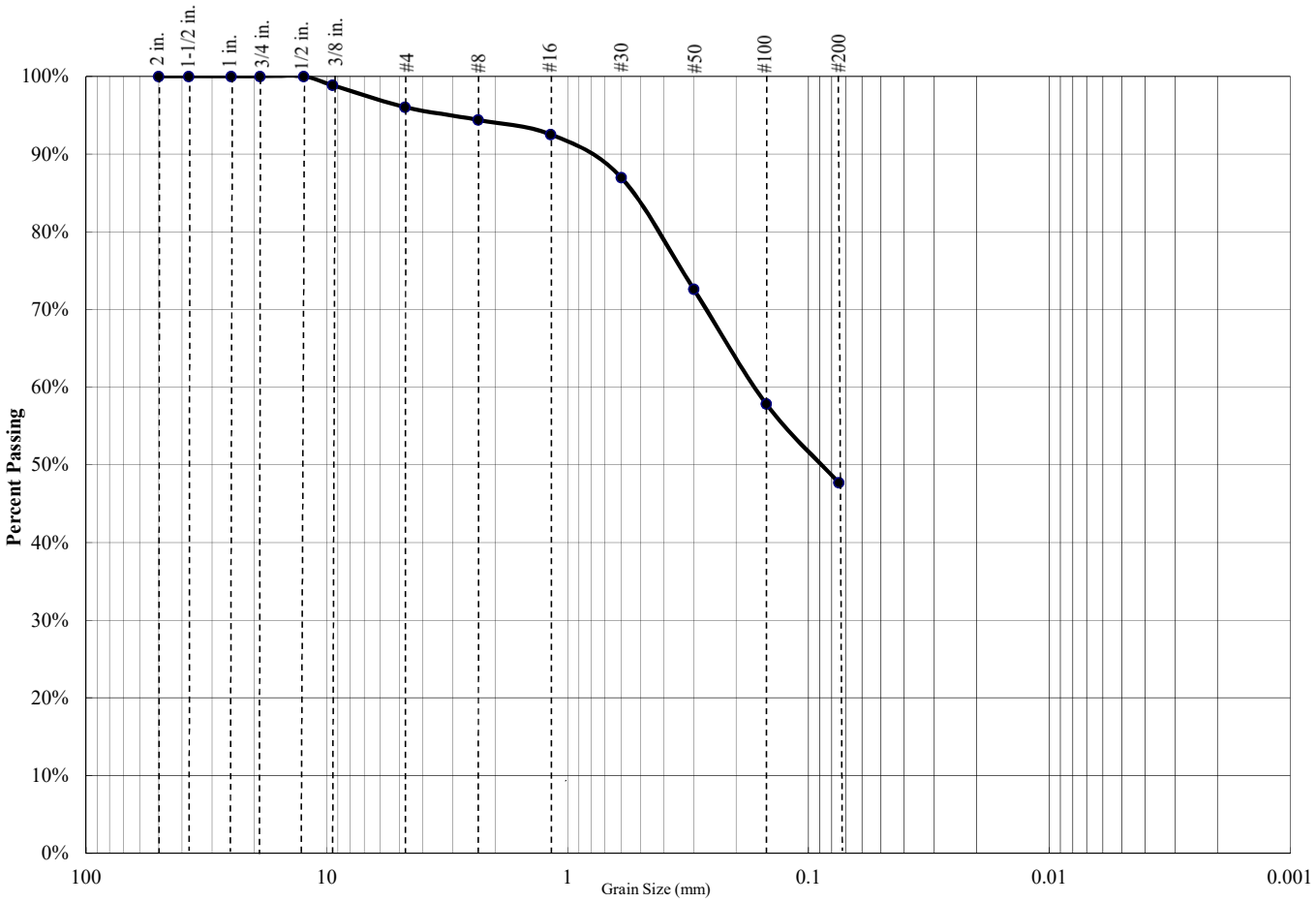
Project Number: 3-220-0514

Boring: B-2 @ 10'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
4%	48%	48%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	98.9%
#4	96.1%
#8	94.4%
#16	92.5%
#30	87.0%
#50	72.6%
#100	57.9%
#200	47.7%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Clayey SAND (SC)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

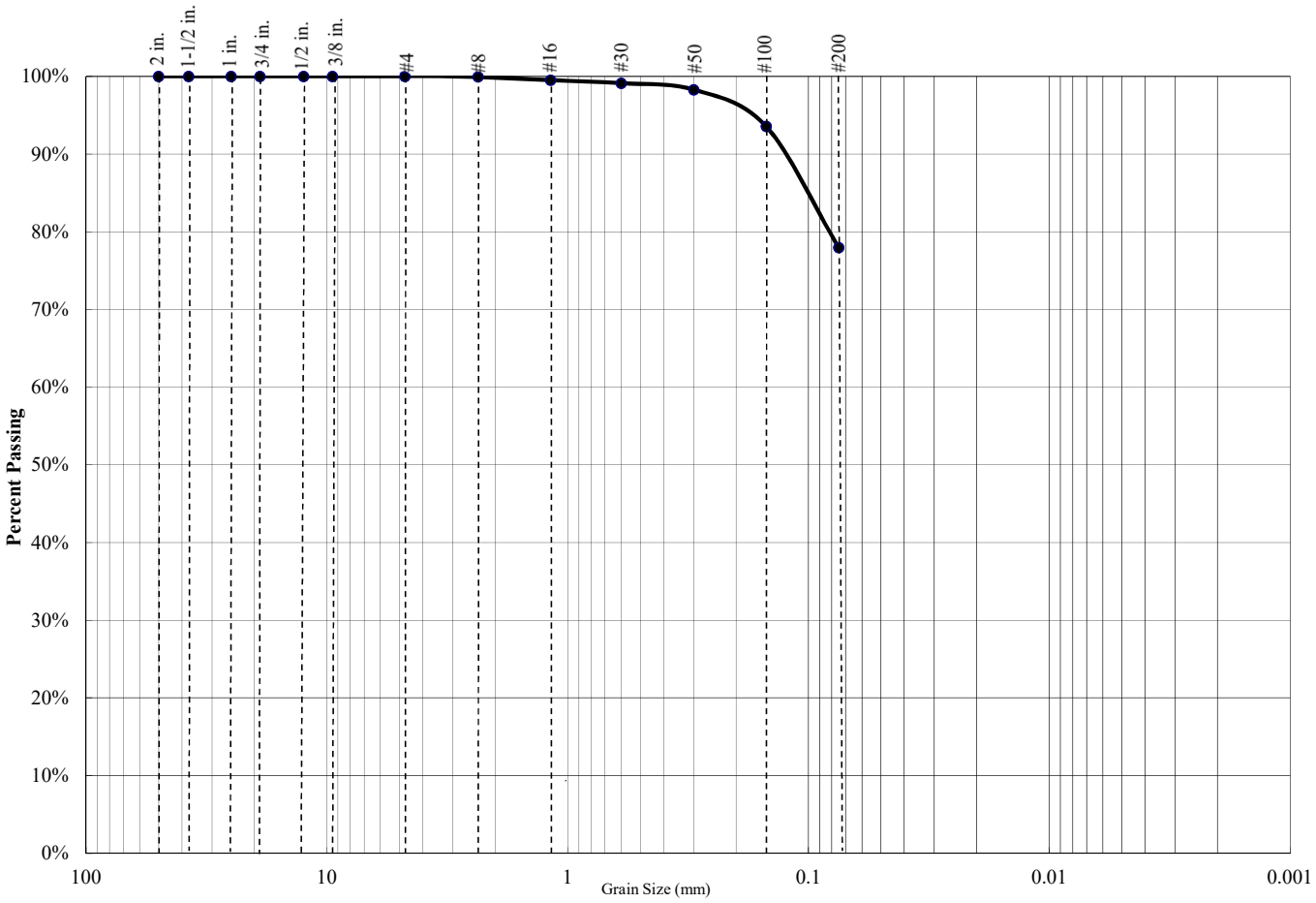
Project Number: 3-220-0514

Boring: B-4 @ 5'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
0%	22%	78%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	100.0%
#4	100.0%
#8	100.0%
#16	99.5%
#30	99.1%
#50	98.3%
#100	93.6%
#200	78.0%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
CLAY with Sand (CL)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

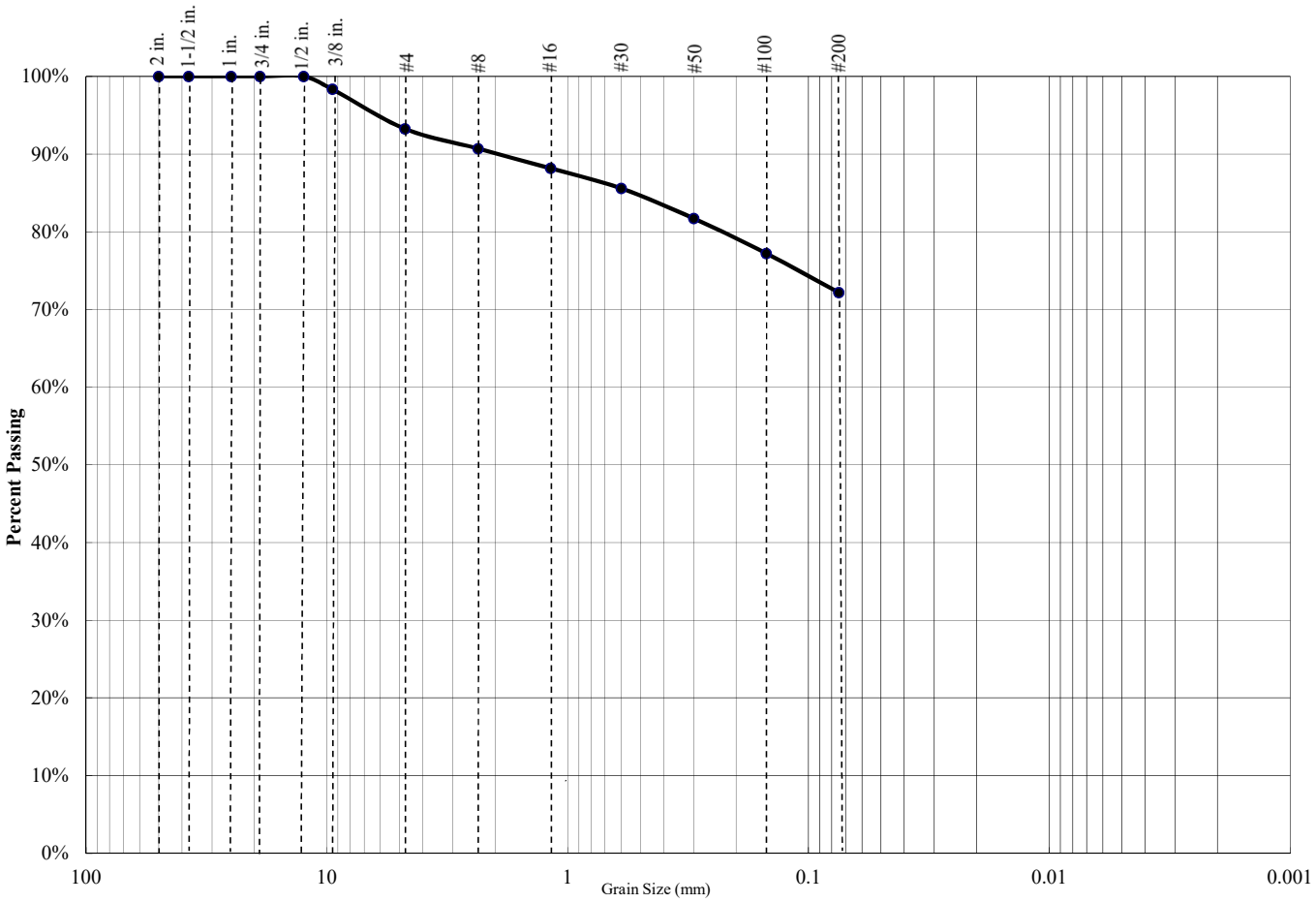
Project Number: 3-220-0514

Boring: B-5 @ 2'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
7%	21%	72%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	98.3%
#4	93.3%
#8	90.7%
#16	88.2%
#30	85.6%
#50	81.7%
#100	77.2%
#200	72.2%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
CLAY with Sand (CL)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

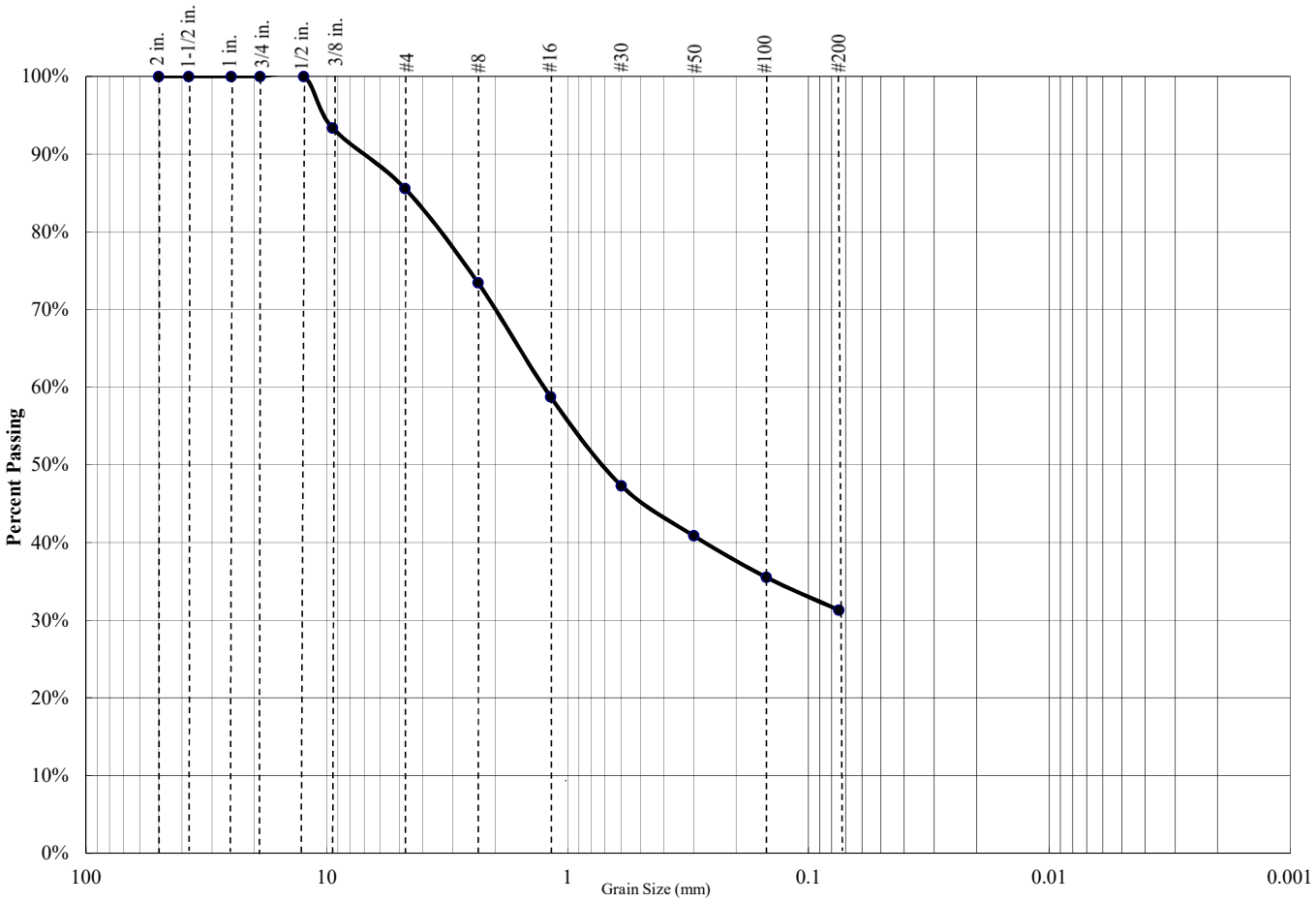
Project Number: 3-220-0514

Boring: B-5 @ 10'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
14%	55%	31%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	93.4%
#4	85.6%
#8	73.5%
#16	58.8%
#30	47.3%
#50	40.9%
#100	35.5%
#200	31.3%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Clayey SAND (SC)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

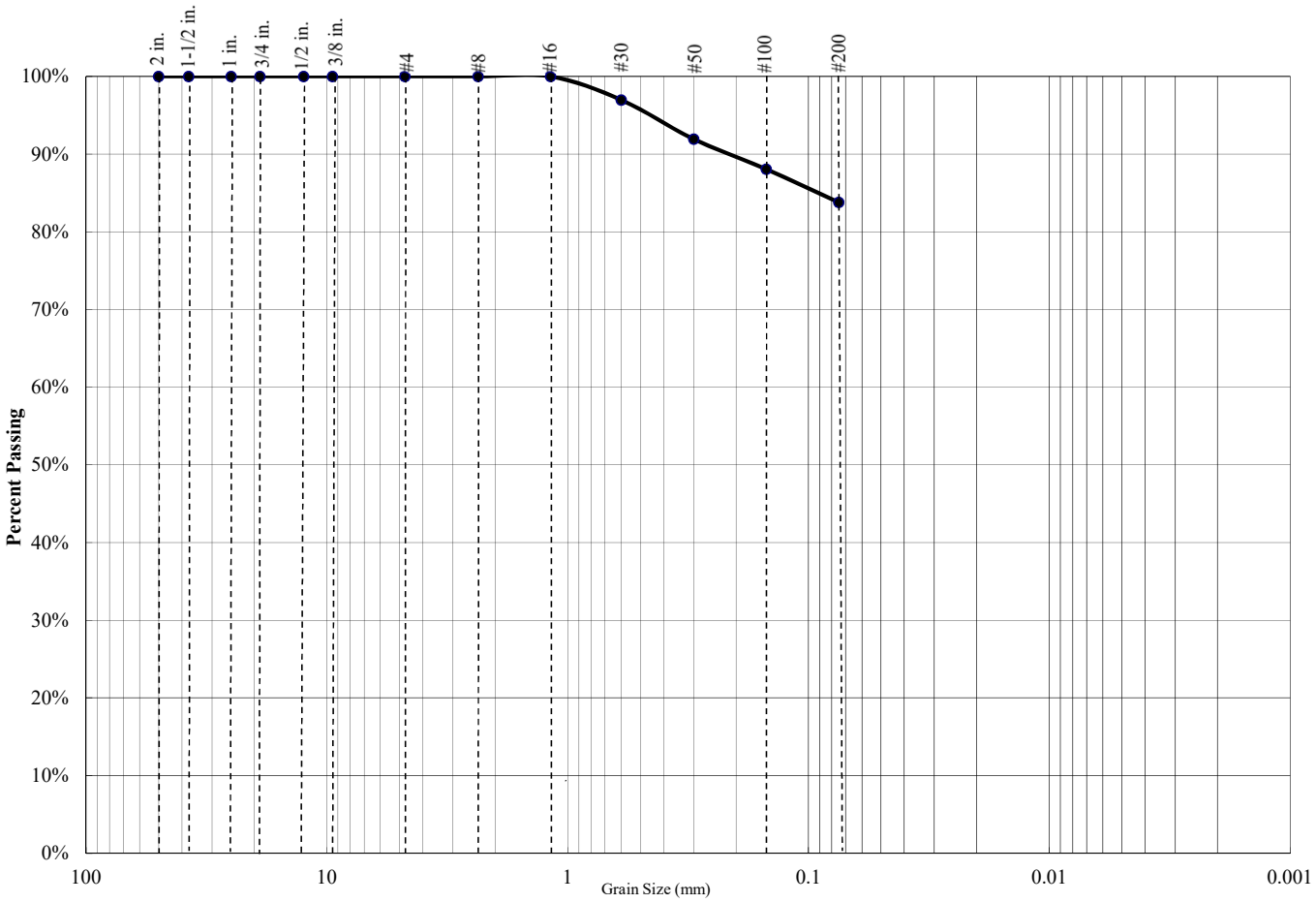
Project Number: 3-220-0514

Boring: B-5 @ 20'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
0%	16%	84%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	100.0%
#4	100.0%
#8	100.0%
#16	100.0%
#30	97.0%
#50	91.9%
#100	88.1%
#200	83.8%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
SILT with Sand (ML)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

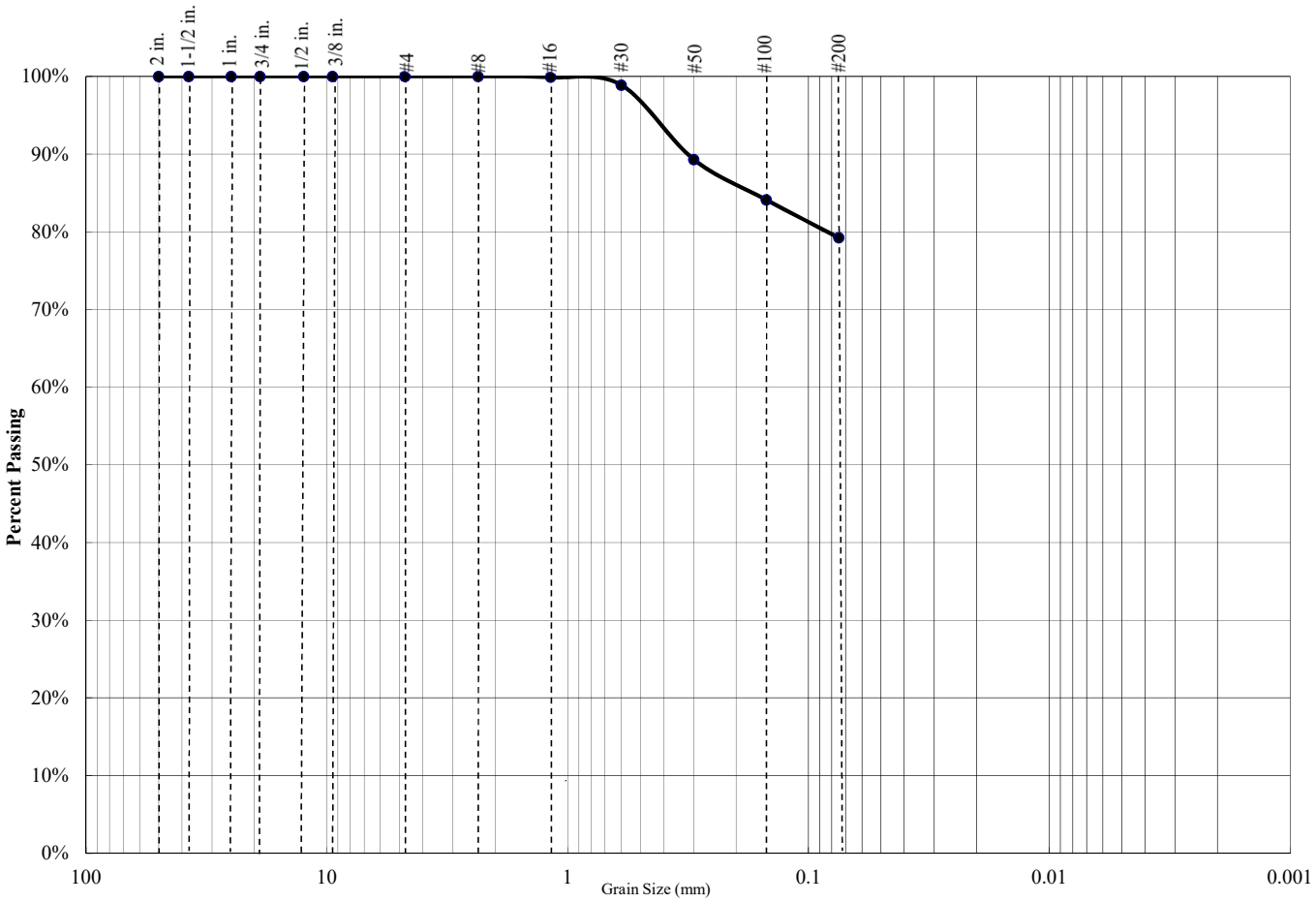
Project Number: 3-220-0514

Boring: B-5 @ 30'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
0%	21%	79%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	100.0%
#4	100.0%
#8	100.0%
#16	99.9%
#30	98.9%
#50	89.3%
#100	84.1%
#200	79.2%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
SILT with Sand (ML)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

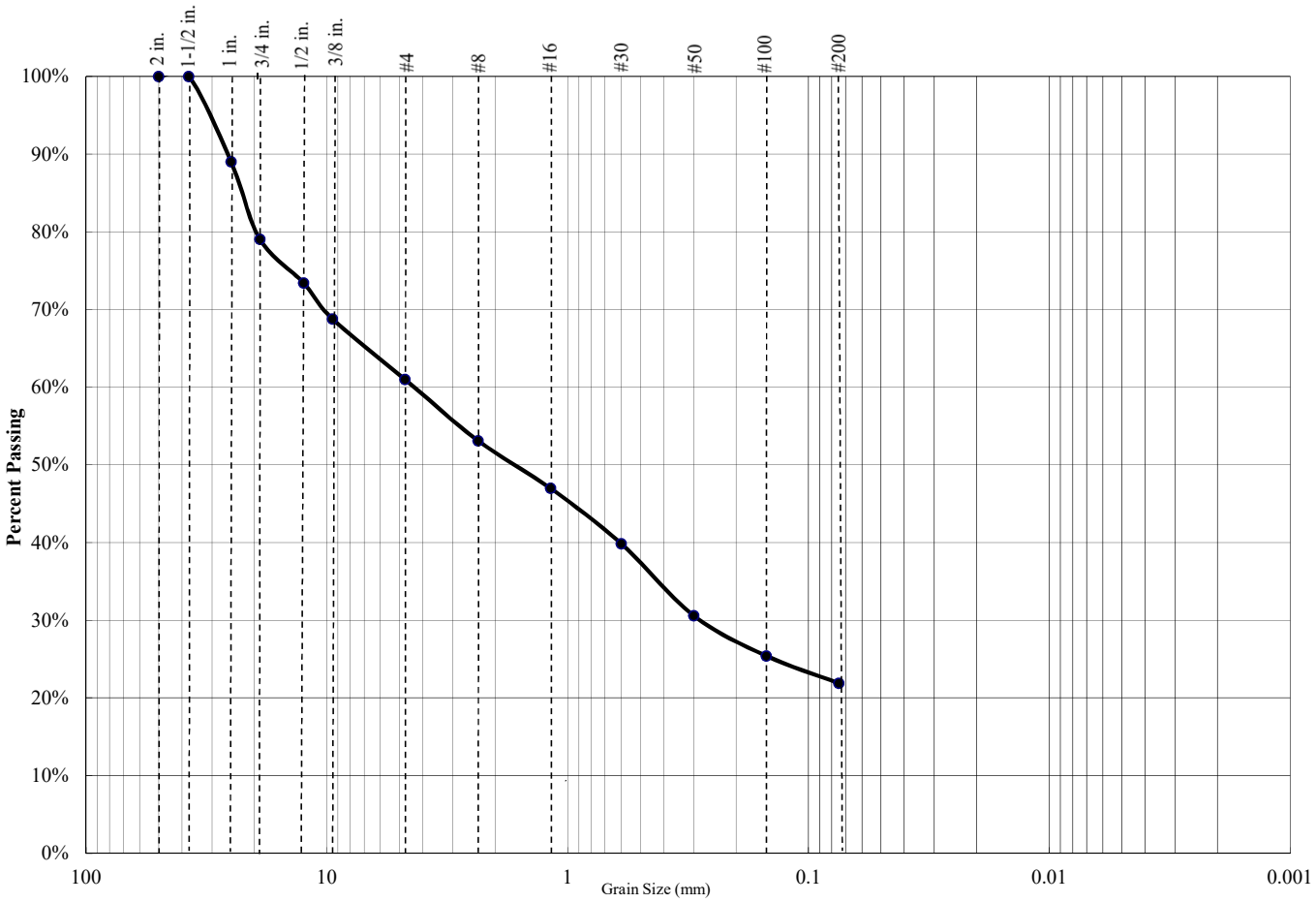
Project Number: 3-220-0514

Boring: B-5 @ 35'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
39%	39%	22%

Sieve Size	Percent Passing
3/4 inch	79.1%
1/2 inch	73.4%
3/8 inch	68.8%
#4	61.0%
#8	53.1%
#16	47.0%
#30	39.9%
#50	30.6%
#100	25.4%
#200	21.9%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Clayey SAND (SC)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

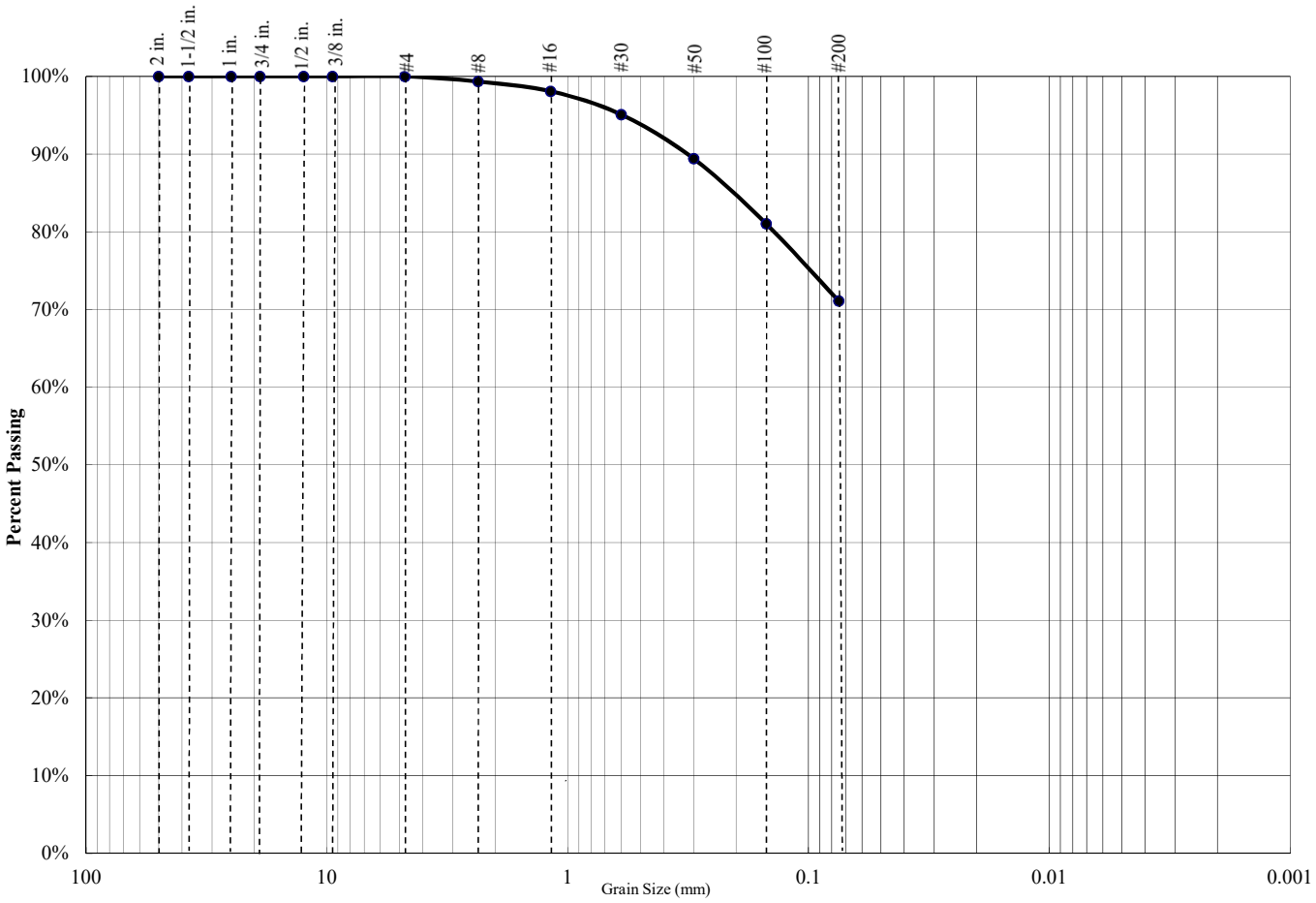
Project Number: 3-220-0514

Boring: B-6 @ 2'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
0%	29%	71%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	100.0%
#4	100.0%
#8	99.3%
#16	98.1%
#30	95.1%
#50	89.4%
#100	81.0%
#200	71.1%

Atterberg Limits		
PL=	LL=	PI=

Coefficients			
D_{85}=		D_{60}=	D_{50}=
D_{30}=		D_{15}=	D_{10}=
C_u=	N/A	C_c=	N/A

USCS CLASSIFICATION
CLAY with Sand (CL)

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA

Project Number: 3-220-0514

Boring: B-9 @ 2'

SALEM engineering group, inc.

EXPANSION INDEX TEST
ASTM D4829

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA
Project Number: 3-220-0514
Date Sampled: 7/9/2020 Date Tested: 7/13/2020
Sampled By: EGR Tested By: M. Noorzay
Sample Location: B-1 @ 1'-4'
Soil Description: Brown Silty GRAVEL (GM) with Sand and trace Clay

Trial #	1	2	3
Weight of Soil & Mold, g.	784.0		
Weight of Mold, g.	367.7		
Weight of Soil, g.	416.3		
Wet Density, pcf	125.6		
Weight of Moisture Sample (Wet), g.	800.0		
Weight of Moisture Sample (Dry), g.	735.3		
Moisture Content, %	8.8		
Dry Density, pcf	115.4		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	51.6		

Time	Inital	30 min	1 hr	6 hrs	12 hrs	24 hrs
Dial Reading	0	0.002	0.004	--	--	0.005

Expansion Index $_{measured}$ = 5
Expansion Index $_{50}$ = 5.7

Expansion Index = **6**

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

SALEM engineering group, inc.

Atterberg Limits Determination

ASTM D4318

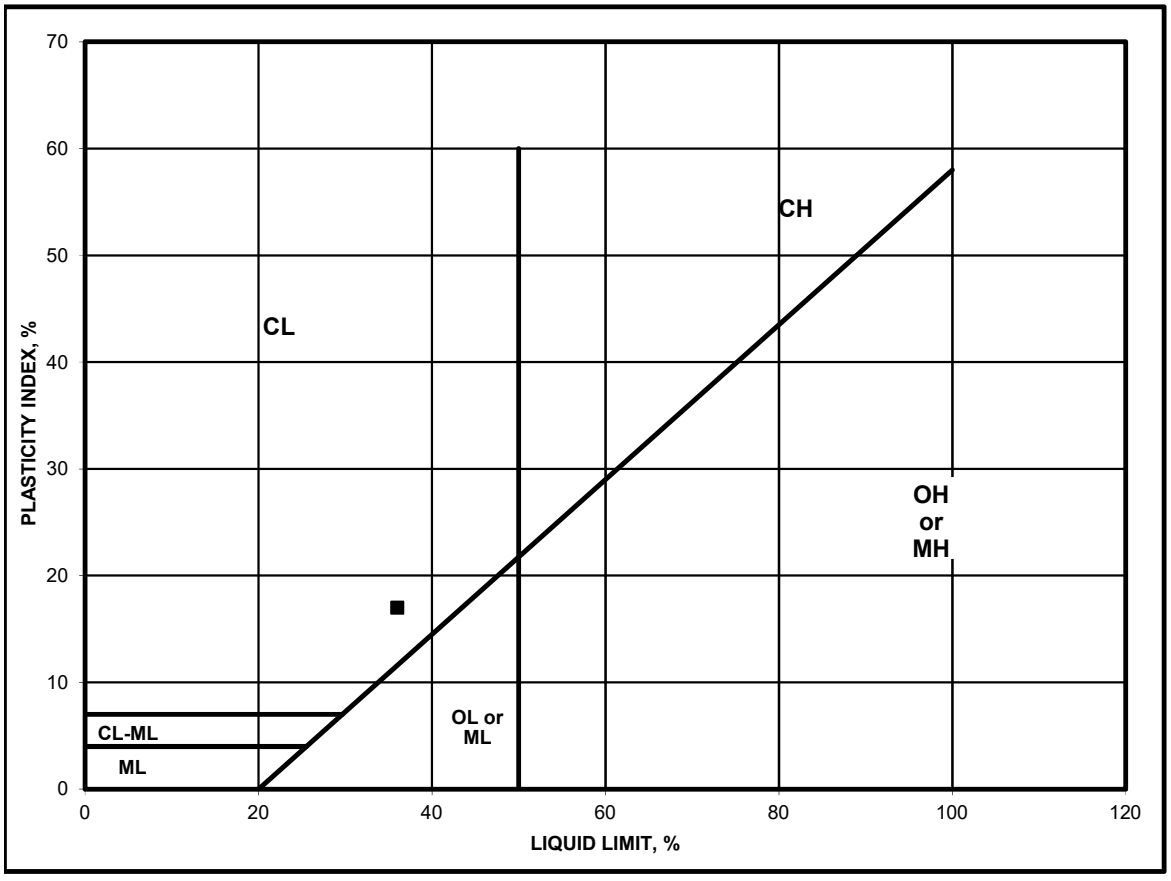
Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA
Project Number: 3-220-0514
Date Sampled: 7/9/2020 Date Tested: 7/17/2020
Sampled By: EGR Tested By: M. Noorzay
Sample Location: B-5 @ 2'

Run Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare	28.98	29.81	29.20	33.31	33.26	33.38
Weight of Dry Soil & Tare	27.63	28.38	27.87	30.18	29.91	29.92
Weight of Water	1.35	1.43	1.33	3.13	3.35	3.46
Weight of Tare	20.66	20.95	20.92	21.11	20.81	20.73
Weight of Dry Soil	6.97	7.43	6.95	9.07	9.10	9.19
Water Content	19.4	19.2	19.1	34.5	36.8	37.6
Number of Blows				32	21	20

Plastic Limit : 19 **Liquid Limit : 36**

Plasticity Index : 17

Unified Soil Classification : CL



SALEM engineering group, inc.

Atterberg Limits Determination

ASTM D4318

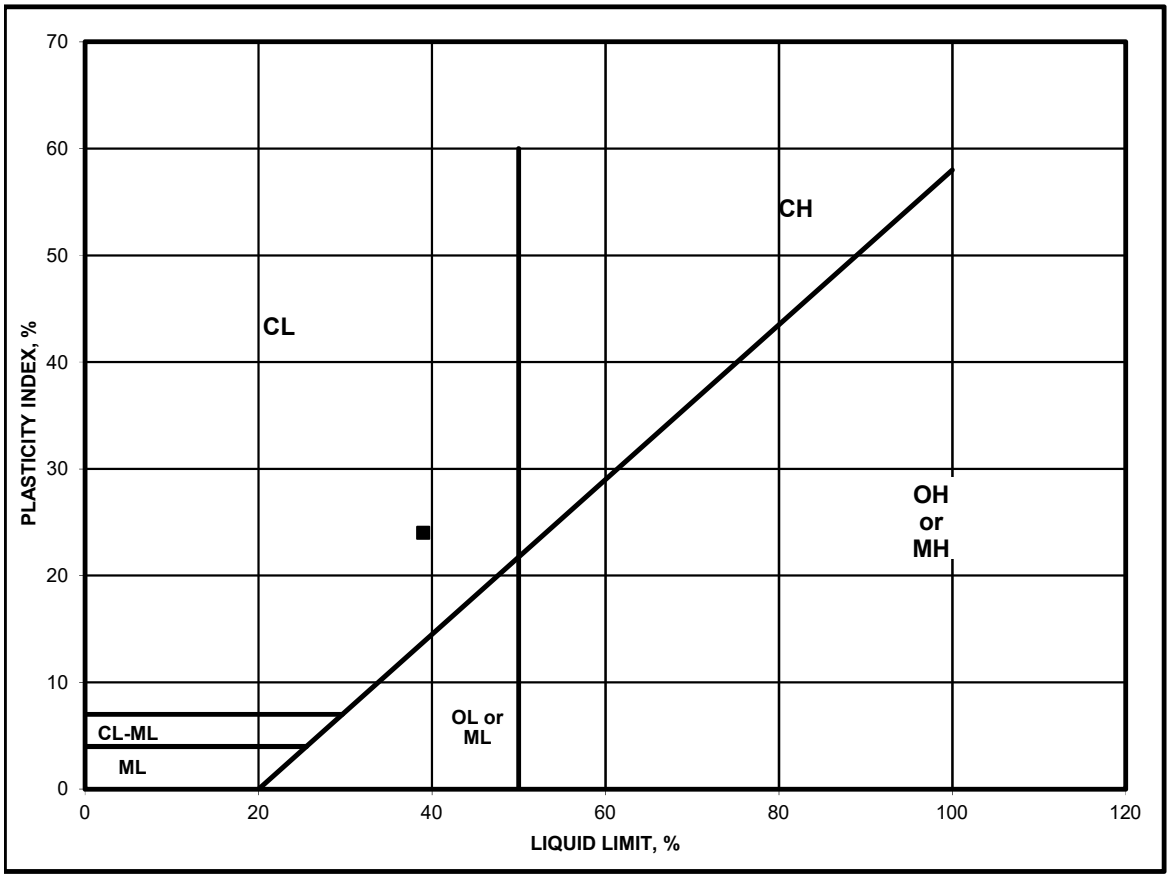
Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA
Project Number: 3-220-0514
Date Sampled: 7/9/2020 Date Tested: 7/17/2020
Sampled By: EGR Tested By: M. Noorzay
Sample Location: B-9 @ 2'

Run Number	Plastic Limit			Liquid Limit		
	1	2	3	1	2	3
Weight of Wet Soil & Tare	30.57	27.80	28.72	34.02	35.63	34.15
Weight of Dry Soil & Tare	29.29	26.86	27.68	30.57	31.56	30.17
Weight of Water	1.28	0.94	1.04	3.45	4.07	3.98
Weight of Tare	20.85	20.75	20.97	20.95	20.78	20.73
Weight of Dry Soil	8.44	6.11	6.71	9.62	10.78	9.44
Water Content	15.2	15.4	15.5	35.9	37.8	42.2
Number of Blows				34	30	18

Plastic Limit : 15 **Liquid Limit : 39**

Plasticity Index : 24

Unified Soil Classification : CL



SALEM engineering group, inc.

CHEMICAL ANALYSIS

SO_4 - Modified CTM 417 & Cl - Modified CTM 417/422

Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA
Project Number: 3-220-0514
Date Sampled: 7/9/2020 Date Tested: 7/13/2020
Sampled By: EGR Tested By: M. Noorzay
Soil Description: Brown Silty GRAVEL (GM) with Sand and trace Clay

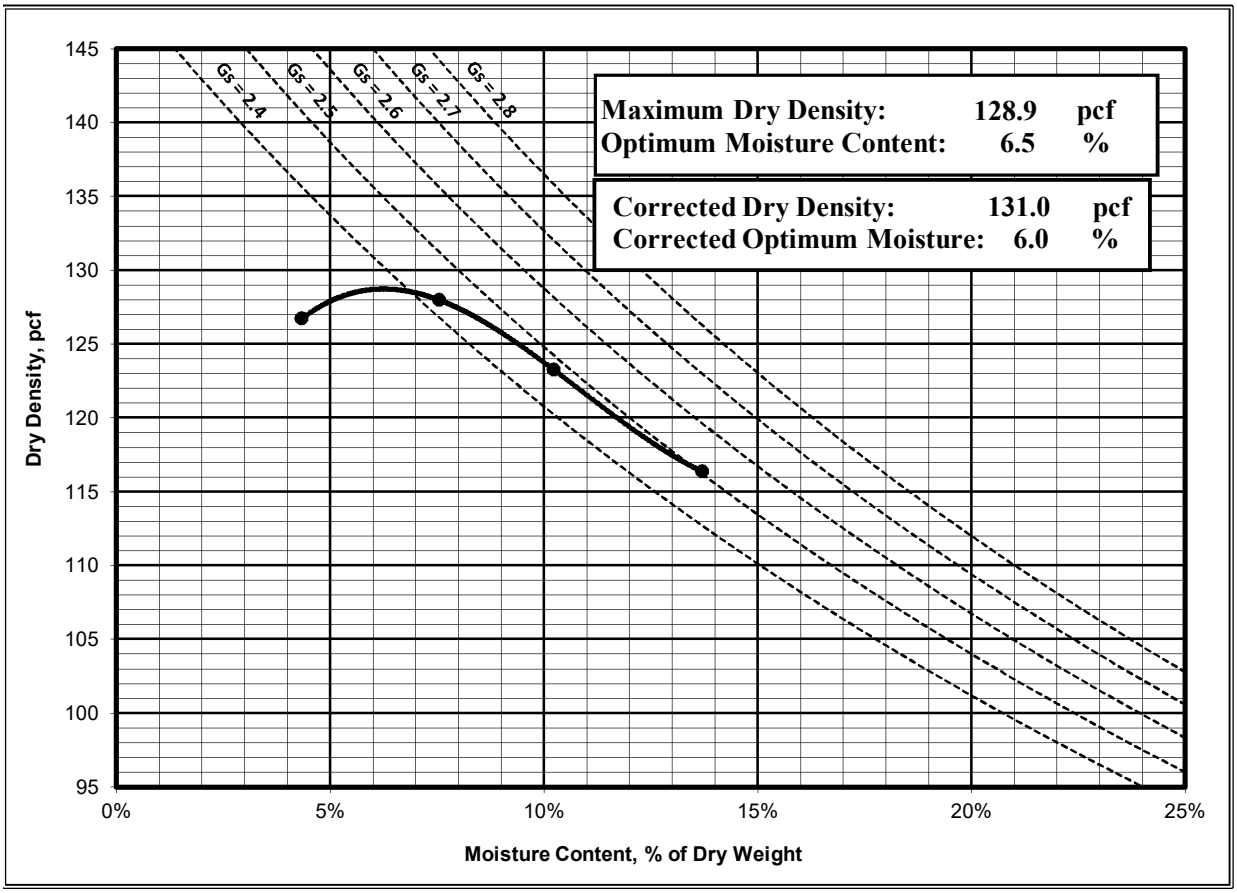
Sample Number	Sample Location	Soluble Sulfate SO_4-S	Soluble Chloride Cl	pH
1a.	B-1 @ 1'-4'	250 mg/kg	20 mg/kg	7.8
1b.	B-1 @ 1'-4'	250 mg/kg	20 mg/kg	7.8
1c.	B-1 @ 1'-4'	260 mg/kg	20 mg/kg	7.8
Average:		**253 mg/kg**	**20 mg/kg**	**7.8**

SALEM engineering group, inc.

Laboratory Compaction Curve
ASTM D1557

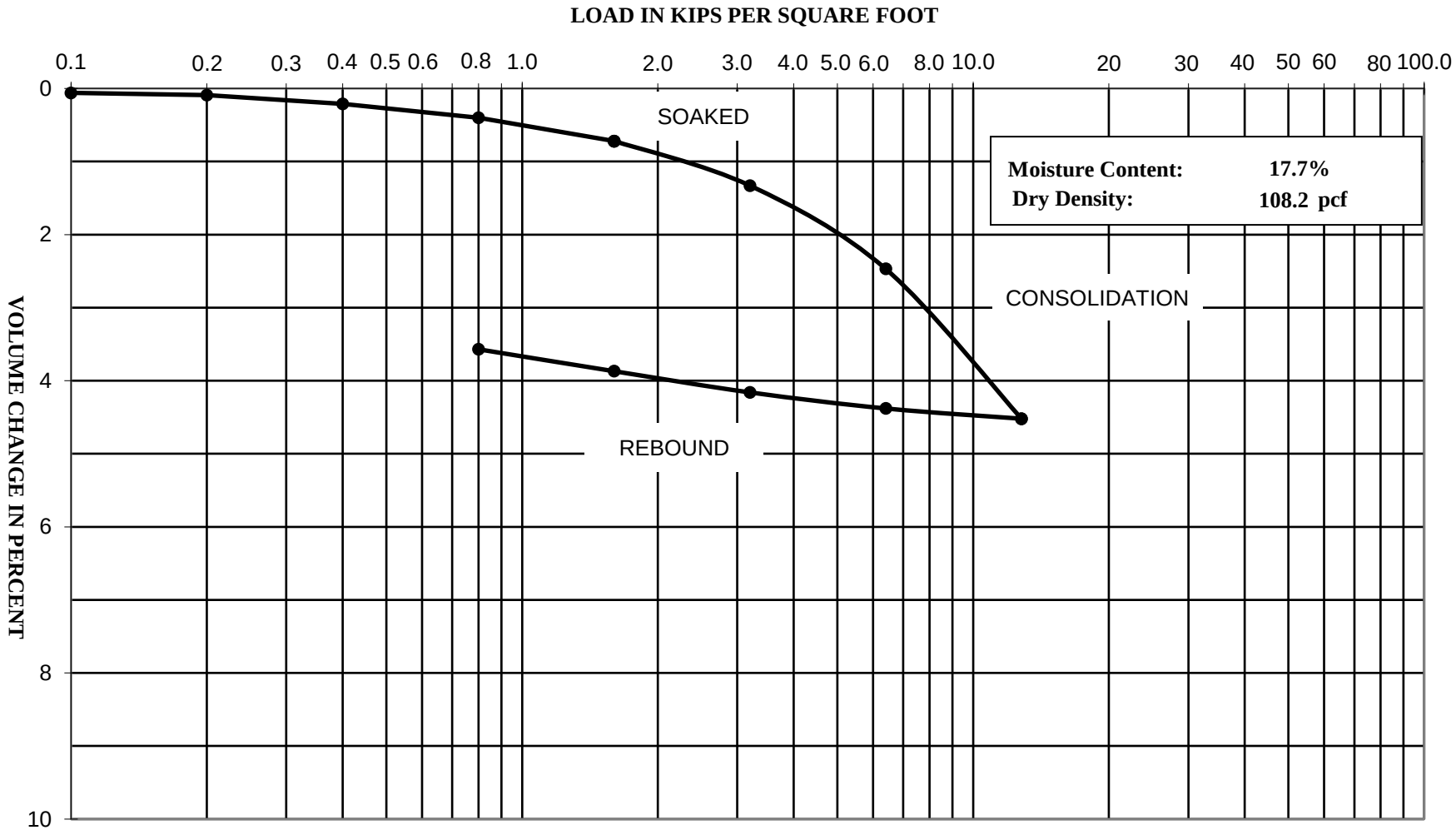
Project Name: Proposed Apartment and Retail Development - San Juan Capistrano, CA
Project Number: 3-220-0514
Date Sampled: 7/9/2020 Date Tested: 7/14/2020
Sampled By: EGR Tested By: M. Noorzay
Sample Location: B-1 @ 1'-4'
Soil Description: Brown Silty GRAVEL (GM) with Sand and trace Clay
Test Method: Method C

	1	2	3	4
Weight of Moist Specimen & Mold, (g)	7364.7	7548.7	7488.6	7367.2
Weight of Compaction Mold, (g)	2866.5	2866.5	2866.5	2866.5
Weight of Moist Specimen, (g)	4498.2	4682.2	4622.1	4500.7
Volume of Mold, (ft^3)	0.0750	0.0750	0.0750	0.0750
Wet Density, (pcf)	132.2	137.6	135.9	132.3
Weight of Wet (Moisture) Sample, (g)	500.0	500.0	500.0	500.0
Weight of Dry (Moisture) Sample, (g)	479.2	464.9	453.6	439.7
Moisture Content, (%)	4.3%	7.6%	10.2%	13.7%
Dry Density, (pcf)	126.7	128.0	123.3	116.3



SALEM engineering group, inc.

CONSOLIDATION - PRESSURE TEST DATA
ASTM D2435



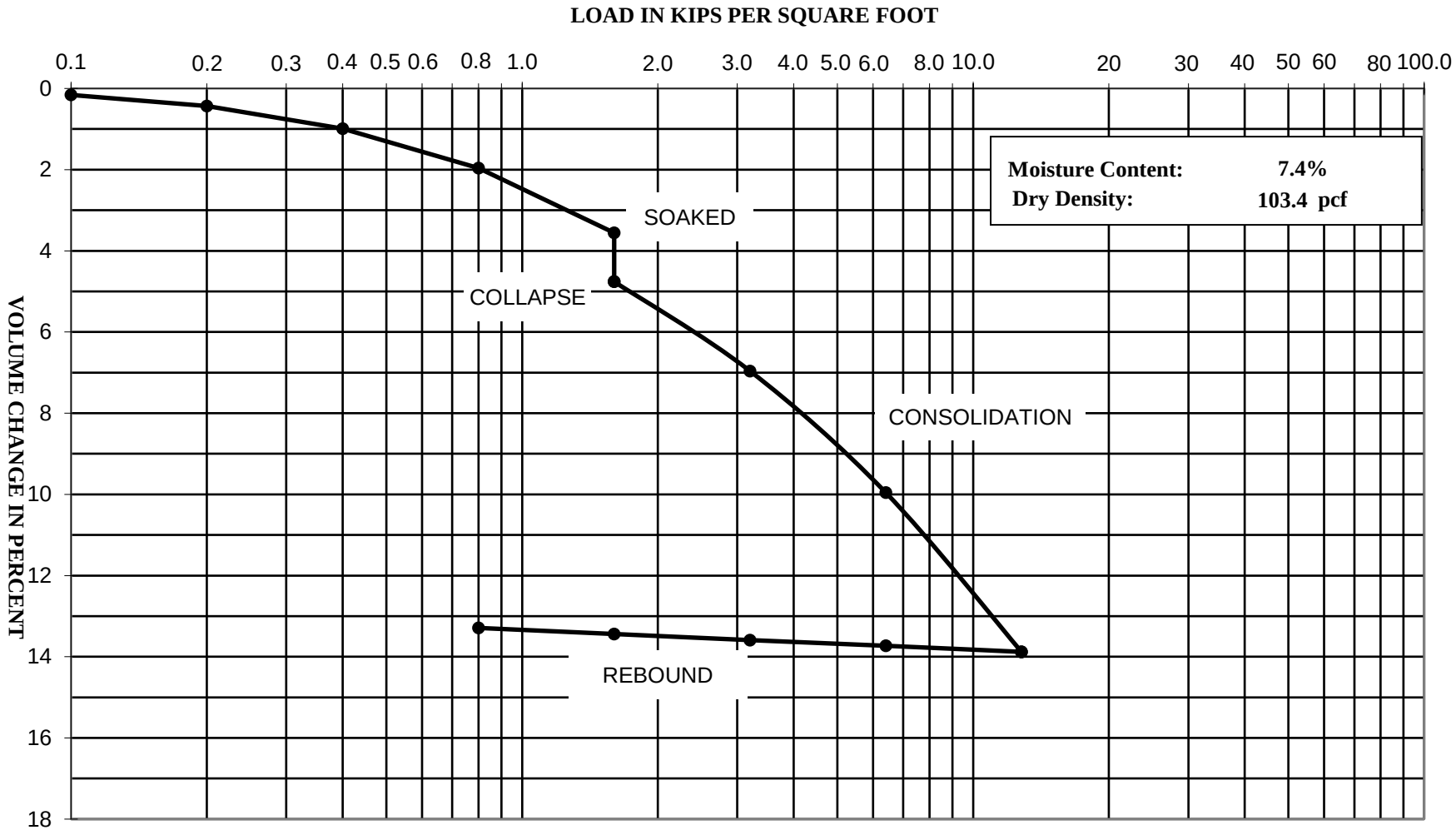
Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

Project Number: 3-220-0906

Boring: B-1 @ 2'

SALEM engineering group, inc.

CONSOLIDATION - PRESSURE TEST DATA
ASTM D2435



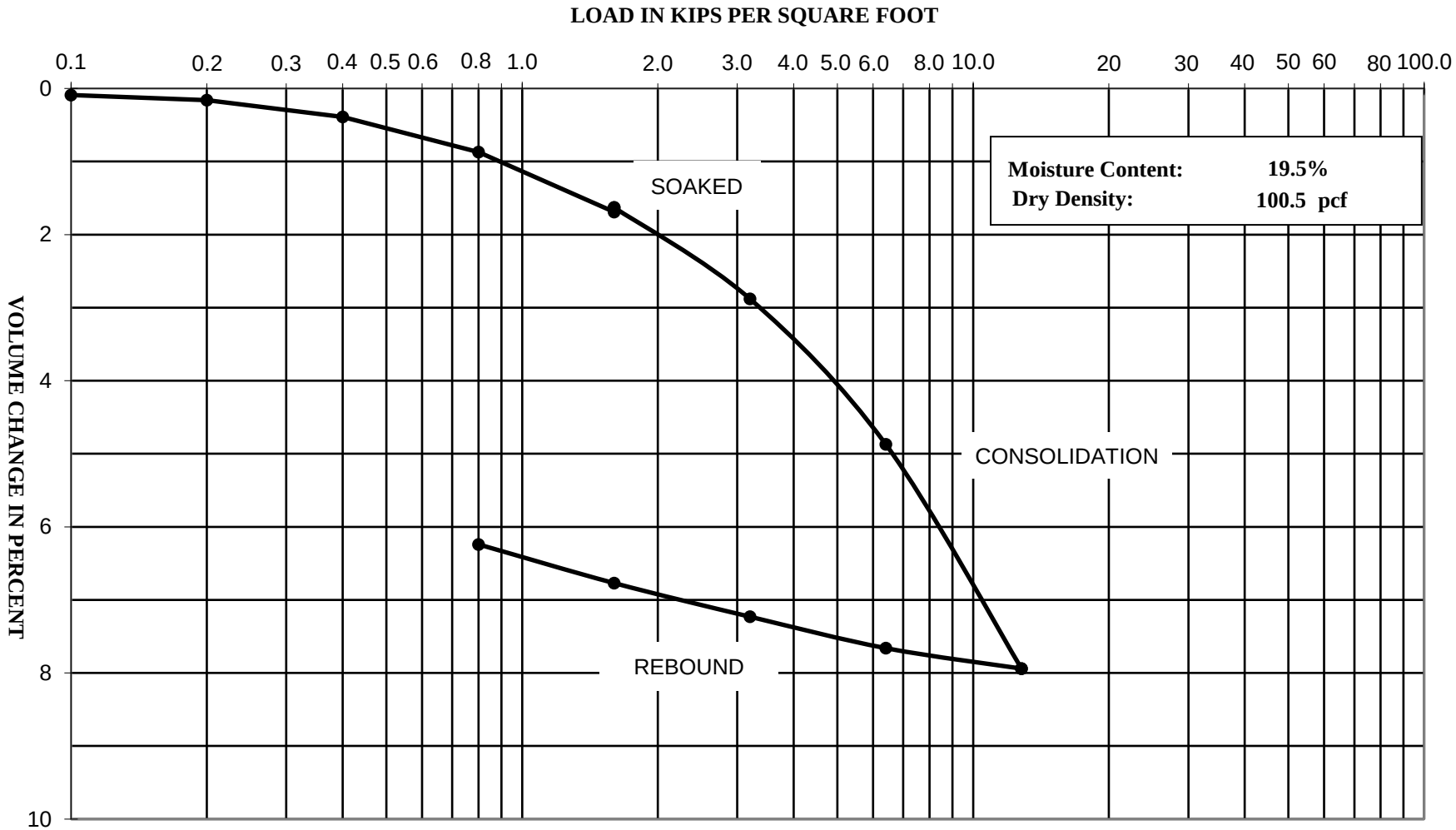
Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

Project Number: 3-220-0906

Boring: B-5 @ 2'

SALEM engineering group, inc.

CONSOLIDATION - PRESSURE TEST DATA
ASTM D2435



Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

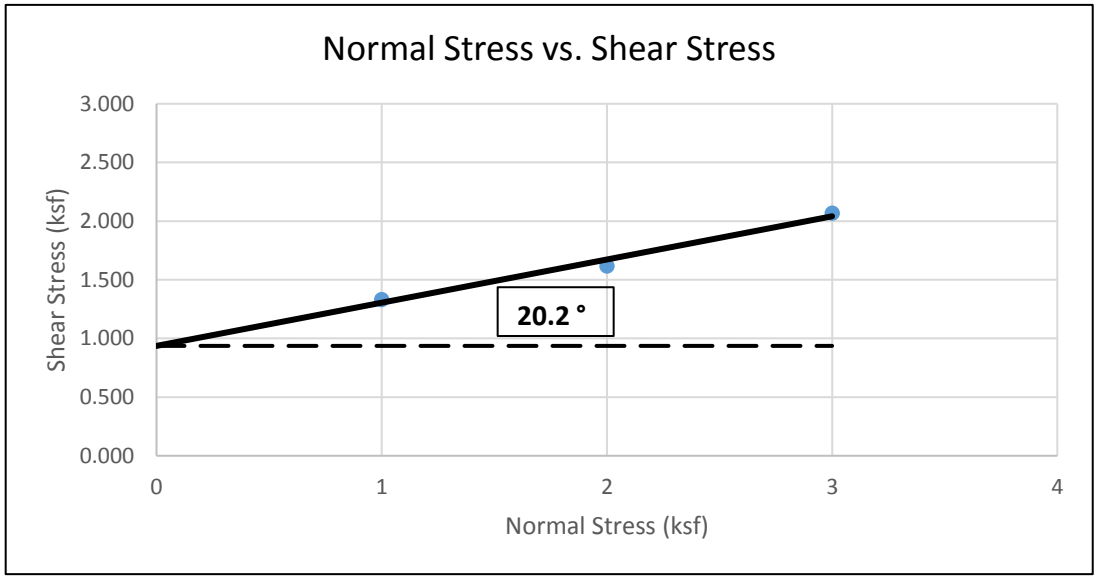
Project Number: 3-220-0906

Boring: B-7 @ 5'

SALEM engineering group, inc.

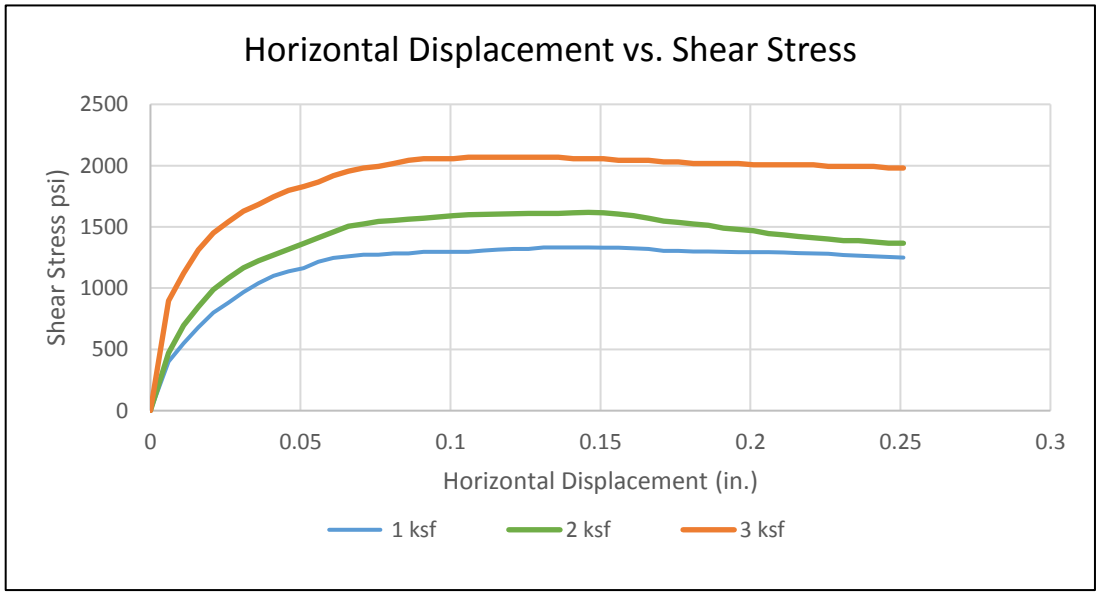
Direct Shear Test (ASTM D3080)

Project Name:	Proposed Multi-Tenant Buildings - San Juan Capistrano, CA
Project Number:	3-220-0906
Client:	Frontier Real Estate Investments
Sample Location:	B-2 @ 2'
Sample Type:	Undisturbed Ring
Soil Classification:	Silty CLAY (CL)
Tested By:	M. Noorzay
Reviewed By:	CJ
Date:	11/3/2020
Equipment Used:	Geomatic Direct Shear Machine



	Sample 1	Sample 2	Sample 3
Normal Stress (ksf)	1.000	2.000	3.000
Shear Rate (in/min)	0.003		
Peak Shear Stress (ksf)	1.332	1.618	2.068
Residual Shear Stress (ksf)	0.000	0.000	0.000

Initial Height of Sample (in)	1.000	1.000	1.000
Height of Sample before Shear (in.)	1	1	1
Diameter of Sample (in)	2.416	2.416	2.416
Initial Moisture Content (%)	26.3		
Final Moisture Content (%)	25.7	26.5	25.7
Dry Density (pcf)	99.2	97.3	97.7



Peak Shear Strength Values	
Slope	0.37
Friction Angle	20.2
Cohesion (psf)	936

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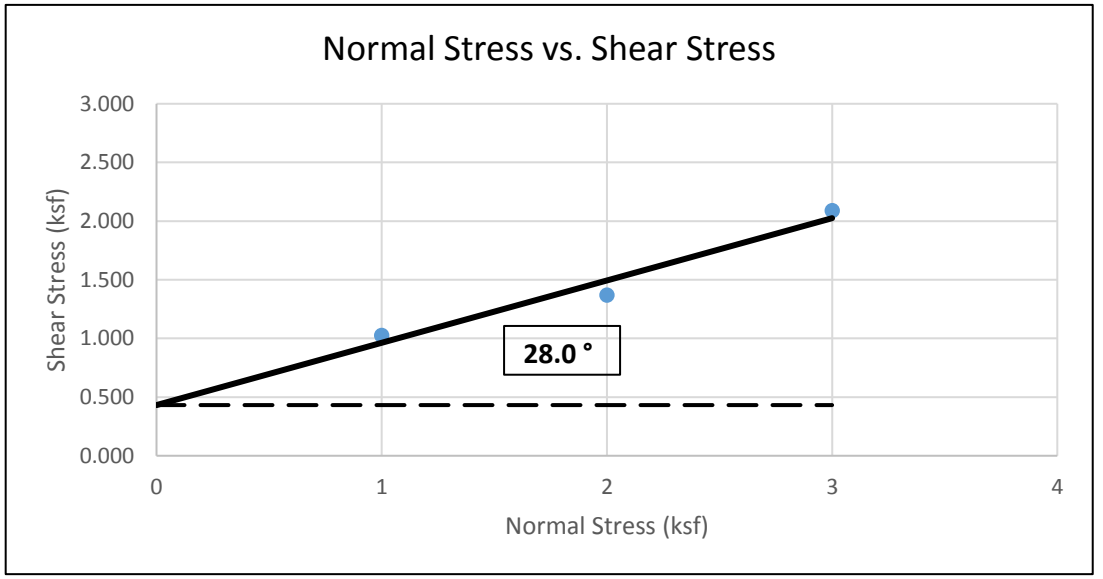
SALEM engineering group, inc.

Direct Shear Test (ASTM D3080)

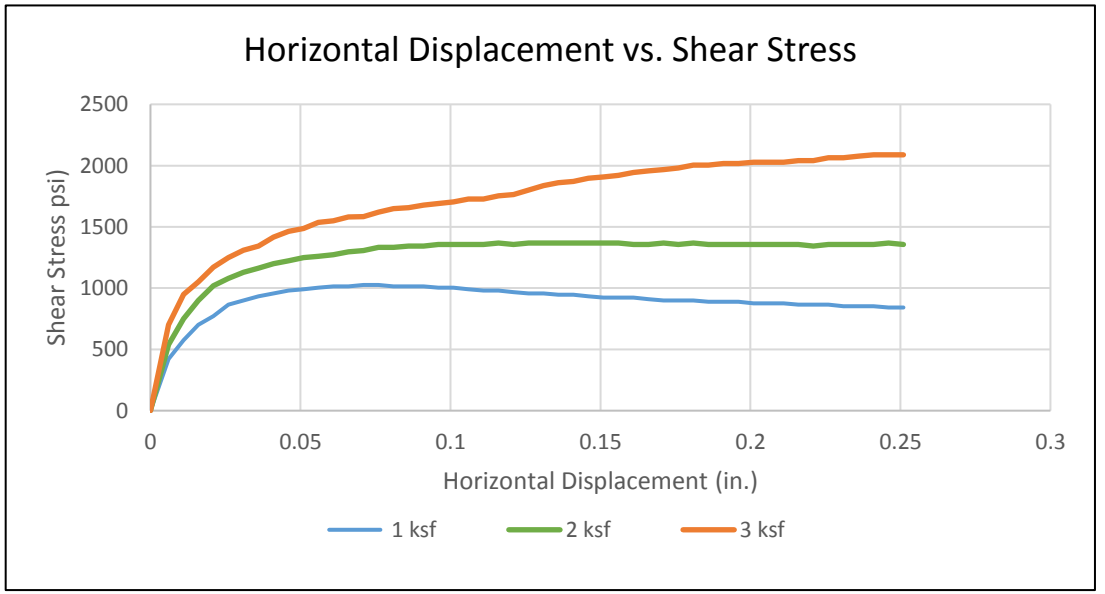
Project Name:	Proposed Multi-Tenant Buildings - San Juan Capistrano, CA
Project Number:	3-220-0906
Client:	Frontier Real Estate Investments
Sample Location:	B-4 @ 5'
Sample Type:	Undisturbed Ring
Soil Classification:	Clayey SAND (SC)
Tested By:	M. Noorzay
Reviewed By:	CJ
Date:	11/2/2020
Equipment Used:	Geomatic Direct Shear Machine



	Sample 1	Sample 2	Sample 3
Normal Stress (ksf)	1.000	2.000	3.000
Shear Rate (in/min)	0.003		
Peak Shear Stress (ksf)	1.026	1.368	2.088
Residual Shear Stress (ksf)	0.000	0.000	0.000

Initial Height of Sample (in)	1.000	1.000	1.000
Height of Sample before Shear (in.)	1	1	1
Diameter of Sample (in)	2.416	2.416	2.416
Initial Moisture Content (%)	11.4		
Final Moisture Content (%)	19.6	18.7	15.4
Dry Density (pcf)	112.5	112.3	105.9

Peak Shear Strength Values	
Slope	0.53
Friction Angle	28.0
Cohesion (psf)	432



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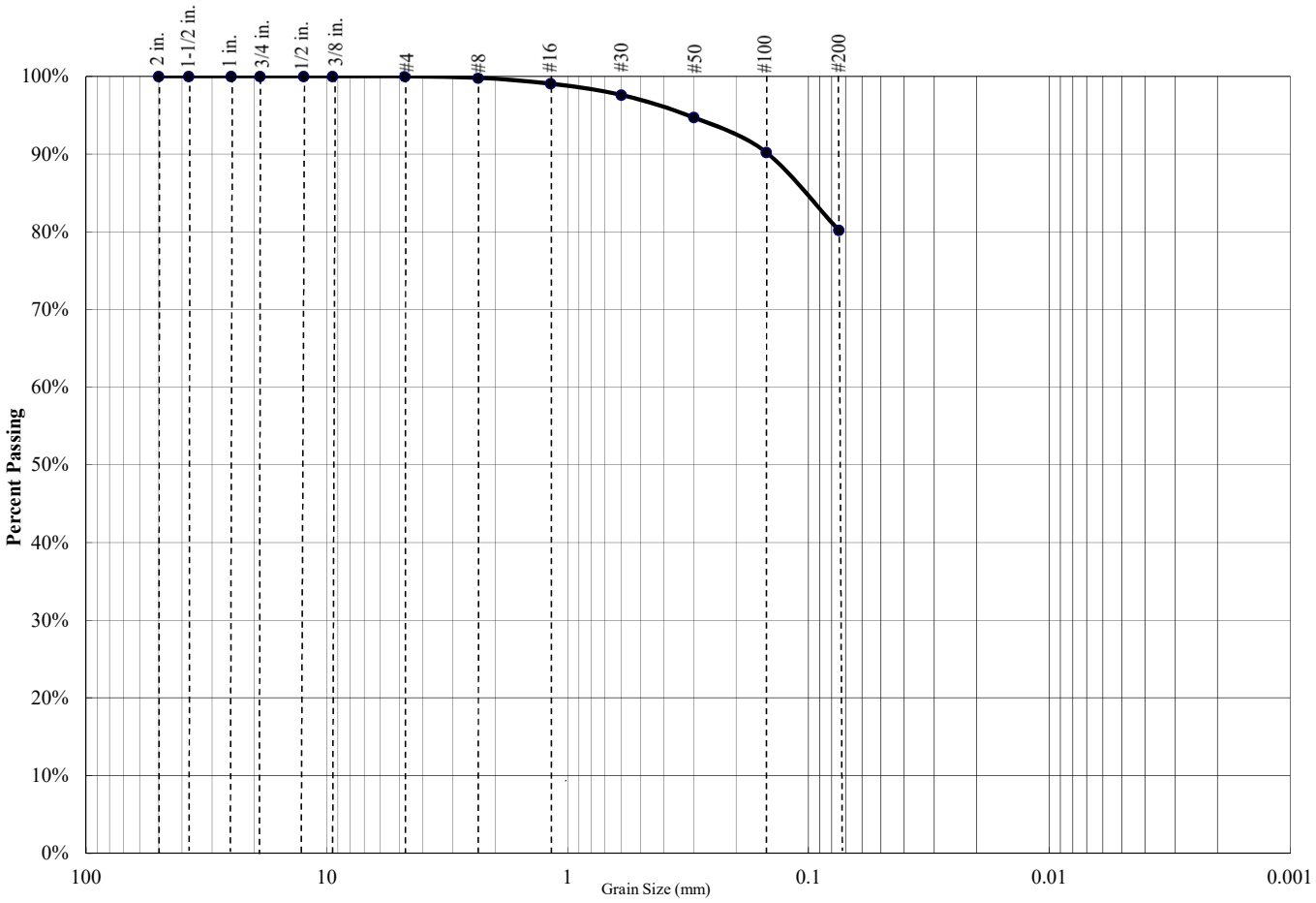
SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
0%	20%	80%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	100.0%
#4	100.0%
#8	99.8%
#16	99.1%
#30	97.6%
#50	94.7%
#100	90.2%
#200	80.2%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Silty CLAY with Sand (CL)

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

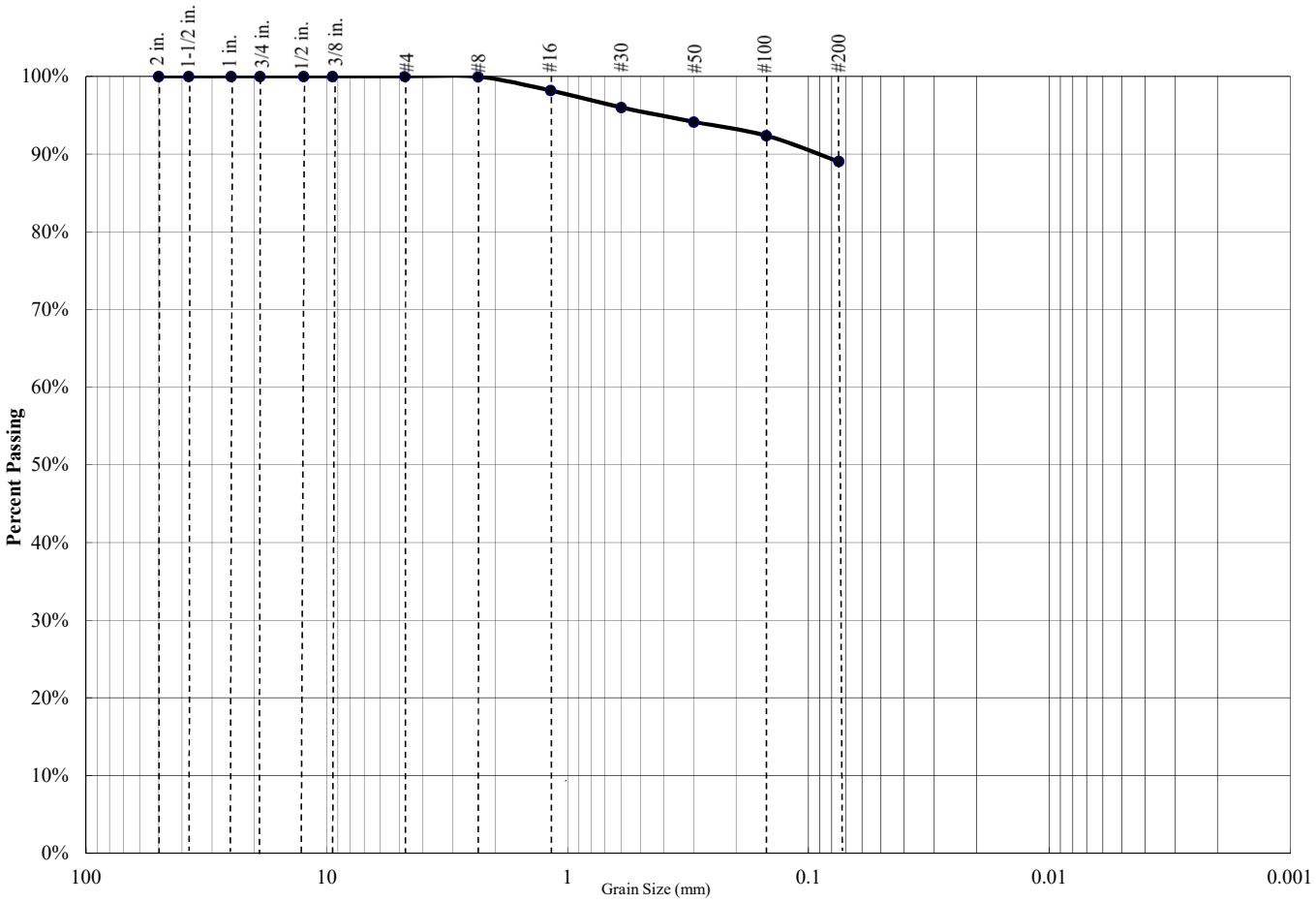
Project Number: 3-220-0906

Boring: B-1 @ 2'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
0%	11%	89%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	100.0%
#4	100.0%
#8	99.9%
#16	98.2%
#30	96.0%
#50	94.1%
#100	92.4%
#200	89.0%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Silty CLAY (CL)

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

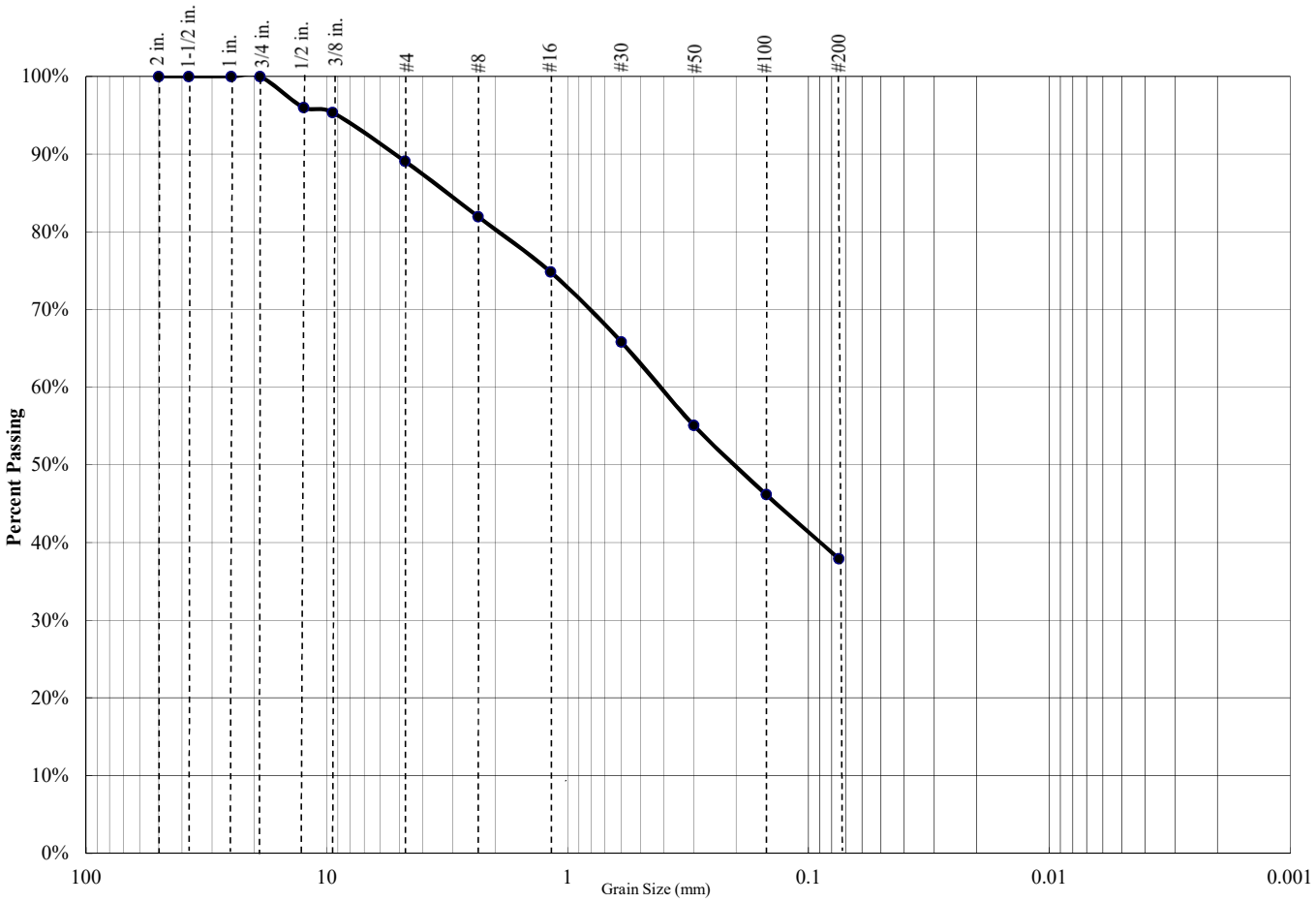
Project Number: 3-220-0906

Boring: B-2 @ 2'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
11%	51%	38%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	96.0%
3/8 inch	95.4%
#4	89.1%
#8	82.0%
#16	74.8%
#30	65.8%
#50	55.1%
#100	46.2%
#200	38.0%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Clayey SAND (SC)

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

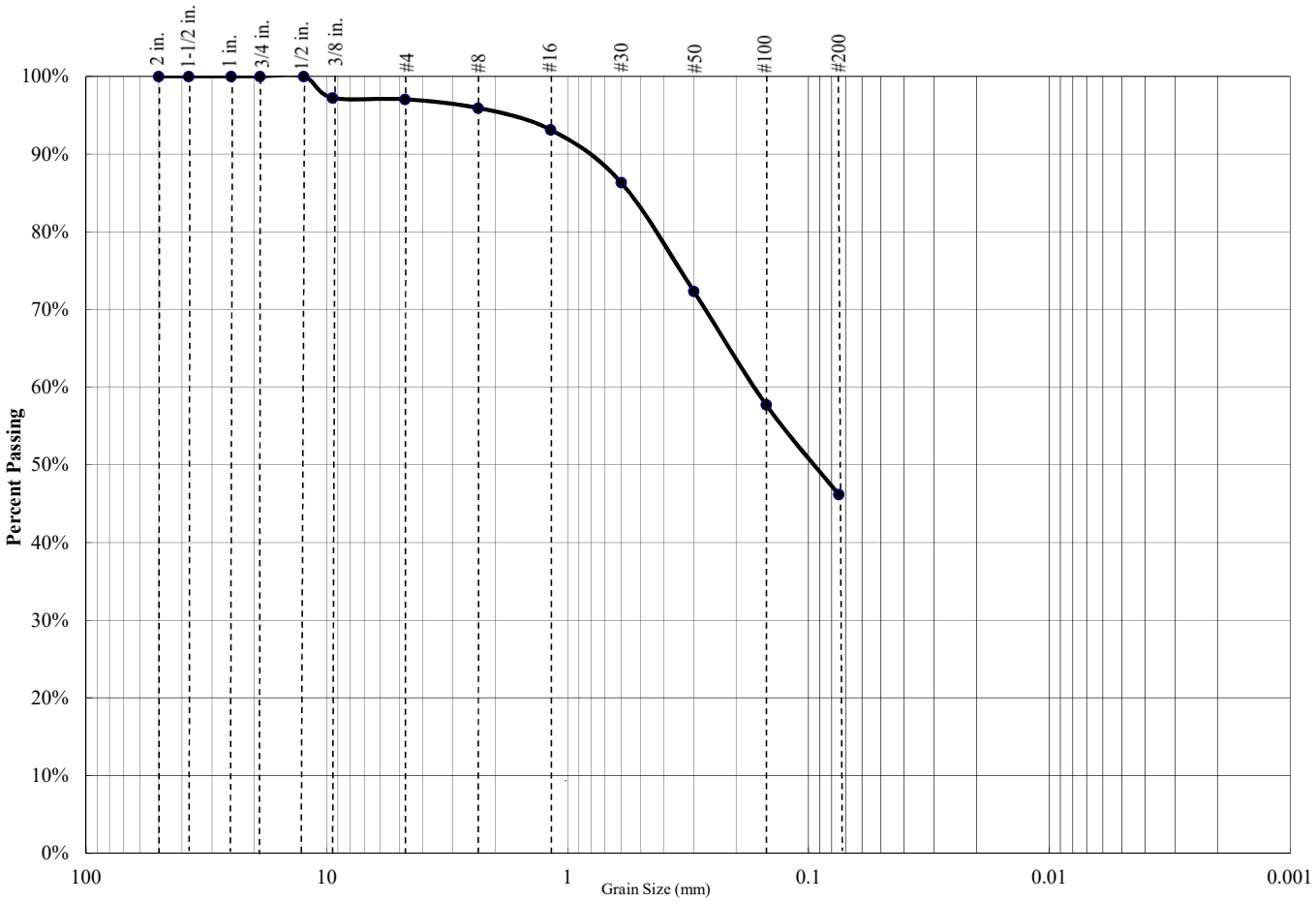
Project Number: 3-220-0906

Boring: B-4 @ 5'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
3%	51%	46%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	97.3%
#4	97.1%
#8	95.9%
#16	93.1%
#30	86.3%
#50	72.4%
#100	57.7%
#200	46.2%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Silty SAND (SM)

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

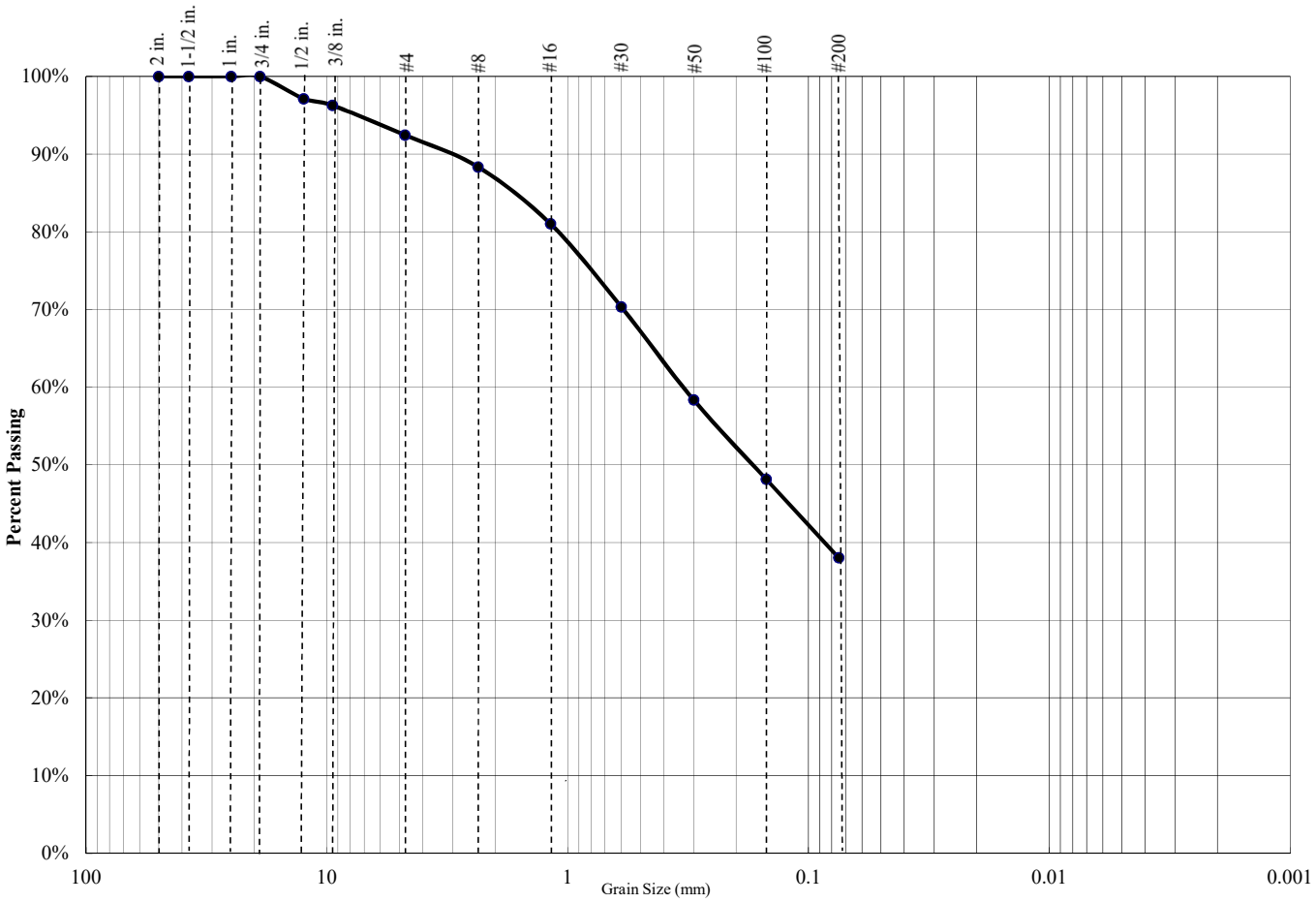
Project Number: 3-220-0906

Boring: B-4 @ 10'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
8%	54%	38%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	97.1%
3/8 inch	96.3%
#4	92.5%
#8	88.3%
#16	81.0%
#30	70.4%
#50	58.4%
#100	48.2%
#200	38.0%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Clayey SAND (SC)

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

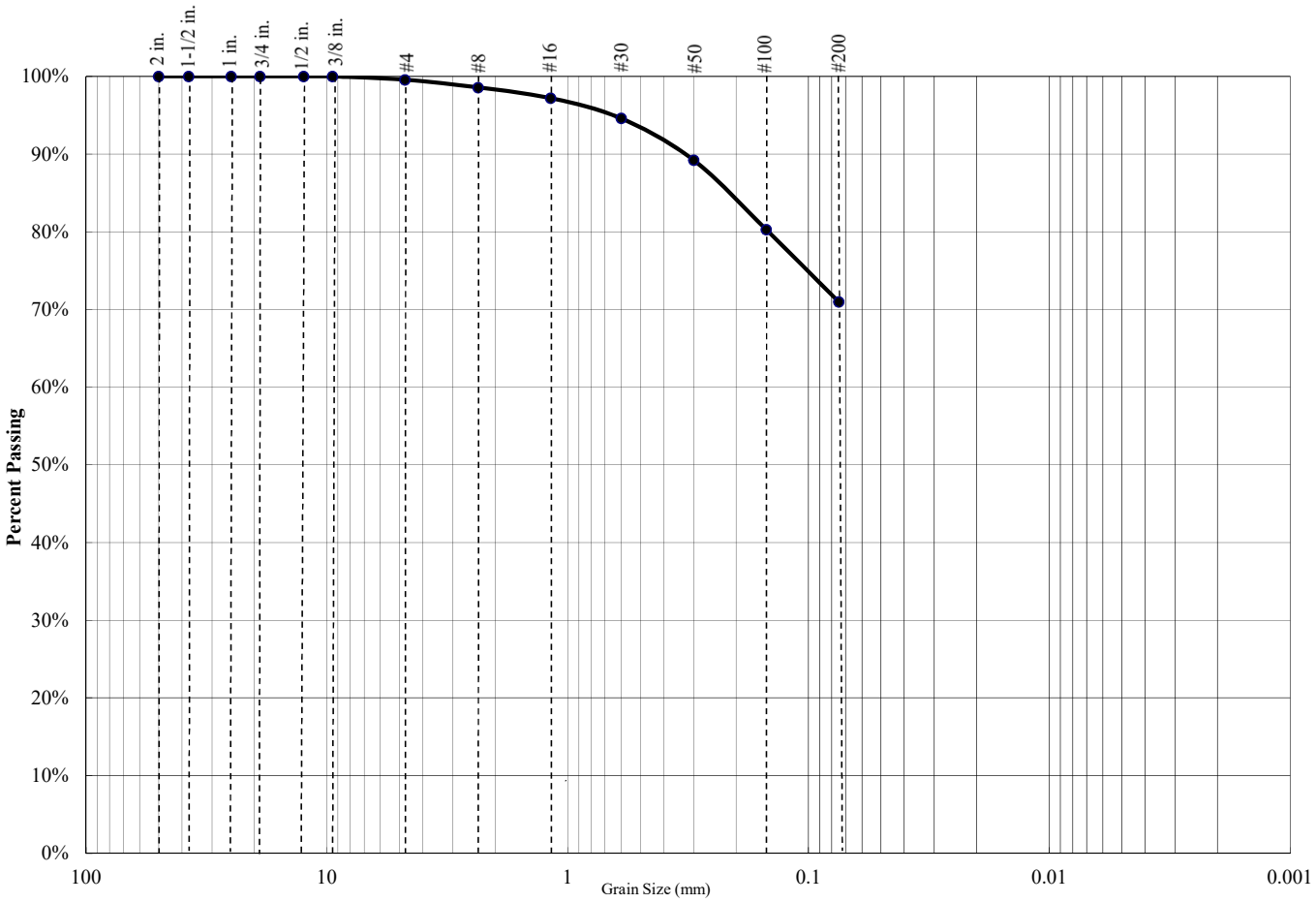
Project Number: 3-220-0906

Boring: B-5 @ 2'

SALEM engineering group, inc.

PARTICLE SIZE DISTRIBUTION DIAGRAM

GRADATION TEST - ASTM C136



Percent Gravel	Percent Sand	Percent Silt/Clay
0%	29%	71%

Sieve Size	Percent Passing
3/4 inch	100.0%
1/2 inch	100.0%
3/8 inch	100.0%
#4	99.6%
#8	98.6%
#16	97.2%
#30	94.6%
#50	89.2%
#100	80.3%
#200	71.0%

Atterberg Limits		
PL=	LL=	PI=

Coefficients					
D_{85}=		D_{60}=		D_{50}=	
D_{30}=		D_{15}=		D_{10}=	
C_u=	N/A	C_c=	N/A		

USCS CLASSIFICATION
Silty CLAY with Sand (CL)

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California

Project Number: 3-220-0906

Boring: B-7 @ 5'

SALEM engineering group, inc.

EXPANSION INDEX TEST
ASTM D4829

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California
Project Number: 3-220-0906
Date Sampled: 10/23/2020 Date Tested: 11/3/2020
Sampled By: E.R. Tested By: M. Noorzay
Sample Location: B-8 @ 1'-4'
Soil Description: Olive Brown Silty CLAY with Sand (CL)

Trial #	1	2	3
Weight of Soil & Mold, g.	769.9		
Weight of Mold, g.	368.5		
Weight of Soil, g.	401.4		
Wet Density, pcf	121.1		
Weight of Moisture Sample (Wet), g.	800.0		
Weight of Moisture Sample (Dry), g.	726.4		
Moisture Content, %	10.1		
Dry Density, pcf	109.9		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	51.3		

Time	Inital	30 min	1 hr	6 hrs	12 hrs	24 hrs
Dial Reading	0	0.018	0.039	--	--	0.046

Expansion Index $_{measured}$ = 46
Expansion Index $_{50}$ = 46.9

Expansion Index = **47**

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

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CHEMICAL ANALYSIS

SO_4 - Modified CTM 417 & Cl - Modified CTM 417/422

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California
Project Number: 3-220-0906
Date Sampled: 10/23/2020 Date Tested: 11/3/2020
Sampled By: E.R. Tested By: M. Noorzay
Soil Description: Olive Brown Silty CLAY with Sand (CL)

Sample Number	Sample Location	Soluble Sulfate SO_4-S	Soluble Chloride Cl	pH
1a.	B-8 @ 1'-4'	1400 mg/kg	45 mg/kg	7.7
1b.	B-8 @ 1'-4'	1500 mg/kg	45 mg/kg	7.7
1c.	B-8 @ 1'-4'	1500 mg/kg	45 mg/kg	7.7
Average:		**1467 mg/kg**	**45 mg/kg**	**7.7**

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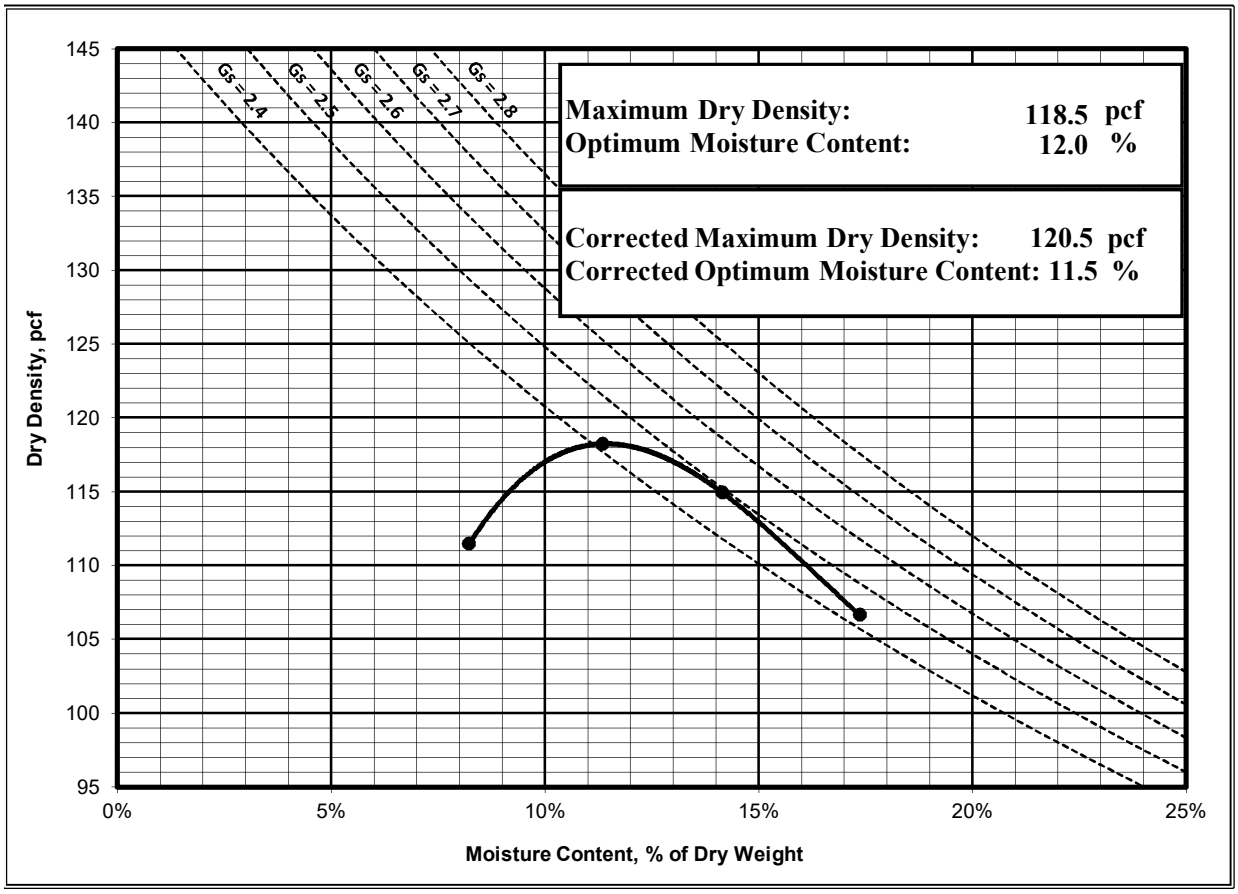
Laboratory Compaction Curve
ASTM D1557

Project Name: Proposed Multi-Tenant Buildings - San Juan Capistrano, California
Project Number: 3-220-0906
Date Sampled: 10/23/2020 Date Tested: 11/4/2020
Sampled By: E.R. Tested By:M. Noorzay
Sample Location: B-8 @ 1' - 4'
Soil Description: Olive Brown Silty CLAY with Sand (CL)
Test Method: Method A

	1	2	3	4
Weight of Moist Specimen & Mold, (g)	3835.5	4002.5	3995.3	3904.2
Weight of Compaction Mold, (g)	2011.9	2011.9	2011.9	2011.9
Weight of Moist Specimen, (g)	1823.6	1990.6	1983.4	1892.3
Volume of Mold, (ft^3)	0.0333	0.0333	0.0333	0.0333
Wet Density, (pcf)	120.6	131.7	131.2	125.2
Weight of Wet (Moisture) Sample, (g)	100.0	100.0	100.0	100.0
Weight of Dry (Moisture) Sample, (g)	92.4	89.8	87.6	85.2
Moisture Content, (%)	8.2%	11.4%	14.2%	17.4%
Dry Density, (pcf)	111.4	118.2	114.9	106.6



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APPENDIX

C

APPENDIX C
GENERAL EARTHWORK AND PAVEMENT SPECIFICATIONS

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

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

2.0 PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of SALEM Engineering Group, Incorporated, hereinafter referred to as the Soils Engineer and/or Testing Agency. Attainment of design grades, when achieved, shall be certified by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary adjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer, or project Architect. No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

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

3.0 TECHNICAL REQUIREMENTS: All compacted materials shall be densified to no less that 95 percent of relative compaction (90% for silty or clayey soil) based on ASTM D1557 Test Method (latest edition), UBC or CAL-216, or as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

4.0 SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the Geotechnical Engineering Report. The Contractor shall make his own interpretation of the data contained in the Geotechnical Engineering Report and the Contractor shall not be relieved of liability for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

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

6.0 CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter and all other matter determined by the Soils Engineer to be deleterious. Such materials shall become the property of the Contractor and shall be removed from the site.

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

7.0 SUBGRADE PREPARATION: Surfaces to receive Engineered Fill and/or building or slab loads shall be prepared as outlined above, scarified to a minimum of 12 inches, moisture-conditioned as necessary, and recompacted to 95 percent relative compaction (90% for silty or clayey soil).

Loose soil areas and/or areas of disturbed soil shall be moisture-conditioned as necessary and recompacted to 95 percent relative compaction (90% for silty or clayey soil). All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill materials shall be approved by the Soils Engineer prior to the placement of any fill material.

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

9.0 FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence or approval of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills, provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

10.0 PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. Compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer. Both cut and fill shall be surface-compacted to the satisfaction of the Soils Engineer prior to final acceptance.

11.0 SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing, or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill

operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill is as specified.

12.0 DEFINITIONS - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed. The term "Standard Specifications": hereinafter referred to, is the most recent edition of the Standard Specifications of the State of California, Department of Transportation. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as determined by ASTM D1557 Test Method (latest edition) or California Test Method 216 (CAL-216), as applicable.

13.0 PREPARATION OF THE SUBGRADE - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 95 percent (90% for silty or clayey soil) based upon ASTM D1557. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

14.0 AGGREGATE BASE - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class II material, ¾-inch or 1½-inches maximum size. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent based upon CAL-216. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

15.0 AGGREGATE SUBBASE - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class II Subbase material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent based upon CAL-216, and it shall be spread and compacted in accordance with the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

16.0 ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades, and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10, unless otherwise stipulated or local conditions warrant more stringent grade. The mineral aggregate shall be Type A or B, ½ inch maximum size, medium grading, and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning, and mixing of the materials shall conform to Section 39. The prime coat, spreading and compacting equipment, and spreading and compacting the mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50 degrees F. The surfacing shall be rolled with a combination steel-wheel and pneumatic rollers, as described in the Standard Specifications. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.