Appendix I

Geotechnical Evaluation

advanced geotechnical services, inc.

January 28, 2021
Client Number 5100
Report Number 10728

Conejo Recreation and Park District
c/o Andrew Goodwin Designs
2050 Parker Street
San Luis Obispo, CA 93401

Geotechnical Engineering Study
Proposed Conejo Community Center and Public Park Improvements
1175 Hendrix Avenue
Thousand Oaks, California

Advanced Geotechnical Services, Inc., (AGS) has prepared this geotechnical engineering study report for the proposed community center and public park improvements to be constructed at the subject site. This report presents the results of our data research, subsurface exploration, laboratory testing, and our professional opinions regarding the geologic and geotechnical engineering factors that may affect the proposed improvements to be constructed at the subject site. The recommendations presented within this report have yet to be peer reviewed by the building official, and may be subject to revision following review.

Based on the results of our geotechnical engineering study, it is our opinion that the site is *suitable* for construction of the proposed improvements, provided recommendations of this report are properly incorporated in the design and implemented during construction.

This opportunity to be of service is sincerely appreciated. This report should be read from beginning to end to understand its limitations and to avoid taking a recommendation out-of-context. If you have any questions, or if we may be of any further assistance, please do *not* hesitate to call. We look forward to being of continued service to you on this project.

Respectfully submitted,
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GEOTECHNICAL ENGINEERING STUDY

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1175 Hendrix Avenue
Thousand Oaks, California

Report to
Conejo Recreation and Park District
c/o Andrew Goodwin Design
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1. INTRODUCTION

1.1 General Remarks

This geotechnical engineering study report has been prepared for the proposed community center and public park improvements to be constructed at the subject site. The purposes of this study are to identify onsite geologic and soil conditions that may affect the proposed improvements, and provide geotechnical recommendations for site preparation and grading, foundation design, pavement design, and drainage. This report presents the findings of our data review, subsurface exploration, laboratory testing, engineering analyses and evaluations, and our conclusions and recommendations. The recommendations presented within this report have yet to be peer reviewed by the building official, and may be subject to revision following review.

Appendices are attached following the main report. Appendix A includes a general description of the field exploration program and boring/test pit logs, Appendix B includes laboratory test results, Appendix C includes the results of the seismicity study, and Appendix D includes the citations of references used in this study and mentioned within this report. Figures and plates referenced in this report are included in Appendix E.

1.2 Site Description and Proposed Improvements

The proposed improvements are to be constructed at 1175 Hendrix Avenue in the Newbury Park area of the City of Thousand Oaks, California, as shown on the *Site Location Map* included as Figure 1 of this report, which is based upon an aerial image obtained from the interactive web app Google Earth (2021). The subject site consists of an irregularly shaped, approximately 48.4-acre sized parcel of land identified as APN 524-0-090-255, bounded by West Gainsborough Road to the west, Warwick Avenue to the east, privately owned properties to the north and both privately and publicly owned lands the south. The subject site is currently improved with a community center building, paved driveway and parking areas, a children's playground area, a baseball field, public picnic and barbeque areas, public gardens, pathways, and trailways, and a channelized drainage feature with foot bridge, as shown on the *Existing Site Plan*, which is based upon a recent aerial image obtained from the interactive County View web program maintained by the County of Ventura, included as Figure 2 of this report.

The currently proposed improvements will include the demolition of the existing community center building and the construction of a new replacement building, improvement and expansion of the existing driveway and parking lot areas, improvement and expansion of the children's playground area, construction of an amphitheater, improvement of the picnic and barbeque areas, improvement of the pathway and trailway areas, and replacement of the foot bridge which traverses the drainage feature, as shown on the *Conejo Community Park – Schematic Plan – L1.0 – Main Park* and the *Conejo Community Park – L5.0 – Tarantula Hill Trail* plans included as Plates 1 and 2, respectively, of this report. Grading plans have not been provided to our office as of the date of this report, but site grading is anticipated to include removal and recompaction of the soils to support the proposed improvements and site grade adjustments to create grade to support the proposed improvements. The permanent proposed cut and fill depths are currently unknown as of the date of this report.

1.3 Scope of Services

This geotechnical engineering study included:

a. Site observation and review of available geotechnical and geologic data related to the general study area. A *Site Location Map* is provided as Figure 1, the base map obtained from the interactive web program Google Earth (2021), and an *Existing Site Plan* is provided as Figure 2, the base map obtained from the interactive County View web program maintained by the County of Ventura (2021).

b. Preparation of the proposed site plans, *Conejo Community Park – Schematic Plan – L1.0 – Main Park* and the *Conejo Community Park – L5.0 – Tarantula Hill Trail*, included as Plates 1 and 2, respectively, each based upon conceptual schematic plans provided for use by Andrew

Goodwin Designs, detailing the locations and configurations of the proposed improvements, and indicating the locations of our exploratory excavations.

c. Excavation, sampling, and logging of twenty-one hollow stem auger borings extending to depths ranging from approximately 4.5 feet to 20.5 feet below the existing ground surface for soil identification and sampling purposes and for field percolation testing, and the excavation, sampling and logging of seven backhoe excavated test pits extending to depths ranging from approximately 2 feet to 10 feet below the existing ground surface for geologic evaluation within the location of the proposed improvements. The exploratory excavations were located in the field using a tape measure and approximate reference points. Thus, the actual location of the exploratory excavations may deviate slightly from the locations indicated on the site plans, however the accuracy of these measurements is considered to be acceptable for the purposes of this study. The logs are included in Appendix A, along with a general description of the field operations.

d. Laboratory testing of selected samples to determine the engineering properties of the onsite materials as encountered during the course of our field exploration program. The results of laboratory testing are presented in Appendix B and on the boring and test pit logs included in Appendix A. Soil samples will be *discarded* 30 days after the date of this report, unless this office receives a specific request and fee to retain the samples for a longer period of time.

e. Determination of seismic parameters for potential onsite ground motion.

f. Engineering analysis of the data and information obtained from our field study, laboratory testing, and literature review.

g. Development of geotechnical recommendations for site preparation and grading, and geotechnical design criteria for building foundations, slab-on-grade construction, underground utility trenches, temporary excavations, and drainage.

h. Preparation of this report summarizing our findings, conclusions, and recommendations regarding the geotechnical aspects of the project site.

The scope of this geotechnical study did *not* include environmental issues or detailed assessments of soil corrosivity.

2. GEOLOGIC SETTING

2.1 Geology

Geologic conditions beneath the subject property have been interpreted and characterized based upon our review of published regional references, our observations of isolated exposures available during surface mapping, and our subsurface exploration program. Our interpretations involve projections of data and require that geologic conditions are reasonably constant between points of exposure. Work should continue under the review of an Engineering Geologist to ensure that geologic conditions different from those described below are recognized and evaluated as soon as possible. Certain subsurface conditions such as groundwater levels and the consistency of near-surface soils will vary with the seasons.

The subject site is located within the western portion of the Newbury Park USGS 7.5-minute quadrangle. According to Dibblee, the subject site is underlain by Pleistocene age Older Alluvium (Qoa) and or Miocene age bedrock of the Monterey Formation (Tm), Detrital Sediments of Lindero Canyon (Tvcg), and the Lower Topanga Formation (Ttls), consisting predominantly of shale, conglomerate of volcanic detritus, sandstone deposits, respectively, as shown on the *Regional Geologic Map* included as Figure 3 of this report.

The results of our subsurface exploration program have indicated that artificial fill is present in many areas, mantling naturally deposited colluvium, older alluvium, and or bedrock materials. Detailed descriptions of the materials encountered are provided on the Boring and Test Pit Logs included in Appendix A of this report.

2.2 Faulting

Southern California is a tectonically active region subject to hazards associated with earthquakes and faulting. Alquist-Priolo Earthquake Fault Zones are zones that have been established by the State of California as areas which contain active faults, and projects that are located within these zones require that a fault investigation be performed to determine if active faulting affects the site. The subject site is located approximately 3.25 miles south of the Simi-Santa Rosa Earthquake Fault Zone, which has been classified by the State of California as being an active earthquake fault, as shown on the *Earthquake Fault Zones* map included as Figure 4 of this report (CDMG 1999). As the subject site is not located within an area where active earthquake faulting is known to have occurred in the past, a detailed fault investigation study has not been performed and is not a requirement at this time.

3. EARTH MATERIALS AND SUBSURFACE CONDITIONS

3.1 Artificial Fill (af)

Artificial fill soils were encountered in the majority of the borings and test pits excavated at the subject site, with an observed maximum thickness of approximately 15 feet in Boring B-2 excavated to the west of the existing community center building. The existing artificial fill soils were observed to consist of sandy clay, silty clay, clayey sand, silty sand, sand, and sandy silt present in a generally slightly moist to very moist and dense/stiff condition. These fill materials were presumed to have been placed during the original development of the site as a community center and public park within the eastern portion of the site, for the establishment of Jeaunine Drive within the western portion of the site, and for the establishment of the West Gainsborough Drive roadway along the western margin of the site. These fill soils are presumed to have been placed in a controlled manner during the construction of the existing improvements, however an engineer's certification of these existing fill soils has not been recovered as of the date of this report, and therefore these fills are considered to be uncertified.

3.2 Colluvium (Qcol)

Colluvial soils, consisting of the naturally deposited soil horizon, were encountered below the artificial fill soils in Borings B-5, B-8, B-9, and B-12, and in Test Pit TP-3, and at the existing ground surface in Test Pits TP-1, TP-2, and TP-6. These materials were observed to consist of sandy clay, clayey sand, and silty sand derived from the weathering and downslope transport of the underlying native materials. These materials were observed to be present in a generally moist to very moist and dense/stiff condition. The maximum observed upper depth of the colluvial soil was approximately 11 feet below the existing ground surface in Boring B-8.

3.3 Older Alluvium (Qoa)

Older alluvium was encountered below the existing artificial fill and or colluvium soil in Borings B-3, B-4, B-14, B-16, P-1, P-2, P-3, and P-4 and Test Pit TP-4 excavated in the central eastern portion of the site, at upper depths ranging from approximately 3 feet below the existing ground surface in Test Pit TP-4 to approximately 14 feet below the existing ground surface in Boring B-4. These materials were observed to consist of silty clay, clayey sand, silty sand, clayey silt, and silt present in a generally moist and dense/stiff condition.

3.4 Monterey Formation (Tm)

Shale bedrock of the Miocene Age Monterey Formation was encountered in Borings B-1, B-2, B-3, B-5, B-6, B-8, B-9, B-10, B-11, B-13, P-1, and P-3 excavated within the community center and public park areas in the southeastern and eastern portions of the site. These materials were encountered at upper depths ranging from approximately 1 foot below the existing ground surface in Boring B-11 to approximately 20 feet below the existing ground surface in Boring B-3. These materials were observed to consist of claystone, siltstone, and shale present in a generally very moist to moist and stiff to very hard condition.

3.5 Detrital Sediments of Lindero Canyon (Tvcg)

Sedimentary bedrock of the Detrital Sediments of Lindero Canyon Formation was encountered in Borings B-6 and B-12 and in Test Pits TP-1, TP-2 and TP-5 at upper depths ranging from approximately 1 foot to 10 feet below the existing ground surface. These materials were observed to consist of deposited materials of a volcanic origin, present in a dry to slightly moist and hard condition.

3.6 Lower Topanga Formation (Ttls)

Sedimentary bedrock of the Lower Topanga Formation was encountered below a depth of approximately 6 feet in Test Pit TP-6. This material was observed to consist of claystone present in a moist and hard condition.

3.7 Soil / Bedrock Parameters

3.7.1 Compaction

Several compaction curves were developed in this study for representative samples of the near surface soils encountered during our exploration program. The results are summarized in the table below, and the laboratory data sheets are presented in Appendix B of this report.

Sample Location	Sample Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture (%)
B-1	0'-5'	Moderate to Dark Yellowish Brown Sandy CLAY	118	13
B-3	0'-5'	Dark Yellowish Brown Silty CLAY	109	15
B-8	0'-5'	Dark Yellowish Brown Silty Sandy CLAY	119.5	12.5
TP-1	0'-2'	Moderate Yellowish Brown Clayey SAND	92	24.5
TP-2	0'-2'	Dark Yellowish Brown Silty CLAY	112	15.5

3.7.2 Expansion Category

The potential of the soil to swell or expand increases with an increase in soil density, a decrease in initial moisture content (low percent saturation), an increase in clay content, and an increase in the activity of the clay content. Expansive soils change in volume (shrink or swell) due to changes in the soil moisture content. In addition to swell potential of the soil, the amount of volume change depends on (1) the availability of water, (2) the restraining pressure, and (3) time. The sample location, the initial moisture content, the initial dry density, and the final moisture content for each specimen used to perform the expansion index test are provided in the following table. The risk of soil expansion increases with an increase in expansion index. These test results show that soils with a *high* to *very high* expansion potential are present throughout the subject site. It is recommended that additional testing be performed on a sample obtained from the finished building pads after any required grading or fill placement is performed to achieve final pad grade.

Sample Location	Sample Depth (ft)	Soil Description	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Dry Density (pcf)	Expansion Index
B-1	0'-5'	Moderate to Dark Yellowish Brown Sandy CLAY	12.4	26.8	102.3	109
B-3	0'-5'	Dark Yellowish Brown Silty CLAY	13.8	32.9	98.6	163
B-8	0'-5'	Dark Yellowish Brown Silty Sandy CLAY	12.2	26.0	105.0	122
TP-1	0'-2'	Moderate Yellowish Brown Clayey SAND	21.3	39.8	80.8	54
TP-2	0'-2'	Dark Yellowish Brown Silty CLAY	13.6	31.0	98.5	140

3.7.3 Shear Strength

Direct shear testing was used to measure the peak and ultimate shear strength values for both remolded samples of the near surface soils to evaluate the behavior of a compacted fill, and for undisturbed samples of the subsurface materials. The laboratory data is presented in Appendix B of this report, and summarized in the table below.

Material Shear Strengths Summary

Sample ID	Soil Description	Peak Cohesion, psf	Peak Friction Angle, degrees	Ultimate Cohesion, psf	Ultimate Friction Angle, degrees
B-1 @ 0'-5'	MODERATE TO DARK YELLOWISH BROWN SILTY SANDY CLAY (REMOLDED)	940	21	310	29
B-3 @ 0'-5'	DARK YELLOWISH BROWN SILTY CLAY (REMOLDED)	760	12	460	19
B-6 @ 2.5'	DARK YELLOWISH BROWN SILTY SANDY CLAY (UNDISTURBED)	550	30	310	27
B-16 @ 5'	LIGHT GRAY SILTY SAND (UNDISTURBED)	370	33	120	31
B-16 @ 7.5'	MODERATE YELLOWISH BROWN TO TAN SILT (UNDISTURBED)	20	44	0	43

3.7.4 Compressibility

Consolidation testing was performed on several undisturbed samples of the earth materials collected from our exploratory borings, and also on a remolded sample of the near surface soils to determine the characteristics of a fill compacted to 90% relative compaction. The consolidation test results showed little to no tendency to hydroconsolidate for both the undisturbed samples and the remolded sample, but a very high potential to swell due to the highly expansive nature of the majority of the materials encountered at the site was observed within numerous samples, including the remolded example. Those samples which did not swell when saturated displayed low to moderate potentials for consolidation. The laboratory data is presented in Appendix B of this report.

3.7.5 Corrosivity

The risk of corrosion of construction materials relates to the potential for soil-induced chemical reaction. The rate of deterioration depends on soil resistivity, texture, acidity, and chemical concentration. To provide a basis for a preliminary corrosion evaluation, one sample of the near surface soils on the site was analyzed. The results of these tests are summarized in the following table, and the test results data sheet from Capco Analytical Services, Inc., is attached in Appendix B. Sulfate and chloride concentrations are expressed in mg/kg on a dry weight basis.

Sample Location	Depth, (ft)	Description	pH	Chloride, mg/kg	Sulfate, mg/kg	Specific Conductance, ohms-cm
B-1	0'-5'	MODERATE TO DARK YELLOWISH BROWN SANDY CLAY	8.1	190	320	1700
B-3	0'-5'	DARK YELLOWISH BROWN SILTY CLAY	8.2	35	66	5500

The sulfate content is negligible (*S0* exposure category based on ACI 318), and therefore special considerations for concrete which will be in contact with the onsite soils is not required for protection from sulfate exposure. It is recommended that additional testing be performed on a sample obtained from the finished pad after any required grading or fill placement is performed to achieve final pad grade.

3.7.6 R-value

Representative samples of the upper site soils present in existing and proposed pavement areas were transported to an outside laboratory for *R*-value testing, and the results are included in Appendix B. The results showed *R*-values ranging from 3 to 12, which are relatively low, and typical of fine grained soils (clays and silts) such as are the predominant soil types at the site, which provide generally poor support for pavements.

3.8 Groundwater

At the time of our field exploration program, perched groundwater was encountered within our exploratory Borings B-1, B-2, B-16, P-1, and P-3 at depths ranging from approximately 7.5 feet to 15 feet below the existing ground surface. The subject site is not located within an area where historic groundwater levels have been monitored, as shown on the *Historically Highest Groundwater Map* (CDMG 2002) included as Figure 5 of this report. The perched groundwater was observed only in the borings excavated in the lawn area upon the northwest facing slope which descends below the existing community center building (Borings B-1, B-2, B-16, P-1, and P-3), and is presumed to be the result of either leaking water pipes or the downslope migration of irrigation water which has

permeated the near surface soils and accumulated near the contact between the less permeable earth materials present at depth.

3.9 Percolation Testing

The field percolation testing program was performed in accordance with the specifications for the falling-head borehole infiltration test method specified in section C.6 of Appendix C of the **Ventura County Technical Manual for Stormwater Quality Control Measures, Manual Errata Update June 2018** (Geosyntec Inc. and Larry Walker Associates 2018). Our percolation testing program consisted of:

a. Drilling, sampling, and logging of four percolation test borings (Borings P-1 through P-4) in the anticipated infiltration area as identified by the project design team. The percolation test locations are shown on the *Conejo Community Park – Schematic Plan – L1.0 – Main Park* included as Plate 1. The borings were excavated to depths ranging from approximately 5.5 feet to 16.5 feet below the existing ground surface with a truck mounted hollow stem auger drill rig for the purpose of evaluating the subsurface soil conditions, and to perform percolation testing. The earth materials encountered and tested are considered to be representative of the earth materials underlying the site in the vicinity of the areas tested, at the depths tested.

b. Performing field percolation testing to determine the infiltration capabilities of the subsurface materials in the proposed infiltration area.

c. Evaluating and summarizing the percolation test data as presented in the following paragraphs of this report.

The falling head borehole infiltration test method used consisted of the excavation of the percolation test holes utilizing a truck mounted hollow stem auger drill rig with an 8-inch diameter auger. The test holes were excavated to the anticipated depth of the bottom of the infiltration BMP system, and approximately 11 feet below the anticipated bottom of the proposed infiltration BMP, assuming a typical 5-foot depth for the proposed infiltration BMP. These testing depths are in accordance with the standards detailed in Appendix C of the **Ventura County Technical Manual for Stormwater Quality Control Measures, Manual Errata Update 2018** (Geosyntec Inc. and Larry Walker Associates 2018).

Within Borings P-1 and P-3, each excavated to a depth of approximately 16.5 feet below the existing ground surface, artificial fill materials were encountered extending to depths of approximately 5 feet and 7 feet, respectively, below which older alluvium material was encountered. Within each of these exploratory borings, siltstone bedrock of the Monterey Formation was encountered below a depth of approximately 15 feet. Perched groundwater was encountered at depths of approximately 15 feet in Boring P-1 and 13 feet in Boring P-3.

Within Borings P-2 and P-4, each excavated to a depth of approximately 5.5 feet below the existing ground surface, artificial fill materials were encountered extending to depths of approximately 4.5 feet and 4 feet, respectively, below which older alluvium material was encountered. No groundwater was encountered within either of these exploratory excavations.

Upon completion of the excavation and sampling operations, each test hole was prepared by installing an appropriate length of 3-inch diameter perforated PVC pipe, and filling each test hole with water to initiate the 24-hour pre-saturation period.

At the completion of the pre-saturation period, Borings P-1 and P-3 were each found to have water remaining within the excavations, with water recorded to be at a depth of approximately 4.25 feet in Boring P-1 and approximately 8.33 feet in Boring P-3. Borings P-2 and P-4 were observed to be completely drained.

As test holes P-2 and P-4 were found to be completely drained following the presaturation period, each test hole was then refilled with water to a height of approximately 12-inches above the bottom of the excavation. The water drop in each test hole was then recorded at 60-minute intervals, and additional water was added to the test hole to restore the top of the water column to a height of approximately 12-inches above the bottom of the boring after each reading. This process was continued for a period of 4 hours for each test boring. As test holes P-1 and P-3 were found to have water remaining following the presaturation period, additional testing was not performed within these test holes.

The percolation test data is summarized in the table below, with the average percolation rates provided in terms of inches per hour.

Boring	Tested Depth (ft)	Average Field Absorption Rate (in/hr)
P-1	5.0	-
P-2	16.0	1.94
P-3	5.0	-
P-4	16.0	1.53

Upon completion of the field testing program, the perforated pipe was removed and the test holes were backfilled with the excavated soil.

It should be noted that the infiltration data presented in this report represents the infiltration rates at the specific locations and depths, and under the specific conditions tested. Therefore, the infiltration rates obtained as a result of this testing should be considered as an approximate range of likely values for the onsite materials. Sound engineering judgement should be exercised in extrapolating the test results for other conditions and locations. Published technical design references vary in methods they present for using the field percolation test data. Most references include reduction and or correction factors for several parameters including, but not limited to, size of the stormwater management system relative to the test volume, number of tests conducted, variability in the soil profile, anticipated silt loading, anticipated biological buildup, anticipated long-term maintenance, and other factors. Typically, in aggregate these factors range from about 2.5 to 50 depending on the method used. The final determination of the means by which these data are used is left to the design engineer.

4. SEISMICITY

4.1 Seismic Design Criteria

The method defined in the California Building Code (CBC) is utilized in the seismic design of structures, and is based on the Maximum Considered Earthquake Ground Motion. The maximum considered earthquake spectral response accelerations are then adjusted for the general type of earth materials within approximately the upper 100 feet underlying the site, termed a Site Class, which would be D for the subject site. The Site Class is based on parameters such as shear wave velocity, standard penetration test resistance, undrained shear strength, and earth material type.

The site-specific seismic design criteria required by the CBC were determined utilizing the SEAOC/OSHPD (2021) Seismic Design Maps online web app, utilizing ASCE 7-16 Standards. The output from the Seismic Design Maps web app is included as an attachment in Appendix C of this report, and the primary design criteria are summarized in the table below.

ASCE Standard	F_a	F_v	PGA	PGA_M	S_S	S_1	S_{MS}	S_{M1}	S_{DS}	S_{D1}
7-16	1	Null*	0.564	0.621	1.485	0.535	1.485	Null*	0.990	Null*

*See Section 11.4.8

Conformance to these criteria does *not* constitute a guarantee or assurance that significant structural damage or ground failure will *not* occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and *not* to avoid all damage, since such design may be economically prohibitive.

4.2 Earthquake Effects

The intensity of ground shaking during an earthquake can result in a number of phenomena classified as ground failure, which include ground rupture due to faulting, landslides, liquefaction, lurching, rock fall, and seismically induced settlement. Other seismic hazards include Seiches and tsunamis. Descriptions of each of these phenomena and an assessment of each, as it affects the proposed site, are included in the following sections. The Seismic Hazards Mapping Act of 1990, which became effective in 1991, requires mitigation of seismic hazards to a level that does *not* cause collapse of the building intended for human occupancy, but it does *not* require mitigation to a level of no ground failure or structural damage.

4.2.1 Shallow Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects the ground surface. Where associated with reverse faults, such ruptures rarely occur as single breaks or are confined to a narrow zone. More commonly, ground rupture associated with faulting is characterized by relatively short segments of faulting that occur over a broad area of the upper plate. In some cases, particularly in unconsolidated alluvial sediments, *secondary ground ruptures* can develop from a number of causes not necessarily related directly to surface rupture of the causative fault. The secondary processes may include ground shaking, seismic settlement, landslides, and liquefaction.

As the subject site is *not* located within an Alquist-Priolo Earthquake Fault Hazard Zone, and no known earthquake faults have been identified as being present below the subject site, a detailed fault investigation study will not be a requirement at this time.

4.2.2 Earthquake-Induced Landsliding

Landslides are slope failures that occur where the horizontal seismic forces act to induce soil failure. The subject site is not located within an area that has been identified by the State of California (CDMG 2002) as being potentially susceptible to hazards associated with earthquake induced landsliding, as shown on the *Seismic Hazard Zones Map* included as Figure 6 of this report. Our surficial reconnaissance of the subject site, and our subsurface exploration program, have *not* revealed evidence of prior landslide events having impacted the site. The potential of earthquake-induced landsliding impacting the subject site is not considered to be a significant risk.

4.2.3 Seiches and Tsunamis

Seiches are an oscillation of the surface of an inland body of water that varies in period from a few minutes to several hours. Seismic excitations can induce such oscillations. Tsunamis are large sea waves produced by submarine earthquakes or volcanic eruptions. Since the site is *not* located close to an inland body of water and is at an elevation sufficiently above sea level to be outside the zone of a tsunami runup, the risk of these two hazards is not pertinent to this site.

4.2.4 Evaluation of Liquefaction Potential

The subject site is not located within an area considered by the State of California (CDMG 2002) to be susceptible to hazards associated with liquefaction, as shown on the *Seismic Hazard Zones Map* included as Figure 6 of this report. As dense older alluvium and bedrock materials are present at relatively shallow depths below the subject site, and shallow groundwater is not present below the proposed improvements, earthquake induced liquefaction and related effects are not considered to be a risk at the subject site.

4.2.5 Settlement Due to Seismic Shaking

As the subject site is underlain by dense older alluvium and or bedrock material, and our recommendations as presented within this report are to support the proposed improvements entirely with foundations bearing into newly

placed certified compacted fill established above the older alluvium and or bedrock, or cast-in-place concrete pile foundations bearing into competent older alluvium and or bedrock, settlement due to seismic shaking is not considered to be a risk at the subject site.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions and Design Requirements

Based on the findings of our data review, subsurface exploration, laboratory testing, field testing, and engineering analyses, and within the scope of this study, the construction of the proposed improvements at the subject site is considered to be *feasible* from a geotechnical engineering viewpoint, provided the recommendations in this report are incorporated into the building plans and implemented during construction.

Due to the presence of soils with a *very high* expansion potential at the subject site, as discussed within the preceding and following sections of this report, it is recommended that lime treatment of the soils to be placed within 5 feet of the proposed finished grade, or within 2 feet of the bottom of any proposed foundations, whichever is deeper, be performed below the proposed community center and amphitheater structures, and below any other permanent structures to be constructed as a part of the proposed scope of improvements, as is discussed in greater detail within the *Site Preparation* section of this report.

The following sections discuss conditions that should be anticipated, and provide recommendations for specific mitigation during the design and construction phases of the proposed improvements. It should be noted that the recommendations presented within this report have yet to be peer reviewed by the building official, and may be subject to revision following review.

5.1.1 Faults / Seismicity

Although no known active faults traverse through the subject site, like most of Southern California, the site lies within a seismically active area. Earthquake resistant structural design is recommended. Designing structures to be earthquake-proof is generally considered to be impractical, especially for private projects, due to cost limitations. Significant damage to structures may be unavoidable during large earthquakes. Structural design based on the 2019 CBC (California Building Code) structural analysis procedures calls for the seismic parameters given previously in the *Seismic Design Criteria* section. These minimum code values are intended to protect life and may not provide an acceptable level of protection against significant cosmetic damage and serious economic loss. Significantly higher than code parameters would be necessary to further reduce potential economic loss during a major seismic event. Structural Engineers, however, often regard higher than code values or procedures as impractical for use in structural design. The Structural Engineer and project Owner must decide if the level of risk associated with code values is acceptable and, if not, to assign appropriate seismic values above code values for use in structural design.

5.1.2 Hazardous Materials

AGS has *not* been retained to provide any type of environmental assessment of the subject property, *nor* to provide recommendations with respect to any contamination that might be present.

5.1.3 Landslides

Based upon the results of our field reconnaissance program, our review of regional information, the results of our subsurface exploration program and laboratory testing programs, and the results of our engineering evaluations as detailed within this report, it is our professional opinion that the subject site has not been previously impacted by a landslide event, and that the conditions of the site are generally favorable with respect to the potential for a future landslide event impacting the site, and will remain so provided the site is properly improved and maintained.

5.1.4 Rockfall

Due to the topography of the subject site and surround areas, damage to life or property due to rockfall is not considered to be a risk to the proposed improvements to be constructed at the subject site.

5.1.5 Cut Slopes

Although a detailed site grading plan has not been provided to our office as of the date of this report, no cut slopes are anticipated to be constructed to complete the proposed improvements.

5.1.6 Fill Slopes

Although a detailed site grading plan has not been provided to our office as of the date of this report, the construction of new fill slopes with a maximum finished gradient of 2:1 (horizontal:vertical) are anticipated to be constructed to establish grade for the proposed improvements. Recommendations for use in the construction of any proposed fill slopes have been provided in the *Site Preparation* section of this report.

5.1.7 Slope Setback

When located next to a descending 3(H):1(V) slope or steeper, the base of footings for buildings should be a minimum of 5 feet or one-third (⅓) the slope height from the face of slope, whichever is greater, but need *not* exceed 40 feet from the face of slope. *Examples of Slope Setbacks* are included in Figure 7.

5.1.8 Foundation Type

With proper site preparation, conventional shallow foundations can be used for the support of the proposed improvements. All shallow foundations shall be supported by newly placed compacted fill, placed in accordance with the recommendations presented in the *Site Preparation* section of this report, and shall be designed and constructed in accordance with the recommendations presented in the *Shallow Foundations* section of this report.

Where site grading to create a compacted fill may not be desired due to potential impact to the surrounding area, such as in the location of the proposed bridge, the use of cast-in-place concrete piles bearing into competent older alluvium and or bedrock, constructed in accordance with the recommendations presented in the *Pile Foundation Design* section of this report is recommended.

5.1.9 Removal Depths / Expansion Potential

Our field exploration program indicated that uncertified artificial fill is present throughout much of the study area, and that the strength and consistency of the near surface soils present at the site is variable. In our opinion, these surficial soils are *not* suitable in their present condition for the support of the proposed improvements, without the potential for detrimental movements occurring. Furthermore, many of the onsite soils have a *very high* potential for expansion.

To mitigate the geotechnical hazards of the surficial soils, the soils will require removal, moisture conditioning, and recompaction *prior* to construction of any overlying improvements. Recommendations for minimum removal depths are given below in the *Site Preparation* section, but all existing artificial fill and colluvial materials, and the upper zone of highly weathered bedrock, where present, will need to be completely removed prior to placing compacted fill below the footprint of the proposed community center building, amphitheater, and any other proposed permanent structures. These materials were observed to have depths ranging from approximately 6 feet to 15 feet below the existing ground surface within the exploratory borings excavated in these areas. Furthermore, it is recommended to lime treat the fill soils to be placed within 5 feet of the proposed finished pad grade, or 2 feet below the bottom of any proposed foundations, whichever is deeper, below the footprint of the proposed community center and amphitheater structures, and below any other permanent structures to be constructed as a part of the proposed scope of improvements, as is discussed in greater detail within the *Site Preparation* section of this report.

Below proposed driveway and pavement areas, all existing artificial fill soils should be removed to expose competent native materials prior to the placement of fill. Within proposed pathway and trailway areas, the near surface soils should be removed, processed, and recompacted.

5.1.10 Site Grade Adjustments

As a proposed grading plan has not been provided to our office as of the date of this report, permanent proposed grade changes are not known at this time, but area expected to be relatively minor.

5.1.11 Exploratory Excavations

The locations and dimensions of excavations completed during site exploration should be noted relative to the future grading/building plans. Although boring and test pit backfill was tamped during placement, these materials are essentially uncompacted, and may retain some potential for settlement. Removal and recompaction of these materials may be required to support improvements over these excavations.

5.1.12 Excavation Characteristics

Difficult excavation in the location of the proposed improvements is not anticipated.

5.1.13 Drainage

All surface runoff must be carefully controlled and must remain a crucial element of site maintenance. Proper drainage and irrigation are important to reduce the potential for damaging ground movements. Final grading shall provide positive drainage away from foundations and slopes in compliance with the local jurisdiction's grading requirements to reduce the risk of water ponding adjacent to foundations or ponding above slopes or flowing over slope faces. All pad drainage shall be collected and diverted away from proposed buildings and foundations in non-erosive devices. Gutters and roof drains should be provided, properly maintained, and discharge directly into glue-joined, watertight subsurface piping. A drainage system consisting of area drains, catch basins, and connecting lines should be provided to capture landscape/hardscape sheet flow discharge water. All drainage piping should be watertight and discharge directly to an approved dispersal area.

A waterproofing system should be used on all retaining walls, and a Miradrain drainage panel, or similar, should be placed over the waterproofing. A perforated subdrain pipe of schedule 40 or better should be installed at the base of the wall and drained to an approved dispersal area. *Accordion* type pipe is *not* acceptable. Basement floors or floors below exterior grade should be waterproofed. Your project architect or Civil Engineer should provide detailed specifications for all waterproofing.

If a raised floor is used, the ground surface below the floor should be sloped away from footings and in a manner to collect and transfer any water due to a water line break, for example, to an approved dispersal area in a non-erosive device.

All underground plumbing fixtures should be absolutely leak-free. As part of the maintenance program, utility lines should be checked for leaks for early detection of water infiltrating the soils that could cause detrimental soil movements. Detected leaks should be promptly repaired. Proper drainage shall also be provided away from the building footings during construction. This is especially important when construction takes place during the rainy season.

Seepage of surface irrigation water or the spread of extensive root systems into the subgrade of footings, slabs, or pavements can cause differential movements and consequent distress in these structural elements. Trees and large shrubbery should *not* be planted so that roots grow under foundations and flatwork when they reach maturity. Landscaping and watering schedules should be planned with consideration for these potential problems.

Drainage systems should be well maintained, and care should be taken to *not over* or *under* irrigate the site. Landscape watering should be held to a minimum while maintaining a uniformly moist condition without allowing the soil to dry out. During extreme hot and dry periods, adequate watering may be necessary to keep soil from separating or pulling back from the foundations. Cracks in paved surfaces should be sealed to limit infiltration of surface waters.

5.1.14 Plan Review

At this time, AGS has been provided with a conceptual plan detailing the proposed improvements, as utilized for the base maps for the *Conejo Community Park – Schematic Plan – L1.0 – Main Park* and the *Conejo Community Park – L5.0 – Tarantula Hill Trail* plans included as Plates 1 and 2 of this report. When these plans become finalized, they should be reviewed by AGS prior to submittal to regulatory agencies for approval. A grading plan review report *may* be required by the City to be submitted with the approved grading plans. Additional analysis *may* be required at that time depending on specific details of the proposed grading and improvements, and any corrections deemed necessary will be made known to the Project Civil Engineer. Approval by this office will be indicated by manual signature and stamp once our recommendations have been incorporated into the design or shown as notes on the plan.

Please be aware that the contract fee for our services to prepare this report does not include additional work that may be required, such as grading observation and testing, footing observations, plan review, or responses to governmental (regulatory) plan reviews associated with you obtaining a building permit. Where additional services are requested or required, you will be billed on an hourly basis for consultation or analysis. AGS requests a minimum of 24 hours be provided for plan reviews. Please anticipate additional time for plan corrections if all of our geotechnical recommendations have not been added to the plans, prior to our approving and stamping the plans.

5.1.15 Improvements on Expansive Soils and Near Slopes

Expansive soils contain clay minerals that change in volume due to changes in soil moisture content. Soils tend to shrink (decrease in volume) when they dry out and swell (heave or increase in volume) when they absorb moisture. The amount of volume change depends on (1) the swell potential of the soil, (2) the availability of water, (3) the restraining pressure on the soil, and (4) time.

Hillside developments involve risks that are *not* found in typical flatland developments. Construction of improvements near slopes often offer exceptional views, but such construction must be accepted with some risk, and these risks can never be eliminated. Downward and lateral movements (slope creep) are typical of fill slopes, cut slopes, and even natural slopes in an area near the edge of slopes. Slope creep is the very slow, gradual downslope movement of the outer portion of the slope surface due to gravity. The influence often extends 20 to 30 feet from the top of slope into the outer edge of the building pad. The higher and steeper the slope, the more pronounced the potential movements. Over time, slope creep can cause decorative walls, fences, and trees to lean in a downslope direction and can cause patios and other hardscape to move toward the slope, causing cracks to develop in these structures. Any construction within the creep zone, including but not limited to walls, swimming pools, patios, and other structures, may become distressed and require periodic maintenance. The cost to design foundation systems to resist such movements may be prohibitive and more costly than periodic repairs.

The recommendations presented in this report are intended to reduce the risks associated with construction on expansive soil and near slopes. Although such risks cannot be eliminated, these risks can be reduced with proper construction practices and foundation design, drainage, maintenance of landscaping and plumbing, including that associated with water service and waste lines. Property Owners must maintain their property if they are to reduce the risk of slope or foundation movements. Information regarding the care and maintenance of improvements located on expansive soils and near slopes and the associated risks should be passed on to future owners of the property.

Slopes and pads on this project should be designed to control the flow of water and reduce water-induced erosion and slope deterioration. A long-term maintenance program should be implemented. Slopes require maintenance to reduce the risk of erosion and degradation with time due to natural or man-made conditions. All slopes should be maintained with dense, deep rooting, lightweight, drought-resistant groundcover and possibly shrubs and trees. A reliable irrigation system should be installed on manufactured slopes, adjusted so over watering does not occur, and periodically checked for leakage. *All leaks should be repaired immediately.* Excessive watering of slopes, which

can cause erosion and surficial failures, must be avoided. Overwatering can also increase the potential for soil softening and strength loss that could lead to slumping of the slope face. Any problems, such as erosion or slumps, should be repaired immediately to avoid more serious problems.

Roof gutters and downspouts should be inspected periodically. If clogged, they should be cleaned. If damaged, they should be repaired. Any separation cracks between sections of flatwork should be sealed to prevent infiltration of water. Catch basins, grates, and subsurface drainage piping should be kept free of silt and debris. Paved diverter terraces, interceptor terraces, downdrains, appurtenances such as inlets, and velocity reducer structures must be maintained in a clean condition and good repair. Side swales, which direct water around the building, should be maintained so they will not become ineffective. In short, drainage structures should be kept in good condition and clean over the entire length to the outlet to an approved dispersal area.

Standing water on the pad area above descending slopes is a major contributor toward slope failure. Standing water around foundations is a major contributor to foundation movements. Fine grading of the site should provide positive drainage away from natural slopes, and water should *not* be allowed to pond or gather in the natural slope area. Surface water should *not* be discharged onto any adjacent descending slope.

Rodent activity should be controlled to prevent water penetration and loosening of the soil. Rodents, particularly ground squirrels, can damage slopes. Rodent control measures should be part of any slope maintenance program.

Extensive landscaping or modifications to the property may seriously alter the surface drainage pattern or affect slope stability. When landscaping, homeowners should avoid disrupting flow patterns created when the property was originally graded or altering slopes. The normal property drainage in hillside areas, for example, is from the rear yard to the street. Some properties drain to natural watercourses. Earth berms are used to prevent water from flowing over slope faces, and these berms must be maintained.

Large trees or vegetation with large root systems should be planted at sufficient distance from the structure or slab-on-grade areas to avoid roots from extending under footings and slabs, in which case they could lift the footings or slabs or alter the moisture conditions and cause movements.

In summary, proper maintenance is the *key* to reducing the risk of foundation movements and slope distress.

5.1.16 Additional Recommendations

The following additional geotechnical recommendations should be incorporated into the final design and construction practice. All such work and design should be in conformance with local governmental regulations or the recommendations contained herein, whichever are more restrictive. The following recommendations have *not* been reviewed or approved by the building official for the City at this time. These recommendations may change based on obtaining approval from the City. Final design of the proposed project should be made following approval from the City.

5.2 Site Preparation

As of the date of this report, a site grading plan has not been provided to our office, however, based upon our understanding of the proposed improvements, site grade adjustments will be required to establish grade to support the proposed improvements. Additionally, it has been recommended to remove and recompact the soils present below the proposed community center building, amphitheater, and any other proposed permanent improvements, and below any proposed pavement areas. In an effort to mitigate the potential hazards associated with construction upon highly expansive soils, it is recommended to lime treat the fill soils to be placed within 5 feet of the proposed finished pad grade, or 2 feet below the bottom of any proposed foundations, whichever is deeper, below the footprint of the proposed community center and amphitheater structures, and below any other permanent structures to be constructed as a part of the proposed scope of improvements, as is discussed in greater detail within the following sections of this report.

General guidelines are presented below to provide a basis for quality control during site grading. We recommend that all structural fills be placed and compacted with engineering control under continuous observation and testing by the Geotechnical Engineer and or his field representative, and in accordance with the following requirements.

5.2.1 Removals

a. The contractor should locate and demolish all remaining existing improvements, debris, uncertified fill, and or subsurface trash. These soils and structures should be completely removed to expose competent native material. The resulting excavations should be cleaned of all loose or organic material and the excavation backfilled. In areas to receive fill or to support structures, deeper removals may be required, as discussed below.

b. Remove all brush, vegetation and loose soil *prior* to fill placement. The general depth of stripping should be sufficiently deep to remove the root systems and organic topsoil. A careful search shall be made for subsurface trash, abandoned masonry, abandoned tanks, and other debris (including uncertified fill) during grading. All such materials, which are *not* acceptable fill material, shall be removed *prior* to fill placement. The removal of trees and large shrubs should include complete removal of their root structures.

c. To reduce the risk of differential foundation movement below the proposed community center building, amphitheater, and any other proposed permanent improvements, we recommend that all foundations below these structures be supported by newly placed lime treated certified compacted fill with a uniform composition and a relatively uniform thickness.

d. Below the proposed building areas, all existing artificial fill and colluvium soils should be removed to expose competent older alluvium and or bedrock, and a newly placed certified compacted fill with a minimum thickness of 5 feet below the proposed finished grade, or 3 feet below the bottoms of the proposed foundations, whichever is deeper, should be placed for foundation and slab support. The limits of over-excavation should extend laterally a distance of at least the thickness of fill below the proposed foundations, and a minimum of 3 feet laterally beyond the outside perimeter of foundations, and or a distance equivalent to the depth of removal, whichever is greater. In the location of the proposed community center building, removals extending to as deep as approximately 15-feet, or possibly deeper, should be anticipated. The depths of fill below proposed structures should not exceed a vertical ratio of 2:1 (thickest to thinnest), which may require deepening of the excavation into competent bedrock.

e. Soils to be placed within 5 feet of the proposed finished grade, or 2 feet below the bottom of any proposed shallow foundations, below the footprint of the proposed community center building, amphitheater, and any other proposed permanent structures, shall be lime treated in an effort to mitigate the potential effects of highly expansive soils. It is estimated that a lime treatment of +/-5% volume by weight will be necessary to achieve the desired results. It is recommended that a specialty contractor with experience in soil lime treatment be consulted with prior to the beginning of site grading, and contracted to perform these services during construction.

f. In all other areas to receive fill, or to support driveway or parking lot improvements, all existing artificial fill and colluvium soils, and any highly weathered native material which may be present, should be removed to expose competent undisturbed older alluvium and or bedrock prior to the placement of fill.

g. In areas to support proposed trailway and pathway improvements, or in areas to receive landscape fill to be placed at a gradient of up to, but no greater than, 5:1 (horizontal:vertical), a minimum of the upper 12-inches of the existing earth materials should be processed as a certified compacted fill.

h. The removals can be limited to the proposed building areas, areas to support foundations, driveway and parking lot areas, and areas to receive fill. A careful search shall be made for deeper loose soil spots during grading operations. If encountered, these loose spots should be properly removed to expose competent material and properly backfilled and compacted as directed by a field representative of the Project Geologist and or Geotechnical Engineer.

i. The bottom of all removal areas should be verified to expose suitable, competent material by the Project Geologist and or Geotechnical Engineer, or their representative, prior to the placement of fill.

5.2.2 Fill Slopes

a. Fill slopes must be founded on a keyway established into competent undisturbed older alluvium and or bedrock to be approved by the Geotechnical Engineer or Geologist, and or their field representative. Keyway excavations shall be a minimum of 10 feet in width, dipped into the hill, must extend at least to the proposed toe of slope, and extend at least 2 feet into competent material at the outer edge of the keyway. Fill slopes should be benched into the existing slope. Figure 8 shows *Typical Keyway, Benching, and Drainage Details.*

b. Fill slopes shall be constructed by placing fill soil a sufficient distance beyond the proposed finished slope to allow compaction equipment to operate at the outer surface limits of the final slope surface. The excess fill shall be cut back to finished grade.

5.2.3 Suitable Fill Material

a. The excavated site soils, cleaned of deleterious material, can be re-used for fill. Rock larger than 6 inches should *not* be buried or placed in compacted fill. Rock fragments less than 6 inches may be used provided the fragments are *not* placed in concentrated pockets, and a sufficient percentage of finer grained material surrounds and infiltrates the rock voids. Furthermore, the placement of any rock must be under the continuous observation of the Geotechnical Engineer, and or his field representative.

b. Material imported to the subject site from offsite sources, *if required*, should have an expansion index of less than 90. Imported material should be approved by the Geotechnical Engineer *prior* to placement.

c. Soils to be placed within 5 feet of the proposed finished grade, or 2 feet below the bottom of any proposed shallow foundations, below the foot print of the proposed community center building, amphitheater, and any other proposed permanent structures, shall be lime treated in an effort to mitigate the potential effects of the highly expansive soils present at the site. It is estimated that a lime treatment of +/-5% volume by weight will be necessary. It is recommended that a specialty contractor with experience in soil lime treatment be consulted with prior to the beginning of site grading and contracted to perform these services during construction. Fill soils which will support the foundation system of individual structures shall be of a similar composition in an effort to avoid differential movement.

5.2.4 *Placement of Compacted Fill*

a. All fill materials should be placed in controlled, horizontal layers *not* exceeding 6 to 8 inches thick, and should be moisture conditioned to be at least 2% but no greater than 5% above the optimum moisture content. Fill materials should be compacted to a minimum 90% of the laboratory maximum dry density, as determined by ASTM D1557. If either the moisture content or relative compaction does *not* meet these criteria, the Contractor should rework the fill until it does meet the criteria. If the fill materials pump (flex) under the weight of construction equipment, difficulties in obtaining the required minimum compaction may be experienced. Therefore, if soil pumping occurs, it may be necessary to control the moisture content to a closer tolerance, or to use construction equipment that is not as prone to cause pumping.

b. The field test methods to be used to determine the in-place dry density of the compacted fill shall be in conformance with either ASTM D1556 (sand cone test method) or ASTM D2922 (nuclear gauge method).

c. Subgrade for the support of pavement sections shall be moisture conditioned, as required, to be at least 2% over the optimum moisture content, and be recompacted to at least 95% of the maximum dry density to a depth of at least 12 inches.

5.2.5 *Testing of Compacted Fill*

a. At least one compaction test shall be performed for every 500 yd^3 of the fill material. In addition, at least one test shall be performed for every 2 feet of fill thickness.

5.2.6 *Inclement Weather and Construction Delays*

a. If construction delays or the weather result in the surface of the fill drying, the surface should be scarified and moisture conditioned before the next layer of fill is added. Each new layer of fill should be placed on a rough surface so planes of weakness are not created in the fill.

b. During periods of wet weather and before stopping work, all loose material shall be spread and compacted, surfaces shall be sloped to drain to areas where water can be removed, and erosion protection or drainage provisions shall be made in accordance with the plans provided by the Civil Engineer. After the rainy period, the Geotechnical Engineer and or his field representative shall review the site for authorization to resume grading and to provide any specific recommendations that may be required. As a minimum, however, surface materials previously compacted before the wet weather shall be scarified, brought to the proper moisture content, and recompacted *prior* to placing additional fill.

c. During foundation construction, including any concrete flatwork, construction sequences should be scheduled to reduce the time interval between subgrade preparation and concrete placement to avoid drying and cracking of the subgrade, or the surface should be covered or periodically wetted to prevent drying and cracking.

5.2.7 *Responsibilities*

a. Representative samples of material to be used as compacted fill should be analyzed in the laboratory by the Geotechnical Engineer to determine the physical properties of the materials. If any materials other than those previously tested are encountered during grading, the appropriate analysis of this material shall be conducted by the Geotechnical Engineer as soon as practicable. Any imported soil from off-site sources shall be approved *prior* to placement.

b. All grading work shall be observed and tested by the Project Geotechnical Engineer or their field representative to confirm proper site preparation, excavation, scarification, compaction of onsite soil, selection of satisfactory fill materials, and placement and compaction of fill. All removal areas and footing excavations shall be observed by the field representative of the Project Geotechnical Engineer before any fill or steel is placed.

c. The lateral limits and the depths of the removals should be shown by the Civil Engineer on the grading plans.

d. The grading contractor has the ultimate responsibility to achieve uniform compaction in accordance with the geotechnical report and grading specifications.

5.3 Utility Trench Backfill

The onsite soils are suitable for backfill of utility trenches from 1-foot above the top of the pipe to the surface, provided the material is free of organic matter and deleterious substances. The natural soils should provide a firm foundation for site utilities, but any soft or unstable material encountered at pipe invert should be removed and replaced with an adequate bedding material.

The site Civil Engineer, in accordance with manufacturer's requirements, should specify the type of bedding materials. Suitable non-expansive, granular soils will need to be imported for bedding and shading of utilities. Jetting of bedding materials should *not* be permitted unless appropriate drainage is provided and the bedding has a sand equivalent greater than 50.

Trench backfill should be placed in 8-inch lifts, moisture conditioned to be at least 2% but no greater that 5% over the optimum moisture content, and compacted to at least 90% of the maximum density as determined by ASTM D1557, with the exception of the one foot below subgrade in areas to be paved, which should be compacted to 95% of the maximum dry density. If the contractor can demonstrate minimum compaction requirements can be achieved with thicker lifts, the acceptable lift thickness may be increased. Jetting of trench backfill is *not* acceptable to compact the backfill.

In areas where utility trenches pass through an existing pavement section, the trench width at the surface shall be enlarged a minimum of 6 inches on each side to provide bearing on undisturbed material for the new base and paving section to match the existing section.

Major underground utilities shall *not* cross beneath buildings unless specifically approved by the Project Civil Engineer and respective utility company. If approved, trenches crossing building areas shall be backfilled with a select gravelly sand compacted to 95% relative compaction and at a moisture content at or near the optimum moisture.

5.4 Temporary Excavations

Temporary excavations of 5 feet or less in height in onsite materials may not require any special shoring. Vertical excavations more than 5 feet deep, however, will require conventional shoring per CAL/OSHA Regulations, or the excavation may be laid back at a 1(H):1(V) gradient, or angle of bedding, whichever is shallower. Excavations should *not* be allowed to become soaked with water or to dry out. Surcharge loads should *not* be permitted within a horizontal distance equal to the height of the excavation from the top of the excavation, unless the excavation is properly shored. Excavations that might extend below an imaginary plane inclined at 45 degrees below the edge of an existing foundation should be properly shored to maintain foundation support of the existing structure.

5.5 Shallow Foundations

Conventional spread footings founded into newly placed compacted fill can be used to support the proposed improvements. The following foundation design parameters may be used in the design of conventional shallow foundations.

5.5.1 Minimum Footing Dimensions

Minimum Footing Embedment Depth Below Grade, Inches	Minimum Wall Footing Width, Inches	Minimum Isolated or Pad Footing Width, Inches
27	15	24

These embedment depths are below the lowest adjacent, final grade. Where located adjacent to utility trenches, footings shall extend below a one-to-one plane projected upward from the inside bottom of the trench. When located next to a descending 3(H):1(V) slope or steeper, the base of footings for buildings should be a minimum of 5 feet or one-third the slope height from the face of slope, whichever is greater, but need *not* exceed 40 feet from the face of slope. *Examples of Slope Setbacks* are included in Figure 7.

5.5.2 Allowable Bearing Pressure and Lateral Resistance

Allowable net vertical soil bearing pressure, including dead and live loads, are given below for footings supported by certified compacted fill at the minimum required embedment depths, provided the footing width equals or exceeds the recommended minimum.

Support Material	Allowable Bearing Pressure, psf	Allowable Sliding Friction Coefficient	Allowable Passive Resistance, psf per foot of depth	Maximum Passive Resistance, psf
CERTIFIED COMPACTED FILL	2000	0.25	250	2500

Resistance to lateral loads can be assumed to be provided by friction along the base of the foundation and by passive earth pressure on the side of the footing, for that portion of the footing bearing in the recommended earth materials. The allowable friction coefficient may be used with the vertical dead loads, and the allowable lateral passive pressure can be utilized for the sides of footings poured against the supporting material to resist lateral loads. These allowable values can be increased by a factor of 1.5 to convert from allowable to ultimate values.

5.5.3 Steel Reinforcement

All foundations should be reinforced with a minimum of four #4 steel bars. Two of these should be placed near the top of the foundation, and two should be placed near the bottom. Final structural details of the footings, such as footing thickness, concrete strength, and amount of reinforcement, should be established by your Structural Engineer, but reinforcement should comply with the above minimums, and should comply with the requirements of soils with a *very high* expansion potential.

5.5.4 Foundation Settlement

Static settlement of proposed foundations bearing in certified compacted fill placed in accordance with the recommendations of this report due to dead and frequently applied live loads is not expected to exceed approximately ¾-inch under the assumed loading conditions, and is expected to occur primarily upon initial application of loading. Differential settlement is not expected to exceed approximately ¼-inch.

5.5.5 Required Observations

Prior to placing concrete in the foundation excavations, an observation should be made by the field representative of the Project Geotechnical Engineer to confirm that the footing excavations are free of loose and disturbed soils and are embedded in the recommended earth materials.

5.6 Pile Foundation Design

Drilled, cast-in-place concrete friction piles may be used for foundation support where removal and recompaction of the onsite soils and the use of shallow foundations embedded into compacted fill may prove to be too disruptive, such as for the foundation support of the proposed bridge and or for the foundation support of features within the playground area, for example. The pile foundations should be embedded within, and derive support entirely from, the older alluvium and or bedrock material which underlies the existing artificial fill and colluvial soils present at the subject site. The following criteria and design parameters can be used in the design of cast-in-place concrete friction piles.

5.6.1 Embedment Criteria

a. Drilled, cast-in-place concrete friction piles should be a minimum of 24-inches in diameter, and be embedded a minimum of 8 feet into competent older alluvium and or bedrock, but not less than the depth required for adequate vertical support and lateral resistance. The friction piles can be assumed fixed at 3 feet into competent older alluvium and or bedrock.

5.6.2 Steel Reinforcement

a. The structural details, such as (1) concrete strength, (2) type, amount, and placement of reinforcing, (3) structural connection, and (4) spacing, should be established by the project Structural Engineer.

5.6.3 Allowable Bearing Pressure and Lateral Resistance

a. A skin friction of 500 pounds per square foot (psf) for that portion of the pile embedded within competent older alluvium and or bedrock can be utilized to preliminarily determine the minimum pile length required for downward vertical support. Uplift resistance may be taken as ½ of the downward capacity. The allowable skin friction can be increased by ⅓ when considering short duration wind or seismic loads. This allowable skin friction should be verified once final finished grades and initial pile design depths have been determined.

b. Passive earth pressure resistance for that portion of the pile within the competent older alluvium and or bedrock may be computed as an equivalent fluid having a density of 250 pcf, up to a maximum passive earth pressure of 2500 psf. The allowable passive earth pressure may be increased by 100% for isolated piles. Piles spaced a minimum of 2-½ pile diameters on center may be considered isolated.

5.6.4 Required Observations

a. All pile excavations should be observed and approved by a representative of AGS *prior* to placing steel or pouring concrete.

b. All regulations within the most recent version of the CALOSHA Construction Safety Orders should .be followed.

5.6.5 Pile Settlement

The total settlement and differential settlement of structures supported on friction piles as recommended are anticipated to be within tolerable limits. Total and differential settlement is not expected to exceed ¼-inch.

5.7 Slab-On-Grade and Exterior Hardscape

If earthwork operations are conducted such that the construction sequence is not continuous or if construction operations disturb the surface soils, we recommend that the exposed subgrade to support concrete slabs be tested within a day of the concrete pour to verify adequate compaction and moisture conditions. If adequate compaction and moisture conditions are not demonstrated, the disturbed subgrade should be over-excavated, scarified, and recompacted in accordance with the guidelines in *Site Preparation* section *prior* to the slab being poured.

As it has been recommended to use lime treatment to mitigate the effects of expansive soils below the footprint of the proposed community center and amphitheater structures, and below the footprint of any other proposed permanent structures, it may be elected to utilize lime treatment within the upper 12-inches of the soils to support exterior concrete hardscape to provide similar benefits. It is recommended to consult with a specialty contractor familiar with the lime treatment of soils to reduce expansion potential to discuss the potential benefits of these procedures.

5.7.1 Structural Design

Concrete floor slabs on grade should be reinforced with a minimum of #4 steel bars placed on 16-inch centers each way. The final structural details, such as (1) slab thickness, (2) concrete strength, (3) type, amount, and placement of reinforcing, and (4) joint spacing, should be established by your Structural Engineer, but reinforcing should comply with the above minimums. The soils have been determined to be within the *very high* expansion potential category. The perimeter edge of exterior concrete slabs should be extended a minimum of 8 inches below the bottom of the slab and have a minimum width of 6 inches.

Cracking of concrete flatwork can occur and is relatively common. Steel reinforcement and crack control joints are intended to reduce the risk of concrete slab cracking, as are the use of fiber reinforced concrete and proper concrete curing. Also, concrete slabs are generally not perfectly level, but they should be within tolerances included in the project specifications.

Tile flooring can crack, reflecting cracks in the underlying concrete slab. Therefore, if tile flooring is used, the slab designer should consider additional steel reinforcement, above minimum requirements, in the design of concrete slabs-on-grade where tile will be installed. Furthermore, the tile installer should consider installation methods, such as using a vinyl crack isolation membrane between the tile and concrete slab, to reduce the potential for tile cracking.

5.7.2 Vapor Barrier

It is recommended that a minimum 15-mil thick plastic vapor barrier be used under floor slabs in moisture sensitive areas. The vapor barrier should be installed in accordance with the recommendations contained in the latest version of ASTM E1643. In accordance with our understanding of the latest standard of practice, it is suggested that the concrete slab be poured directly on top of the vapor barrier and that no sand should be placed atop the vapor barrier, however it may be recommended by the architect and or structural engineer that a layer of sand be placed between the prepared subgrade and the vapor barrier. Seams of the vapor barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the vapor barrier should be completely repaired *prior* to placement of concrete. The concrete mix should be designed so as to minimize possible curling of the slab. The concrete slab should be allowed to cure properly before placing vinyl or other moisture-sensitive floor covering.

5.8 Retaining Wall Design Criteria

5.8.1 Foundations

Foundations for retaining walls can be designed in accordance with the *Site Preparation* and *Shallow Foundations* sections of this report.

5.8.2 Lateral Earth Pressures for Walls Retaining Less Than 6 Feet of Earth Material

The lateral earth pressure behind retaining walls depends on the allowable wall movement, type of retained earth materials, backfill slopes, wall inclination, surcharge, and any hydrostatic pressures.

Any proposed retaining walls retaining less than 6 feet of the earth materials may be designed using a triangular pressure distribution, and an equivalent fluid pressure of 90 pcf. In areas where the backslopes are steeper than 5(horizontal):1(vertical), the equivalent unit weight should be increased by 13 pcf for gradients up to 2:1. Slopes greater that 2:1 in gradient are not allowed.

The surcharging effect of any adjacent loads on retaining walls due to traffic, footings, or other loads, should be included in the wall design. The magnitude of lateral load due to surcharging depends on the magnitude of the surcharge, the size of the surcharge-loaded area, the distance of the surcharge from the wall, and the restraint of the wall. We can provide assistance in evaluating the effects of surcharge loading, if desired, once details are known and provided.

5.8.3 Seismic Lateral Earth Pressures for Walls Retaining Greater Than 6 Feet of Earth Material

In accordance with the requirements of the current Building Code, a seismic lateral force should be incorporated into the design of all retaining walls retaining more than 6 feet of earth materials. A seismic lateral force of $17.0H^2$ pounds per lineal foot should be added to walls retaining more than 6 feet of earth materials with level backfill, where H is the retained height, in feet, and a seismic lateral force of $28.3H^2$ pounds per lineal foot should be added to walls retaining more than 6 feet of earth materials with backfill sloping at a gradient of greater than 3:1 (horizontal:vertical). This force should be applied at a height of 0.4H above the base of the wall, and is in addition to the static lateral earth pressure given above.

5.8.4 Backfill and Drainage

Except for the upper 2 feet, the soil immediately adjacent to backfilled retaining walls should be free-draining filter material (such as Caltrans Class 2 permeable material) with a minimum horizontal distance of 1 foot. Weep holes and/or drainpipes, as appropriate, should be installed at the base of these walls. In lieu of filter material, crushed stone protected from clogging with the use of synthetic fabric between the natural soil and the gravel or a manufactured drainage structure (e.g., Miradrain) may be used. Subdrain pipe material should consist of a minimum 4-inch-diameter perforated PVC pipe meeting ASTM D2729 or better. Accordion or similar type pipe is *not* acceptable for subdrain pipe. The top 2 feet should be backfilled with less permeable compacted fill to reduce infiltration. All retaining walls should be waterproofed. Figure 9 shows *Typical Retaining Wall Drainage Details*.

Selective fill with an expansion index of less than 90 should be used as backfill behind any proposed retaining walls. Retaining wall backfill shall be placed in accordance with the recommendations presented in the *Site Preparation* section of this report.

During grading and backfilling operations adjacent to any wall, heavy equipment should *not* be allowed to operate within 5 feet laterally of 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 should be used to compact the backfill soils.

The retaining wall backfill should be benched into the backcut where the backcut is sloped less than (flatter) 0.75(H):1.0(V).

5.8.5 Decking

Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal 1 to 2% deflection of the retaining wall. Decking that does *not* cap a retaining wall, should *not* be tied to the wall. The spacing between the wall and deck will require periodic caulking to prevent water intrusion into the retaining wall backfill.

5.9 Asphalt and Concrete Pavement

5.9.1 Grading

All exterior areas to be paved with asphalt or concrete should be graded in accordance with the general recommendations for site grading as described in the *Site Preparation* section of this report. In proposed parking and driveway areas, and any other exterior flatwork areas (walkways, patios, etc.), any existing artificial fill material and loose or disturbed soils should be removed and recompacted. The depth of over-excavation should extend to a minimum of 12 inches below either existing or future subgrade level, whichever is deeper, and a minimum of 12

inches below the bottom of future concrete, asphalt or aggregate base section, whichever is deeper. If test results show that proper moisture and compaction requirements do not exist just *prior* to placing base or placing pavements, the surface should be scarified, moisture conditioned, and properly recompacted.

Compaction testing will be required for all asphalt and aggregate base. A minimum relative compaction of 95% is required for all asphalt, aggregate base, and upper 12 inches of subgrade soils. The aggregate base should have a minimum *R*-value of 78 and meet recognized industry specifications for aggregate base. Base materials should be placed and compacted in lifts not exceeding 6 inches. Asphalt should *not* be placed if the base is pumping. Base materials are *not* required beneath curbs and gutters, however, if base materials are not utilized beneath the curbs and gutters, it is recommended that the subgrade soils be recompacted to at least 95% relative compaction to a minimum depth of 12 inches below the bottom of curbs and gutters.

5.9.2 Maintenance

Pavement section design assumes that proper maintenance practices, such as sealing and repair of localized areas of distress, are employed throughout the design life of the pavement.

5.9.3 Asphalt Pavement Design

Pavement section calculations were performed for asphalt pavement design for a range in traffic indices. Selection of the appropriate traffic index to use should be made by the Project Civil Engineer based on their knowledge of traffic flow and loadings.

The structural sections for asphalt pavement were computed in general accordance with the Caltrans method (**California Department of Transportation Highway Design Manual**), using an *R*-value of 3, which is the lowest *R*-value obtained from the evaluation of representative onsite soils. The results of the *R*-value testing are included in Appendix B of this report, and recommended pavement sections are summarized in the following table.

Traffic Index	Thickness, Inches	
	Asphalt	Aggregate Base
5.0	4.0	8.0
6.0	4.0	12.0
7.0	4.0	16.0

As it has been recommended to use lime treatment to mitigate the effects of expansive soils below the footprint of the proposed community center and amphitheater structures, and below the footprint of any other proposed permanent structures, it may be elected to utilize lime and or cement treatment within the upper 12-inches of the subgrade soils to support asphalt pavement to provide similar benefits. The use of lime and or cement treatment within the subgrade soils may provide an increase in the *R*-value of the subgrade soils, and as a benefit, may allow for the reduction of the required aggregate base section thickness below those values provided in the table above. It is recommended to consult with a specialty contractor familiar with the lime treatment of soils to reduce expansion potential to discuss the potential benefits of these procedures.

5.9.4 Confirmation of R-Value

If desired, or if required by the City, additional testing to determine the R-value of the subgrade soils in parking and driveway areas could be performed near the completion of grading, in order to confirm the pavement structural section. It should be noted that the pavement structural section design recommendations presented in this report may change if a different *R*-value is obtained for the actual subgrade soils.

5.9.5 Concrete Pavement Design

It is recommended that all concrete pavement subject to vehicular traffic be a minimum of 6 inches thick, and be underlain by a minimum of 6 inches of aggregate base. As noted in the above *Asphalt Pavement Design* section of this report, the use of lime and or concrete treatment of the subgrade soils may allow for the reduction of the

recommended pavement section thickness. It is recommended to consult with a specialty contractor familiar with the lime treatment of soils to reduce expansion potential to discuss the potential benefits of these procedures. Concrete flatwork subject only to pedestrian traffic (i.e. walkways, patios, etc.) should be a minimum of 5 inches thick, and need not be underlain by base. All exterior concrete should be reinforced with a minimum of #4 steel bars placed on 16-inch centers each way.

6. OBSERVATIONS AND TESTING

Prior to the start of site preparation and/or construction, *we recommend that a meeting be held with the Contractor to discuss the project.* We recommend that AGS be retained to perform the following tasks prior to and/or during construction. Please *advise* AGS a minimum 24 hours *prior* to any required site visit. *All approved plans, permits, and geotechnical reports must be at the jobsite and be made available during inspections.*

a. *Review* grading, foundation, and drainage plans to *verify* that the recommendations contained in this report have been properly interpreted and are incorporated into the project specifications. *If we are not accorded the opportunity to review these documents, we can take no responsibility for misinterpretation of our conclusions and recommendations.*

b. *Observe and advise* during all grading activities, including site preparation, foundation and retaining wall excavation, and placement of fill, to *confirm* that suitable fill soils are placed upon competent material and to allow design changes if subsurface conditions differ from those anticipated *prior* to the start of construction.

c. *Observe* the installation of all drainage devices.

d. *Test* all fill placed for engineering purposes to *confirm* that suitable fill materials are used and properly compacted.

7. LIMITS AND LIABILITY

All building sites are subject to elements of risk that cannot be wholly identified and/or entirely eliminated. Building sites are subject to many detrimental geotechnical hazards, including but *not* limited to the effects of water infiltration, erosion, concentrated drainage, total settlement, differential settlement, expansive soil movement, seismic shaking, fault rupture, landsliding, and slope creep. The risks from these hazards can be reduced by employing subsurface exploration, laboratory testing, analyses, and experienced geotechnical judgment. Many geotechnical hazards, however, are highly dependent on the property owner properly maintaining the site, drainage facilities, and slope and by correcting any deficiencies found during occupancy of the property in a timely manner. Even with a thorough subsurface exploration and testing program, significant variability between test locations and between sample intervals may exist. Ultimately, geotechnical recommendations are based on the experience and judgment of the geotechnical professionals in evaluating the available data from site observations, subsurface exploration, and laboratory tests. Latent defects can be concealed by earth materials, deposition, geologic history, and existing improvements. If such defects are present, they are beyond the evaluation of the geotechnical professionals. No warranty, expressed or implied, is made or intended in connection with this report, by furnishing of this report, or by any other oral or written statement. Owners and developers are responsible for retaining appropriate design professionals and qualified contractors in developing their property and for properly maintaining the property. Retaining the services of a geotechnical consultant should *not* be construed to relieve the Owner, Developer, or Contractors of their responsibilities or liabilities.

The analysis and recommendations submitted in this report are based in part on our subsurface exploration, laboratory testing, site observations, and provided data on geology and the proposed site development. Our descriptions and the boring logs may show distinctions between fill and native soils, between native (e.g., alluvium,

colluvium, slopewash) and bedrock formation, and between soil type (e.g., sands and silty sands). Such distinctions were based on geologic information, grading plans when available, intermittent recovered soil/bedrock samples, and judgment. Delineations between these categories of materials may not be perfect and may be subject to change as more information becomes available. For example, judgments may be clouded when recovered samples are intermittent and small in comparison to the volume of soil under study, and macrostructure that would aid the identification process are not as apparent as they would be when the borehole is geologically downhole logged by entering the excavation. When the age of the fill is old, the difference between the structure of the fill and native materials may be less pronounced, or the degree of bedrock formation weathering sometimes makes it difficult to distinguish between overlying alluvium, colluvium, or slopewash and weathered bedrock formational material. In general, our recommendations are based more on the properties of the materials than on the category of the material type such as fill, alluvium, colluvium, slopewash, or bedrock formation. Furthermore, the actual stratigraphy may be more variable than shown on the logs.

Although this report may comment or discuss construction techniques or procedures for the design engineer's guidance, this report should *not* be interpreted to prescribe or dictate construction procedures or to relieve the contractor in any way of their responsibility for the construction.

Please be aware that the contract fee for our services to prepare this report does not include additional work that may be required, such as grading observation and testing, footing observations, plan review, or responses to governmental (regulatory) plan reviews associated with you obtaining a building permit. Where additional services are requested or required, you will be billed for any equipment costs and on an hourly basis for consultation or analysis.

The Geotechnical Engineer's actual scope of work during construction is very limited and does *not* assume the day-to-day physical direction of the work, minute examination of the elements, or responsibility for the safety of the contractor's workers. Our scope of services during construction consists of taking soil tests and making visual observations, sometimes on only an intermittent basis, relating to earthwork or foundation excavations for the project. We do *not* guarantee the contractor's performance, but rather look for general conformance to the intent of the plans and geotechnical report. Any discrepancy noted by us regarding earthwork or foundations will be referred to the Owner, project Engineer, Architect, or Contractor for action.

This report is issued with the understanding that it is the responsibility of the Owner, or of their representative, to ensure that the information and recommendations contained herein are called to the attention of the Architect and Engineers for the project and incorporated into the plan and that the necessary steps are taken to see that the Contractor carry out such recommendations in the field. Advanced Geotechnical Services, Inc., (AGS) has prepared this report for the exclusive use of the Client and authorized agents, and this report should *not* be considered transferable. We do recommend, however, that the report be given to future property Owners for the sole purpose of disclosing the report findings.

Findings of this report are valid as of the date of issuance. Changes in conditions of a property may occur with the passage of time whether attributable to natural processes or works of man on this or adjacent properties. Furthermore, changes in applicable or appropriate standards occur due, for example, to legislation and broadening of knowledge. Accordingly, findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, *this report is subject to our review and remains valid for a maximum period of one year*, unless we issue a written opinion of its continued applicability thereafter.

In the event that any changes in the nature and design (including structural loadings different from those anticipated), or other improvements are planned, the conclusions and recommendations contained in this report shall *not* be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

This report may be subject to review by controlling agencies, and any modifications they deem necessary should be made a part thereof, subject to our technical acceptance of such modifications. All submissions of this report should be in its entirety. Under no circumstances should this report be summarized and synthesized to be quoted out of context for any purpose.

Test findings and statements of professional opinion do *not* constitute a guarantee or warranty, and *no* warranties, either expressed or implied, are made as to the professional advice provided under the terms of this agreement. We have strived, however, to provide our services in accordance with generally accepted geotechnical engineering practices in this community at the time of this report.

Appendix A

Field Exploration and Boring/Test Pit Logs

Appendix A
Field Exploration and Boring/Test Pit Logs

The field exploration included a site reconnaissance and subsurface exploration. During the site reconnaissance, the surface site conditions were noted, and the approximate locations of any exploration points were determined. The following descriptions of exploration methods are generic and may include methods not used on this project. Reference to the boring logs can be made to determine which methods are applicable to this project, and any differences between what is described below and actually occurred is described on the boring logs or in the main body of the report.

The test borings were advanced by either hand digging, digging with a backhoe, or drilling. In the case of drilling, a truck-mounted rotary drilling rig with a hollow-stem auger or bucket was used to advance the borings. When we expect to encounter shallow groundwater, a wet rotary drilling operation is usually used. The method actually used is noted on the boring logs. For geologic studies when the need for visual examination of the bedding and other stratigraphic features is needed along with engineering data, the larger bucket augers are used to allow a geologist to enter the excavation for visually logging the hole. When geologically logging borings and trenches, the sides are scraped prior to logging. A prefix B is used to designate a boring made with a drilling rig. When hand dug, the boring numbers have a prefix HB. When a backhoe was used, prefixes TP (test pit) or T (trench) are used. The difference between a trench and test pit being the length of the exploration; a trench being a long narrow exploration, most commonly used for fault studies. In each case, the soils were logged by technical personnel from our office and visually classified in the field in general accordance with the Unified Soil Classification system. The field descriptions have been modified as appropriate to reflect laboratory results when preparing the final boring logs.

Relatively undisturbed samples of the subsurface materials were obtained at appropriate intervals in the borings using a steel drive sampler (2.5-inches inside diameter, 3-inches outside diameter) lined with brass, one-inch-high sample rings with a diameter of 2.4 inches. This is referred to as a modified California sampler. The boring may be advanced by drilling with a hollow-stem auger or with a wet rotary operation. If below the groundwater, the hollow-stem is filled with water or drilling mud to counteract the fluid pressure of the groundwater. The sampler was usually driven into the bottom of the borehole with successive drops of a 140-pound safety hammer connected to the sampler with either A or AW rod and falling 30 inches. An automatic hammer is usually used when drilling with a CME dill rig, and a Safe-T-Driver is used when drilling with a Mobile drill rig. When above the groundwater level, a downhole Safe-T-Driver is usually used. Studies have shown that hammer efficiencies of the automatic hammer is over 90% while that of the Safe-T-Driver is about 70%, based on impact velocities. When a bucket auger is used to advance the boring, the driving weights change with depth, depending on the weight characteristics of the telescoping kelley bar, but the height of fall is usually 18 inches. Sampler driving resistance, expressed as blows per 6 inches of penetration, is presented on the boring logs at the respective sampling depths. When the borings or trenches are excavated with a backhoe, the sampler is pushed into the soil with the force of the backhoe. A hand sampler is used when the borings or trenches are advanced by hand digging or in some cases when a backhoe is used to make the excavation. This hand sampler is similar to the conventional California sampler, but lighter weight. An approximately 8-pound hammer falling about 18 inches is used to drive the hand sampler about 6 inches into the bottom of the exploration. The type of sampler used is noted on the boring logs. In some cases the hammer weight and falling distance deviate from those given above. The actual conditions are shown on the boring logs and supersede the conditions given above.

Ring samples were retained in close-fitting, moisture tight containers for transport to our laboratory for testing. Bulk samples, which were collected from cuttings, were placed in bags and transported to our laboratory for testing.

When noted on the boring logs, standard penetration test (SPT) samples were obtained using either a 20-inch or a 32-inch long split-barrel sampler with a 2-inch outside diameter and a 1.375-inch inside diameter when liners are used (1.5-inch inside diameter without liners). Unless noted otherwise, liners are used. This sampler is driven into the soil with successive drops of a 140-pound, safety hammer falling 30 inches. The blows are recorded for each 6

inches of penetration for a total penetration of 18 or 24 inches. The sum of the number of blows for the last 12 inches of an 18-inch penetration or the middle 12 inches of a 24-inch penetration is referred to as the *N* value.

Logs, which are presented on Plates at the end of this Appendix, include a description and classification of each stratum, sample locations, blow counts, groundwater conditions encountered during drilling, results from selected types of laboratory tests, and drilling information. Keys to *Soil and Bedrock Symbols and Terms* are included on Plate A-1 and Plate A-2.

Each boring or trench, unless noted otherwise, was backfilled with cuttings at the completion of the logging and sampling. The backfill, however, may settle with time, and it is the responsibility of our client to ensure that such settlement does *not* become a liability.

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Boring Log B-1

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ft Depth to Water **15.0** ft After hrs on Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Moderate yellowish brown to dark yellowish brown Silty Sandy CLAY, moist, stiff					E.I. = 109
		12 16 26		with calcium carbonate deposits @ 3 ft.		110.3	14.6		
5		6 9 12		Moderate yellowish brown to dark yellowish brown Silty Clayey SAND, moist, moderately dense		99.9	21.9		
				Monterey Formation (Tm) Moderate yellowish brown Silty CLAYSTONE, moist, stiff					
		12 18 29				107.3	21.0		
10		17 25 35		with concretions @ 10 ft.		118.8	4.5		
				perched water @ 15 ft.					
15		28 50@6"		Light gray fractured gravelly SILTSTONE, very moist, hard		67.8	45.7		
20				Total Depth Explored = 16.5 ft. Perched Groundwater @ 15 ft. Backfilled with Spoils 12/22/2020					
25									

Plate A- 3

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Boring Log B-2

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ft Depth to Water **15.0** ft After hrs on Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, moist, stiff					
		13 23 22				105.0	19.0		
5		13 19 33		slightly lighter color below 4 ft. marbled with light brown @ 6 ft. becomes very dark below 6.5 ft.		108.7	15.1		
		12 15 19				99.3	22.9		
10		13 20 28				125.1	23.0		
15		13 24 35		▼ Perched groundwater @ 15 ft. **Monterery Formation (Tm)** Light brown Silty Clayey Gravelly SAND, wet, dense		106.1	19.0		
20				Total Depth Explored = 16.5 ft. Perched Groundwater @ 15 ft. Backfilled with Spoils 12/22/2020					
25									

Plate A- 4

advanced geotechnical services, inc.

Boring Log B-3

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				Artificial Fill (af) Dark yellowish brown Silty CLAY, moist, stiff					E.I. = 163
		11 17 31				110.1	14.2		
				Moderate yellowish brown Silty SAND, with white calcium carbonate deposits, moist, stiff					
5		19 28 36		Light brown medium to coarse grained SAND with calcium carbonate deposits, moist, dense		115.6	11.6		
		21 35 38				111.8	7.4		
				Dark yellowish brown Silty Sandy CLAY, slightly moist, stiff					
10		23 33 40				98.1	24.7		
				Older Alluvium (Qoa) Light brown Silty SAND with Clay, weathered to light gray, with calcium carbonate vein infill, slightly moist, dense					
15		28 50@6"		with rounded gravel in shoe of sampler		106.8	18.1		
20		0@5.5		**Monterey Formation (Tm)** Light brown SILTSTONE, cemented, very hard		90.7	29.8		
25				Total Depth Explored = 20.5 ft. No Groundwater Encountered Backfilled with Spoils 12/22/2020					

Plate A- 5

advanced geotechnical services, inc.

Boring Log B-4

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty CLAY, very moist, soft					
		5 5 6		rootlets @ 2.5 ft.		98.6	26.3		
5		8 18 22		Light gray to olive Sandy CLAY, very moist, stiff		113.8	17.1		
				Light gray to olive Clayey SAND, very moist, dense					
		14 21 30				104.9	21.0		
				Older Alluvium (Qoa) Light brown Silty CLAY, moist, stiff					
10		28 50@6"		Light brown Clayey SAND with light gray alteration, moist, dense		105.7	19.5		
				Total Depth Explored = 11 ft. No Groundwater Encountered Backfilled with Spoils 12/22/2020					
15									
20									
25									

Plate A- 6

advanced geotechnical services, inc.

Boring Log B-5

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
		27 30 27		**Artificial Fill (af)** Dark yellowish brown Silty Sandy CLAY, moist, dense @ 2.5 ft., root in sampler, minor construction debris		102.3	13.9		
5		12 18 24		**Colluvium (Qcol)** Dark yellowish brown Silty Sandy CLAY, very moist, stiff		110.5	14.9		
		12 18 30		Moderate yellowish brown to light brown Sandy CLAY with greenish alteration, moist, stiff **Monterey Formation (Tm)** Tan SILTSTONE, abundant calcium carbonate deposits, moist, stiff		89.7	31.0		
10		16 21 31				69.6	51.8		
15				Total Depth Explored = 11.5 ft No Groundwater Encountered Backfilled with Spoils 12/22/2020					
20									
25									

Plate A- 7

advanced geotechnical services, inc.

Boring Log B-6

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, moist, stiff					
		16 25 32				104.4	16.5		
				Monterey Formation (Tm) Tan Silty CLAYSTONE, with light green alteration, moist, hard					
5		38 50@5"		**Detrital Sediments of Lindero Canyon (Tcvg)** Light brown volcanic derived sedimentary deposits, dry, hard		110.3	17.9		
				Total Depth Explored = 6 ft. No Groundwater Encountered Backfilled with Spoils 12/22/2020					
10									
15									
20									
25									

Plate A- 8

advanced geotechnical services, inc.

Boring Log B-7

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0				**Artificial Fill (af)** Moderate yellowish brown Silty Clayey SAND to Silty Sandy CLAY, dry, dense					
		15 21 31				112.4	13.7		
5		20 32 40				109.0	12.4		
				Total Depth Explored = 6.5 ft. No Groundwater Encountered Backfilled with Spoils 12/22/2020					
10									
15									
20									
25									

Plate A- 9

advanced geotechnical services, inc.

Boring Log B-8

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, moist, stiff					E.I. = 122
		16 19 26				103.6	13.8		
5		14 20 30		**Colluvium (Qcol)** Dark yellowish brown Silty Sandy CLAY, marbled with calcium carbonate veins, coarse angular gravel inclusions, moist, stiff		102.1	18.6		
		11 30 50@4"		Moderate yellowish brown Clayey SAND, with calcium carbonate veins, moist, dense		125.9	8.5		
10		20 30 17				106.6	13.3		
				Monterey Formation (Tm) Tan SILTSTONE, moist, stiff					
15				Total Depth Explored = 11.5 ft. No Groundwater Encountered Backfilled with Spoils 12/23/2020					
20									
25									

Plate A- 10

advanced geotechnical services, inc.

Boring Log B-9

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown to moderate yellowish brown Silty Sandy CLAY, slightly moist, dense					
		16 18 24		with angular gravel		109.1	12.7		
5		15 25 50@6"		**Colluvium (Qcol)** Dark yellowish brown to light brown Silty Sandy CLAY, with angular gravel, moist, very stiff		108.1	12.4		
		8 25 33				107.6	15.9		
10		17 27 30		**Monterey Formation (Tm)** Olive gray Sandy Silty CLAY with gravel, slightly moist, very stiff		104.5	17.7		
15				Total Depth Explored = 11.5 ft. No Groundwater Encountered Backfilled with Spoils 12/23/2020					
20									
25									

Plate A- 11

advanced geotechnical services, inc.

Boring Log B-10

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, with minor roots and rootlets, slightly moist, stiff					
		12 17 17		minor debris @ 3 ft.		101.6	15.5		
5		15 25 35				75.8	32.9		
				Monterey Formation (Tm) Tan fractured SHALE, slightly moist, hard					
10				Total Depth Explored = 6.5 ft. No Groundwater Encountered Backfilled with Spoils 12/23/2020					
15									
20									
25									

Plate A- 12

advanced geotechnical services, inc.

Boring Log B-11

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Asphalt, 3 inches thick					
				Base, 9.5 inches thick					
		18		**Monterey Formation (Tm)**					
		28		Moderate yellowish brown Sandy CLAY, with light brown and olive		109.0	13.8		
		30		alteration, slightly moist, dense					
		16				116.1	11.3		
		25							
		33		with gravel, calcium carbonate deposits					
5									
10				Total Depth Explored = 4.5 ft. No Groundwater Encountered Backfilled with Spoils and Capped with AC Cold Patch 12/23/2020					
15									
20									
25									

Plate A- 13

advanced geotechnical services, inc.

Boring Log B-12

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				Asphalt, 3 inches thick					
				Base, 7.5 inches thick					
		10 20 25		**Artificial Fill (af)** Moderate yellowish brown Sandy CLAY, slightly moist, stiff		104.7	16.5		
		12 14 22		becomes moderate yellowish brown to light brown color, with minor small gravel, slightly moist, stiff		107.8	16.4		
5		12 25 32		**Colluvium (Qcol)** Moderate yellowish brown to dark yellowish brown Sandy CLAY, slightly moist, stiff		109.4	14.2		
		14 22 24		Moderate yellowish brown Clayey Silty SAND, with calcium carbonate deposits, slightly moist, dense		111.2	11.3		
10		14 25 36		**Detrital Sediments of Lindero Canyon (Tvcg)** Moderate yellowish brown weathered volcanic derived sediments, abundant calcium carbonate deposits, slightly moist, hard		95.7	20.5		
15				Total Depth Explored = 11.5 ft. No Groundwater Encountered Backfilled with Spoils and Capped with AC Cold Patch					
20									
25									

Plate A- 14

advanced geotechnical services, inc.

Boring Log B-13

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Asphalt, 3.5 inches thick					
				Base, 11 inches thick					
		15		**Monterey Formation (Tm)**					
		25		Tan SHALE, abundant light brown iron oxide staining, highly fractured,		78.9	29.0		
		30		slightly moist, hard					
		16				95.4	17.1		
		25							
		32							
5									
10				Total Depth Explored = 4.5 ft. No Groundwater Encountered Backfilled with Spoils and Capped with AC Cold Patch					
15									
20									
25									

Plate A- 15

advanced geotechnical services, inc.

Boring Log B-14

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
		6 12 15		**Artificial Fill (af)** Dark yellowish brown Silty Sandy CLAY, moist, stiff becomes slightly lighter color below 3 ft.		101.0	19.0		
5		18 20 35		Dark yellowish brown Sandy CLAY, slightly moist, very stiff		112.8	15.9		
		20 22 15		**Older Alluvium (Qoa)** Moderate yellowish brown to tan Silty SAND with light brown iron oxide staining and calcium carbonate deposits, moist, dense		118.2	8.4		
10		12 25 36				108.2	18.6		
15				Total Depth Explored = 11.5 ft. No Groundwater Encountered Backfilled with Spoils 12/23/2020					
20									
25									

Plate A- 16

advanced geotechnical services, inc.

Boring Log B-15

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, moist, stiff					
		12 22 23		with light gray to tan gravel in shoe @ 2.5 ft.		98.5	21.3		
5		22 26 16		with angular shale fragments and gravel @ 5 ft.		105.4	17.8		
10				Total Depth Explored = 6.5 ft. No Groundwater Encountered Backfilled with Spoils 12/23/2020					
15									
20									
25									

Plate A- 17

advanced geotechnical services, inc.

Boring Log B-16

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water **7.5** ft After ____ hrs on ____ Logged By **BW**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, moist, stiff					
		20 16 22		Light gray Clayey Sandy SILT, very moist, stiff		109.4	18.5		
5		12 16 24		Light gray Silty SAND, very moist, dense perched groundwater @ 7.5 ft.		114.3	16.3		
		9 16 16		**Older Alluvium (Qoa)** Moderate yellowish brown to Tan SILT with rounded gravel, calcium carbonate deposits, light brown iron oxide staining, moist, stiff		102.1	15.3		
10		12 50@6"		Moderate yellowish brown to tan Clayey SILT with abundant rounded gravel, light bornw iron oxide staining, moist, very stiff		88.5	16.8		
15		25 30 50@6"		no sample recovery @ 15 ft.					
20				Total Depth Explored = 16.5 ft. Perched Groundwater Encountered @ 7.5 ft. Backfilled with Spoils 12/23/2020					
25									

Plate A- 18

advanced geotechnical services, inc.

Boring Log B-17

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/23/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				Asphalt, 3.5 inches thick					
				Base, 8.5 inches thick					
		8		**Artificial Fill (af)**					
		13		Dark yellowish brown Sandy CLAY, with gravel inclusions, tan highly		91.0	21.1		
		16		fractured shale fragments, slightly moist, very stiff					
		13				100.6	19.1		
		16							
5		17							
				Total Depth Explored = 5 ft.					
				No Groundwater Encountered					
				Backfilled and Capped with AC Cold Patch					
10									
15									
20									
25									

Plate A- 19

advanced geotechnical services, inc.

Boring Log P-1

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water **15.0** ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, moist, stiff					
				Dark gray to olive Silty Sandy CLAY, very moist, stiff					
5				**Older Alluvium (Qoa)** Moderate yellowish brown Silty CLAY with Sand, moist, stiff					
10				@ 13 ft., becomes olive gray color					
15		11 17 21		▼ Perched water @ 15 ft. **Monterey Formation (Tm)** Light olive gray SILTSTONE, with light brown iron oxide staining, moist, stiff		85.0	51.6		
20				Total Depth Explored = 16.5 ft. Perched Groundwater @ 15 ft. Backfilled with Spoils 12/23/2020					
25									

Plate A- 20

advanced geotechnical services, inc.

Boring Log P-2

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown to black Silty Sandy CLAY, moist, stiff					
				becomes olive gray color, with sand and gravel, very moist					
		7				83.7	22.0		
5		9							
		17		**Older Alluvium (Qoa)** Light brown to moderate yellowish brown Silty CLAY, moist, stiff					
10				Total Depth Explored = 5.5 ft. No Groundwater Encountered Backfilled with Spoils 12/23/2020					
15									
20									
25									

Plate A- 21

advanced geotechnical services, inc.

Boring Log P-3

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water **13.0** ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown to black Silty CLAY, moist, stiff					
5									
				Older Alluvium (Qoa) Light gray Silty SAND, moist, stiff					
10				▼Perched water @ 13 ft. @ 13 ft., with gravel and cobble					
15		15 25 45		**Monterey Formation (Tm)** Light gray SILTSTONE with light brown iron oxide staining, moist, dense		90.8	48.8		
20				Total Depth Explored = 16.5 ft. Perched Groundwater @ 13 ft. Backfilled with Spoils 12/23/2020					
25									

Plate A- 22

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Boring Log P-4

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **12/22/20**

Comment

Drilling Company/Driller **Choice Drilling** Equipment **Hollow Stem Auger**

Driving Weight (lbs) **140** Average Drop (in.) **30** Hole Diameter (in.) **8**

Elevation ____ ft Depth to Water ____ ft After ____ hrs on ____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Dark yellowish brown Silty Sandy CLAY, moist, stiff					
5		26 33 46		**Older Alluvium (Qoa)** Light gray cemented Silty SAND, with light brown iron oxide staining, slightly moist, very dense		115.4	13.8		
				Total Depth Explored = 5.5 ft. No Groundwater Encountered Backfilled with Spoils 12/23/2020					
10									
15									
20									
25									

Plate A- 23

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Boring/Test Pit Log TP-1

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **1/13/21**

Comment **1175 Hendrix Avenue, Thousand Oaks**

Drilling Company/Driller **Buzza Backhoe Service** Equipment **Backhoe**

Driving Weight (lbs) _____ Average Drop (in.) _____ Hole Diameter (in.) **2'x8'**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Colluvium (Qcol) Moderate yellowish brown Clayey SAND, dry, loose					E.I. =54
				Detrital Sediments of Lindero Canyon (Tcvg) Light brown to tan weathered volcanic derived sediments, dry, hard					
5				Total Depth Explored = 2 ft. No Groundwater Encountered Backfilled with Spoils 1/13/2021					
10									

Trench Description

Depth, ft 1" = 5'

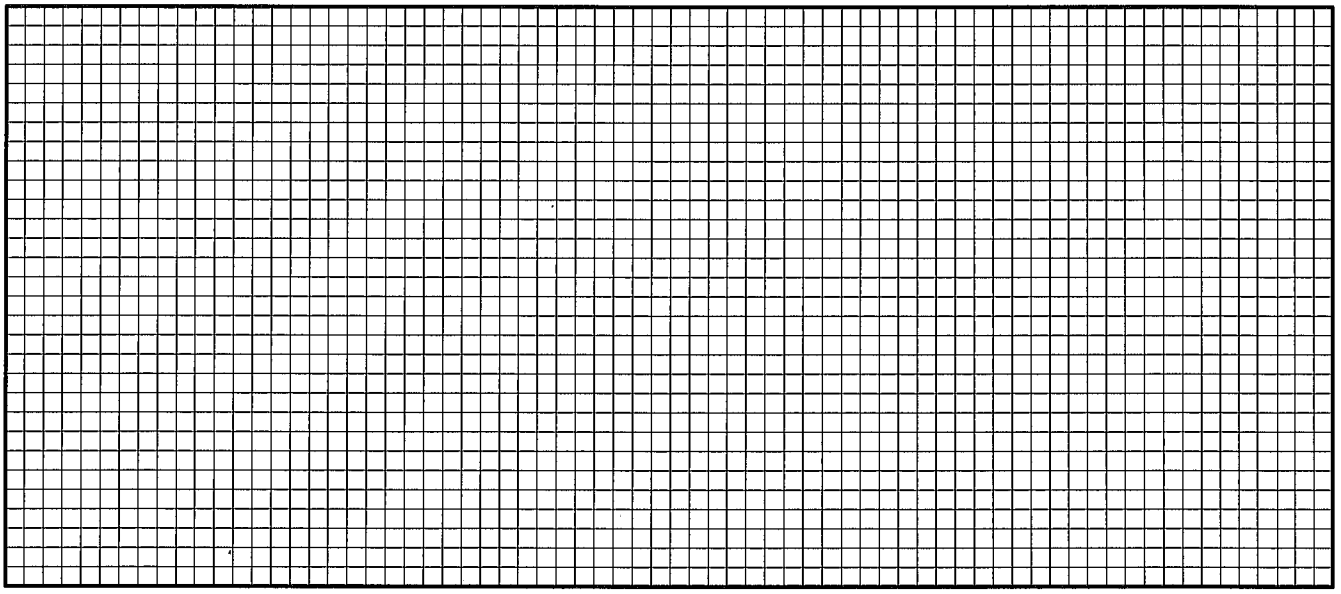

Plate A- 24

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Boring/Test Pit Log TP-2

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **1/13/21**

Comment **1175 Hendrix Avenue, Thousand Oaks**

Drilling Company/Driller **Buzza Backhoe Service** Equipment **Backhoe**

Driving Weight (lbs) _____ Average Drop (in.) _____ Hole Diameter (in.) **2'x6'**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Colluvium (Qcol) Dark yellowish brown Sandy Silty CLAY, desiccation cracks, rootlets, slightly moist, stiff					E.I. = 140
				Detrital Sediments of Lindero Canyon (Tcvg) Light brown to yellowish orange weathered volcanic derived sediments, slightly moist, hard					
5				Total Depth Explored = 3 ft. No Groundwater Encountered Backfilled with Spoils 1/13/2021					
10									

Trench Description

Depth, ft
1" = 5'

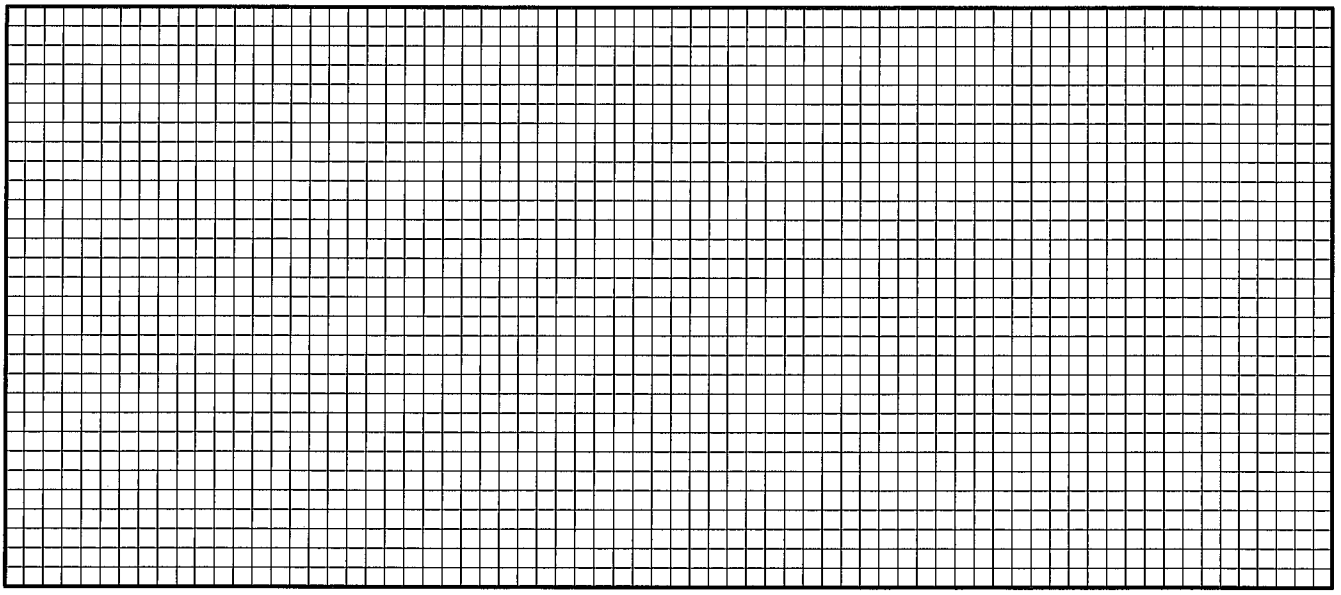

Plate A- 25

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Boring/Test Pit Log TP-3

Sheet 1 of 2

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **1/13/21**

Comment **1175 Hendrix Avenue, Thousand Oaks**

Drilling Company/Driller **Buzza Backhoe Service** Equipment **Backhoe**

Driving Weight (lbs) _____ Average Drop (in.) _____ Hole Diameter (in.) **2'x8'**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Moderate yellowish brown Silty Clayey SAND, with angular gravel and cobble, slightly moist, moderately dense					
				Dark yellowish brown Silty Clayey SAND, abundant angular rock fragments, rootlets, slightly moist increase in clay content below 3.5 ft., gets tight below 4 ft.					
5				becomes light brown color becomes dark yellowish brown color					
				Colluvium (Qcol) Dark yellowish brown Silty SAND, slightly moist, dense					
10									

Trench Description

Depth, ft
1" = 5'

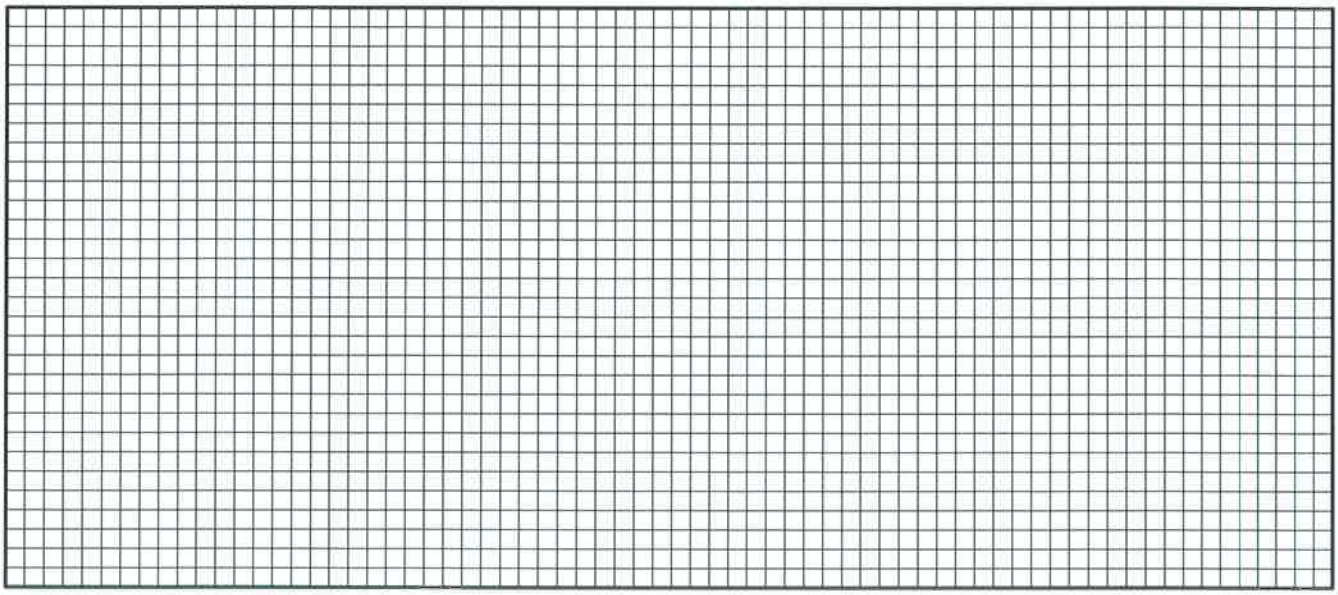

Plate A- 26

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Boring/Test Pit Log TP-4

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **1/13/21**

Comment **1175 Hendrix Avenue, Thousand Oaks**

Drilling Company/Driller **Buzza Backhoe Service** Equipment **Backhoe**

Driving Weight (lbs) _____ Average Drop (in.) _____ Hole Diameter (in.) **2'x10.5'**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Moderate yellowish brown Silty SAND, with minor concrete debris, soda can, small boulder in upper 1 ft., loose at surface becomes dense with depth, lense of yellowish gray color at 2 ft.					
				Older Alluvium (Qoa) Moderate yellowish brown Silty SAND, with rootlets, pinhole voids, slightly moist, dense					
5									
				Total Depth Explored = 5 ft. No Groundwater Encountered Backfilled with Spoils 1/13/2021					
10									

Trench Description

Depth, ft
1" = 5'

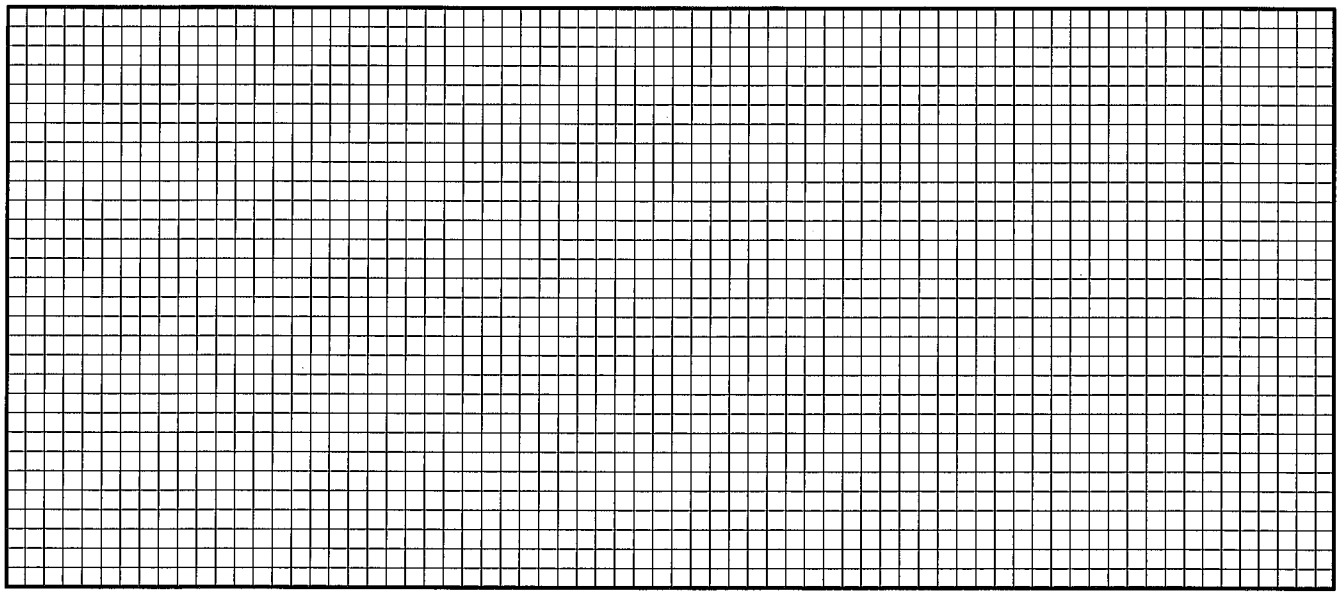

Plate A- 28

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Boring/Test Pit Log TP-5

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **1/13/21**

Comment **1175 Hendrix Avenue, Thousand Oaks**

Drilling Company/Driller **Buzza Backhoe Service** Equipment **Backhoe**

Driving Weight (lbs) _____ Average Drop (in.) _____ Hole Diameter (in.) **2'x10.5'**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (Qoa) Dark yellowish brown fine grained Silty Clayey SAND, disturbed to 1 ft., becomes moist, dense					
				color change to light brown					
5				**Detrital Sediments of Lindero Canyon (Tcvg)** Tan to yellowish orange weathered volcanic derived sediments, with light brown iron oxide staining, dry, hard					
10				Total Depth Explored = 6.5 ft. No Groundwater Encountered Backfilled with Spoils 1/13/2021					

Trench Description

Depth, ft
1" = 5'

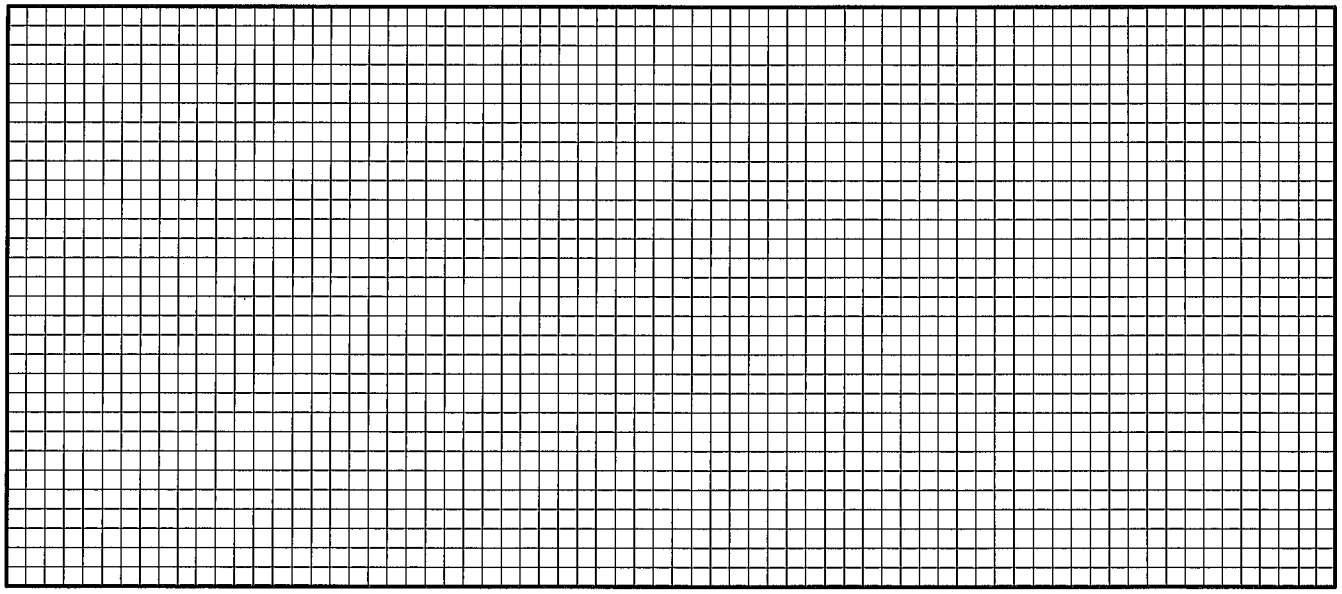

Plate A- 29

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Boring/Test Pit Log TP-6

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **1/13/21**

Comment **1175 Hendrix Avenue, Thousand Oaks**

Drilling Company/Driller **Buzza Backhoe Service** Equipment **Backhoe**

Driving Weight (lbs) _____ Average Drop (in.) _____ Hole Diameter (in.) **2'x8'**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Colluvium (Qcol) Dark yellowish brown Silty Clayey SAND, abundant rootlets, voids, slightly moist, dense					
				grades to light brown color					
5				grades back to dark yellowish brown color with abundant calcium carbonate deposits					
				Lower Topanga Formation (Ttls) Olive CLAYSTONE, moist, dense					
10				Total Depth Explored = 7 ft. No Groundwater Encountered Backfilled with Spoils 1/13/2021					

Trench Description

Depth, ft
1" = 5'

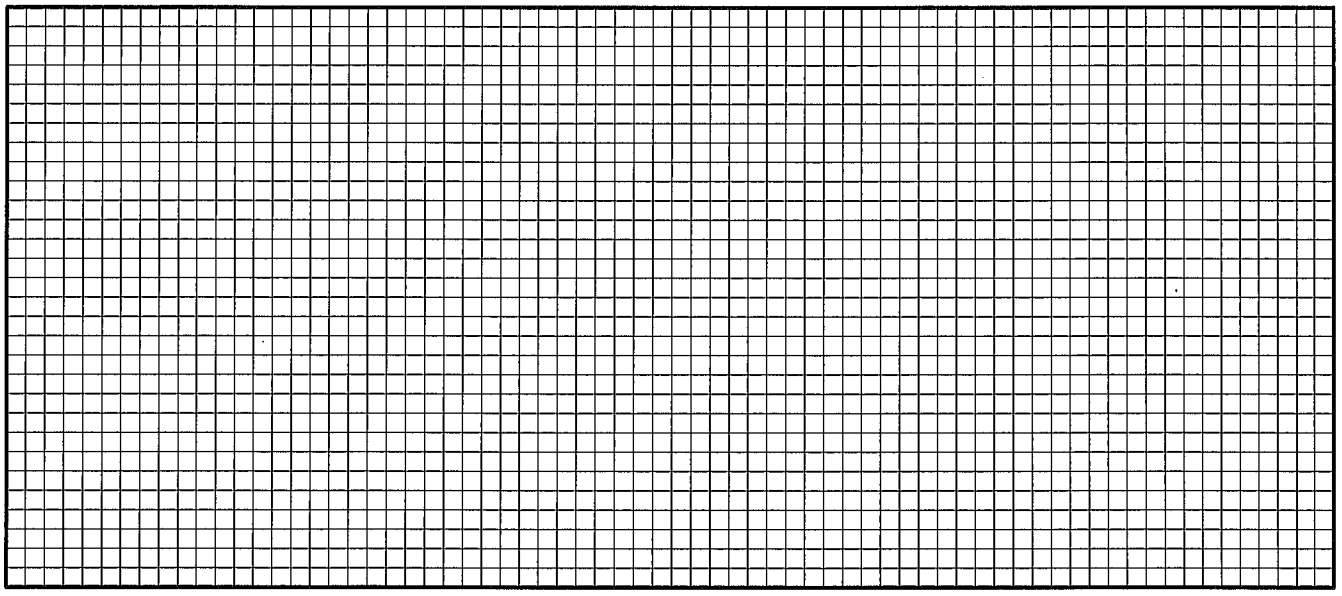

Plate A- 30

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Boring/Test Pit Log TP-7

Sheet 1 of 1

Project **Conejo Recreation and Park District** Client No. **5100** Date Drilled **1/13/21**

Comment **1175 Hendrix Avenue, Thousand Oaks**

Drilling Company/Driller **Buzza Backhoe Service** Equipment **Backhoe**

Driving Weight (lbs) _____ Average Drop (in.) _____ Hole Diameter (in.) **2'x8'**

Elevation _____ ft Depth to Water _____ ft After _____ hrs on _____ Logged By **BW**

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
				Artificial Fill (af) Moderate yellowish brown Silty SAND, dry and loose at surface, minor trash and concrete debris, small angular gravel, cobble and occasional small boulder, dry, dense					
5									
				Total Depth Explored = 6 ft. No Groundwater Encountered Backfilled with Spoils 1/13/2021					
10									

Trench Description

Depth, ft
1" = 5'

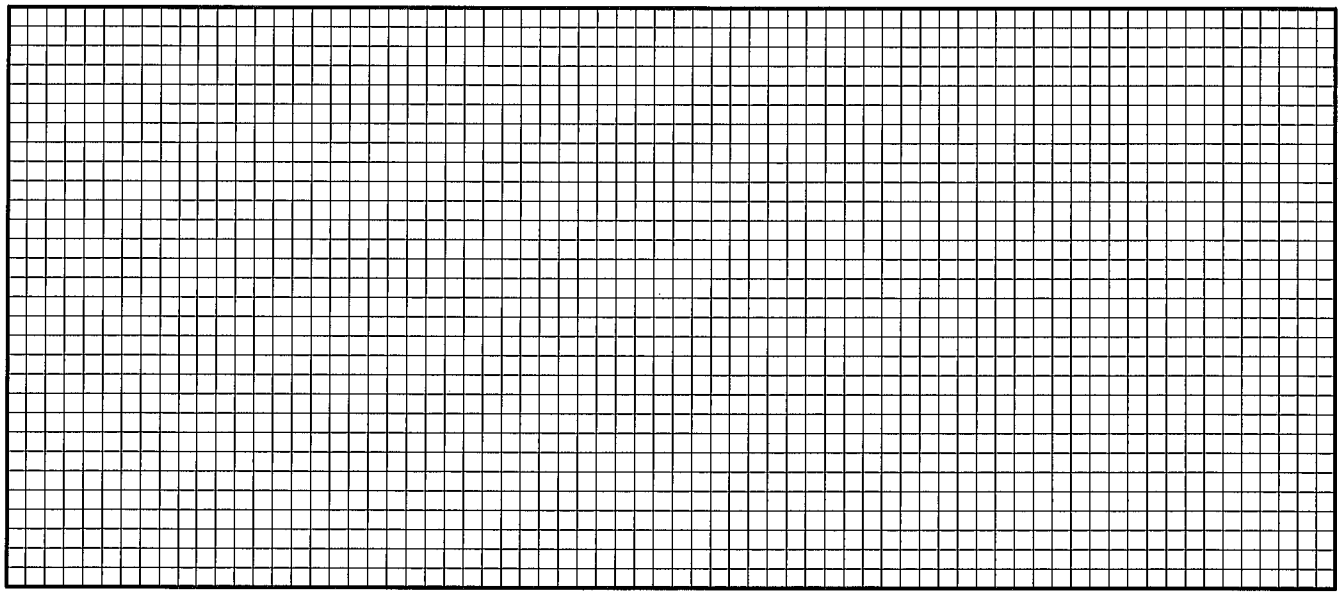


Plate A- 31

Appendix B

Laboratory Testing

Consolidation Test

Consolidation tests were performed in general accordance with ASTM D2435 and D5333 on selected samples to evaluate the load-deformation characteristics of the earth soils. The tests were performed primarily on material that would be most susceptible to consolidation under anticipated foundation loading. The soil specimen, contained in a 2.4-inch-diameter, 1.0-inch-high sampling ring, is placed in a loading frame under a seating pressure of 0.1 ksf. Vertical loads are applied to the samples in several geometric increments, and the resulting deformations were recorded at selected time intervals. When the pressure reaches a preselected effective overburden pressure (often 2 ksf) and the specimen has consolidated under that pressure, the laboratory technician adds water to the test cell and records the vertical movement. After the specimen reaches equilibrium with the addition of water, the technician continues the loading process, usually up to a pressure of about 8 ksf. The specimen is then unloaded in increments, and the test is dismantled. The results of the test are presented in terms of percent volume change versus applied vertical stress. If this test was performed, the results are presented on Plates attached to this appendix.

Compaction Test

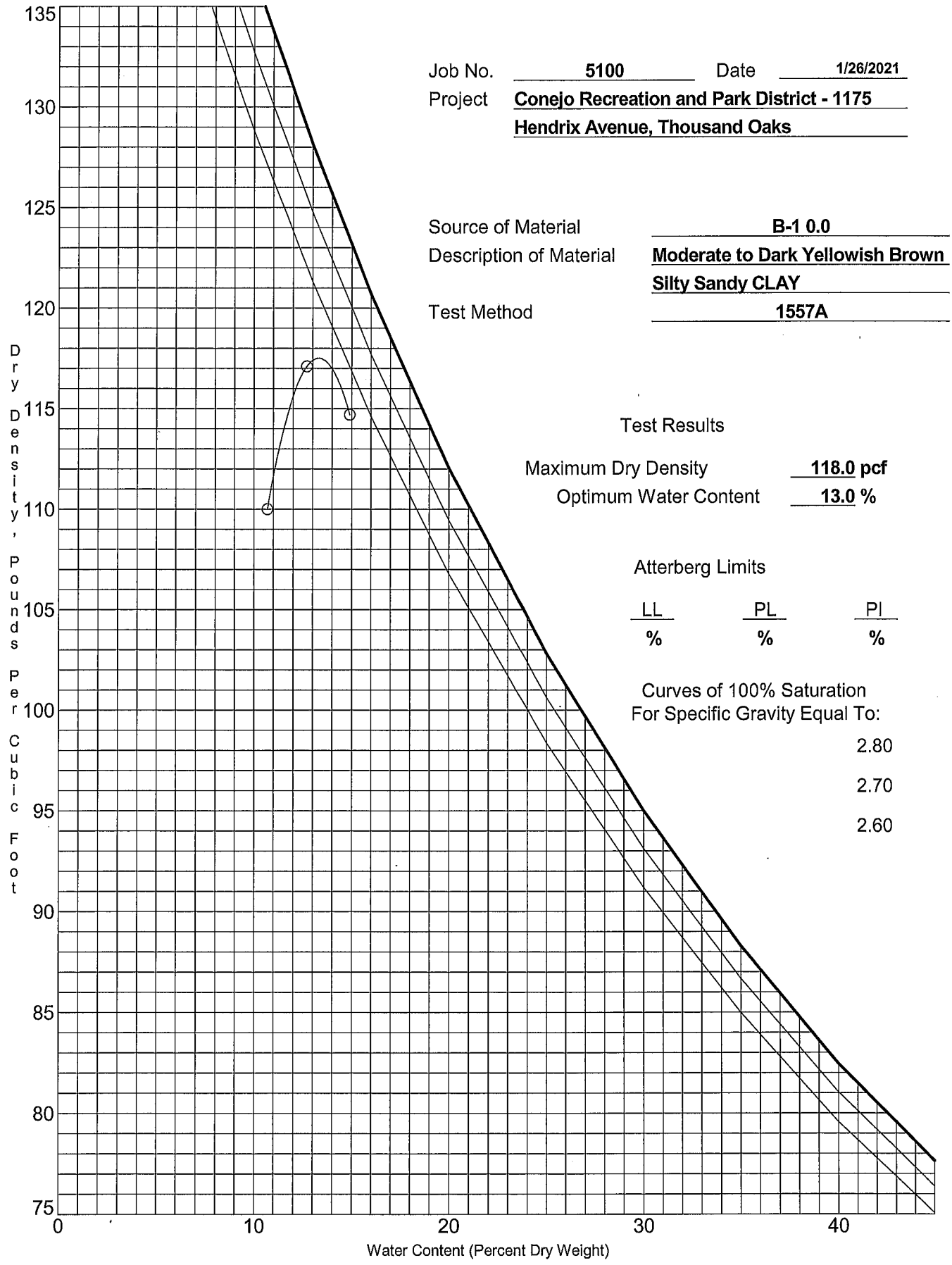
Compaction tests provide information on the relationship between moisture content and dry density of the soil compacted in a given manner. The maximum density is obtained for a given compaction effort at an optimum moisture content. Specifications for earthwork are in terms of the unit weight (or dry density) expressed as a percentage of the maximum density, and the moisture content compared to the optimum moisture content. Compaction tests were performed in general accordance with ASTM Test Designation D1557 to determine the maximum dry densities and optimum moisture contents of the on-site soils. If this test was performed, the results are presented on Plates attached to this appendix.

Expansion Index Test

The expansion index test provides an assessment of the potential for expansion or heave that could be detrimental to foundation or slab performance. Expansion Index tests are performed on shallow on-site soils in general accordance with expansion test procedures in ASTM D4829. In this test, a specimen is compacted at a degree of saturation between 45% and 55% in a 4.01-inch-diameter, 1.0-inch-high ring. The specimen is subjected to a seating pressure of 144 psf, water is added to the test cell, and swell is monitored until the expansion stops. The volume of swell is converted to an expansion index. Any test results are summarized on the boring logs in Appendix A.

Sample Remolding

In some cases remolded samples are used when performing direct shear tests and consolidation tests. Samples are remolded to a specified moisture and density by compacting the soil in a 2.42-inch-diameter sample ring. The specified moisture content is either at optimum or a few percentage points above optimum. The specified dry density is usually at a relative compaction of 90%. The required moisture is added to and mixed with dry soil, providing a homogeneous mixture. A 2.42-inch-diameter ring is placed in a 6-inch-diameter compaction mold, and soil is placed in the mold to above the ring. The soil is then compacted with a 5.5-pound hammer with a free-fall drop of 12 inches. The sample is trimmed, and the dry density is determined. If the dry density deviates more than about one pound per cubic foot from the specified dry density, the process is repeated with the number of blows altered to better achieve the specified dry density.



Job No. **5100** Date **1/26/2021**

Project **Conejo Recreation and Park District - 1175 Hendrix Avenue, Thousand Oaks**

Source of Material **B-1 0.0**

Description of Material **Moderate to Dark Yellowish Brown Silty Sandy CLAY**

Test Method **1557A**

Test Results

Maximum Dry Density **118.0 pcf**

Optimum Water Content **13.0 %**

Atterberg Limits

LL	PL	PI
%	%	%

Curves of 100% Saturation For Specific Gravity Equal To:

2.80

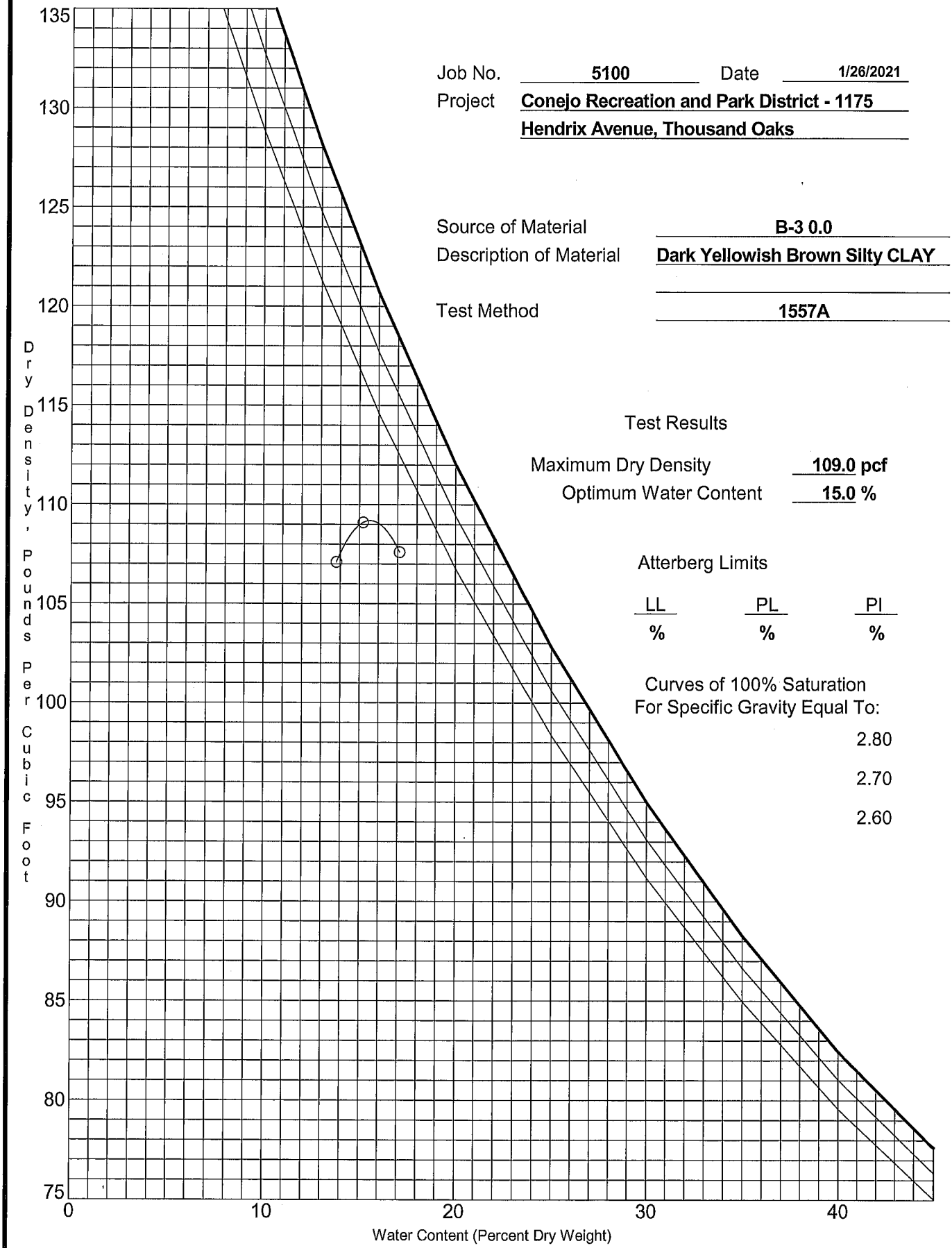
2.70

2.60

Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 3



Job No. 5100 Date 1/26/2021

Project Conejo Recreation and Park District - 1175 Hendrix Avenue, Thousand Oaks

Source of Material B-3 0.0

Description of Material Dark Yellowish Brown Silty CLAY

Test Method 1557A

Test Results

Maximum Dry Density 109.0 pcf

Optimum Water Content 15.0 %

Atterberg Limits

LL	PL	PI
%	%	%

Curves of 100% Saturation For Specific Gravity Equal To:

2.80

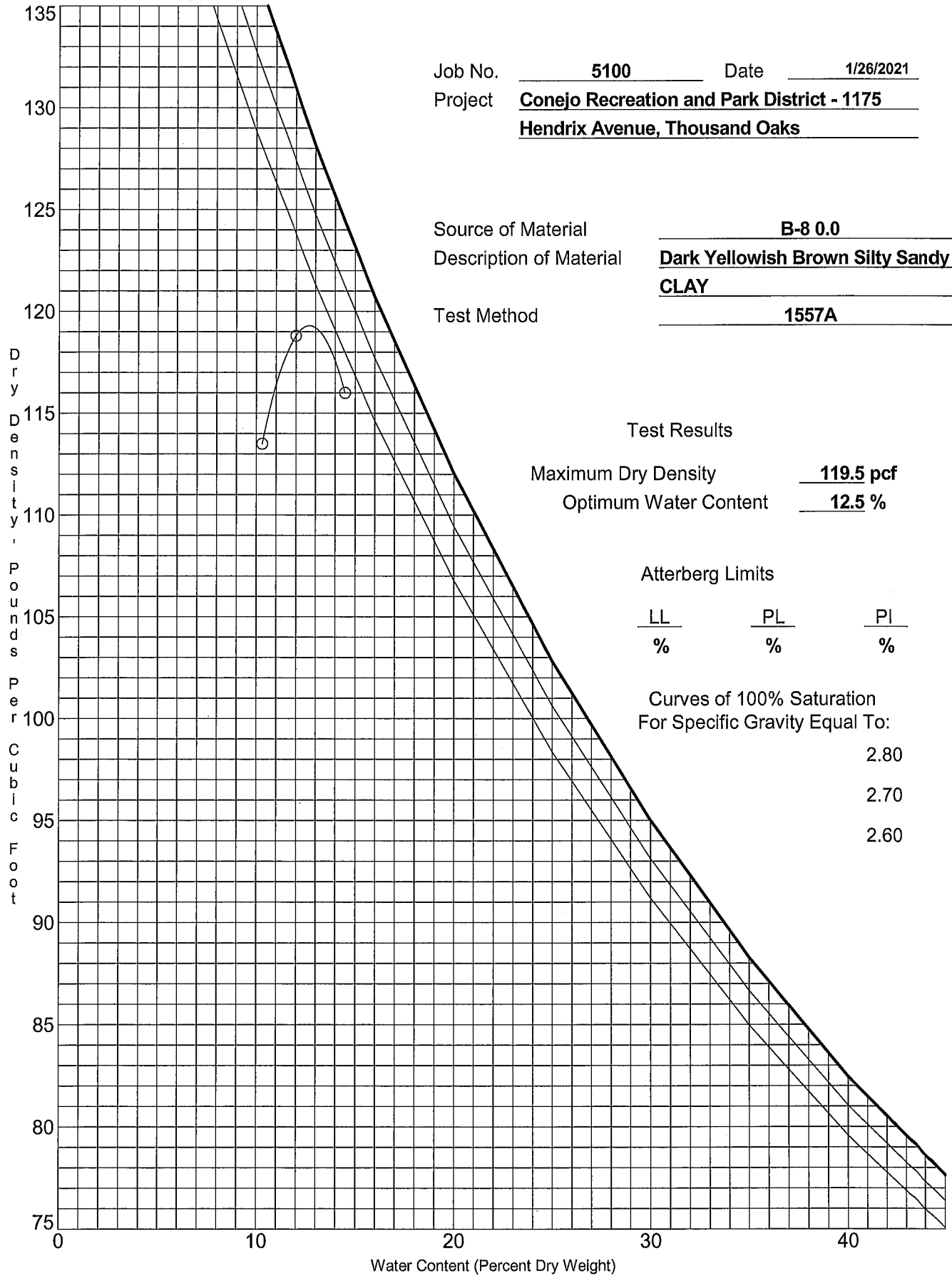
2.70

2.60

Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 4



Job No. 5100 Date 1/26/2021

Project Conejo Recreation and Park District - 1175 Hendrix Avenue, Thousand Oaks

Source of Material B-8 0.0

Description of Material Dark Yellowish Brown Silty Sandy CLAY

Test Method 1557A

Test Results

Maximum Dry Density 119.5 pcf

Optimum Water Content 12.5 %

Atterberg Limits

LL	PL	PI
%	%	%

Curves of 100% Saturation For Specific Gravity Equal To:

2.80

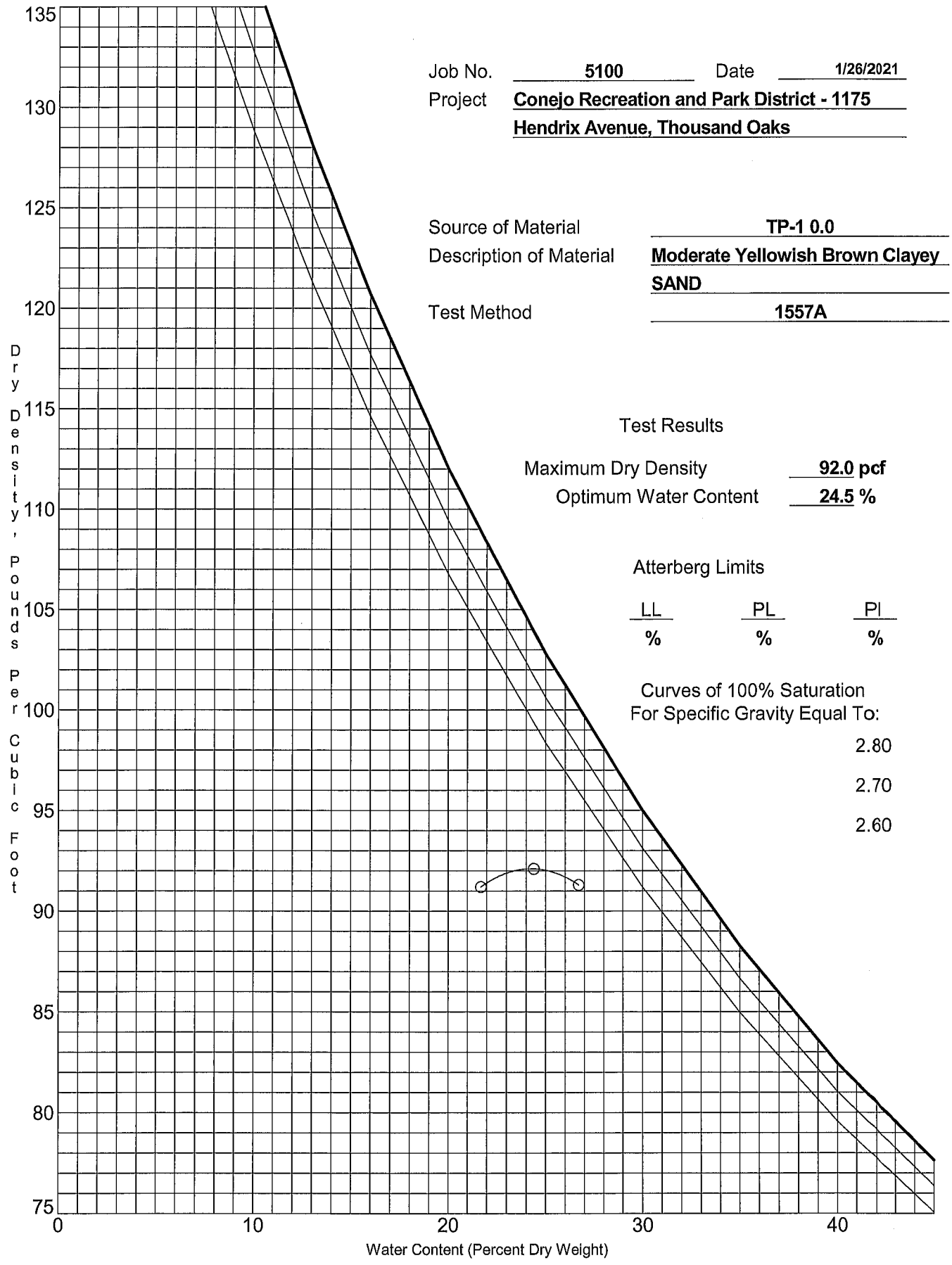
2.70

2.60

Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 5



Job No. 5100 Date 1/26/2021

Project Conejo Recreation and Park District - 1175 Hendrix Avenue, Thousand Oaks

Source of Material TP-1 0.0

Description of Material Moderate Yellowish Brown Clayey SAND

Test Method 1557A

Test Results

Maximum Dry Density 92.0 pcf

Optimum Water Content 24.5 %

Atterberg Limits

LL	PL	PI
%	%	%

Curves of 100% Saturation For Specific Gravity Equal To:

2.80

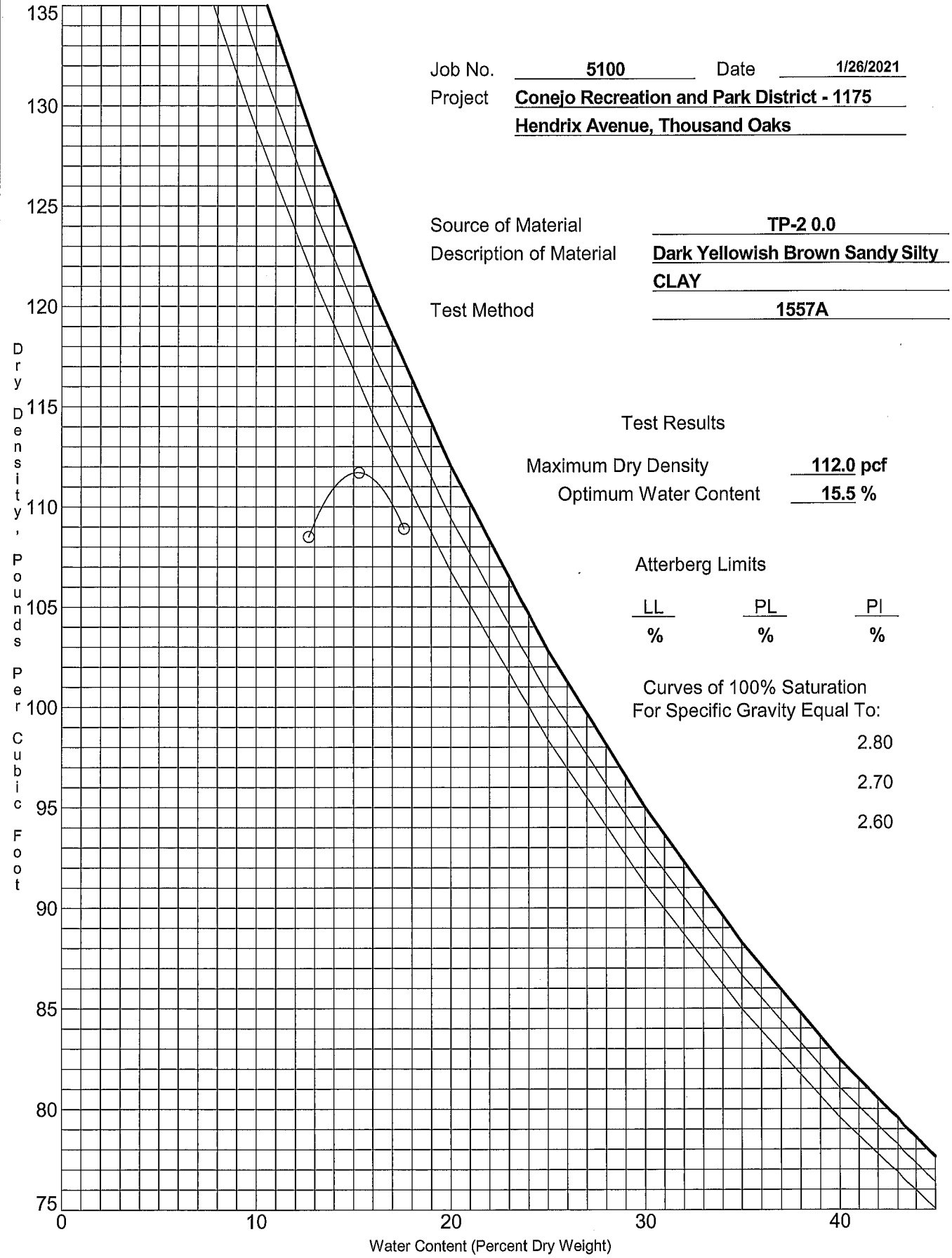
2.70

2.60

Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 6



Job No. 5100 Date 1/26/2021

Project Conejo Recreation and Park District - 1175 Hendrix Avenue, Thousand Oaks

Source of Material TP-2 0.0

Description of Material Dark Yellowish Brown Sandy Silty CLAY

Test Method 1557A

Test Results

Maximum Dry Density 112.0 pcf

Optimum Water Content 15.5 %

Atterberg Limits

LL	PL	PI
%	%	%

Curves of 100% Saturation For Specific Gravity Equal To:

2.80

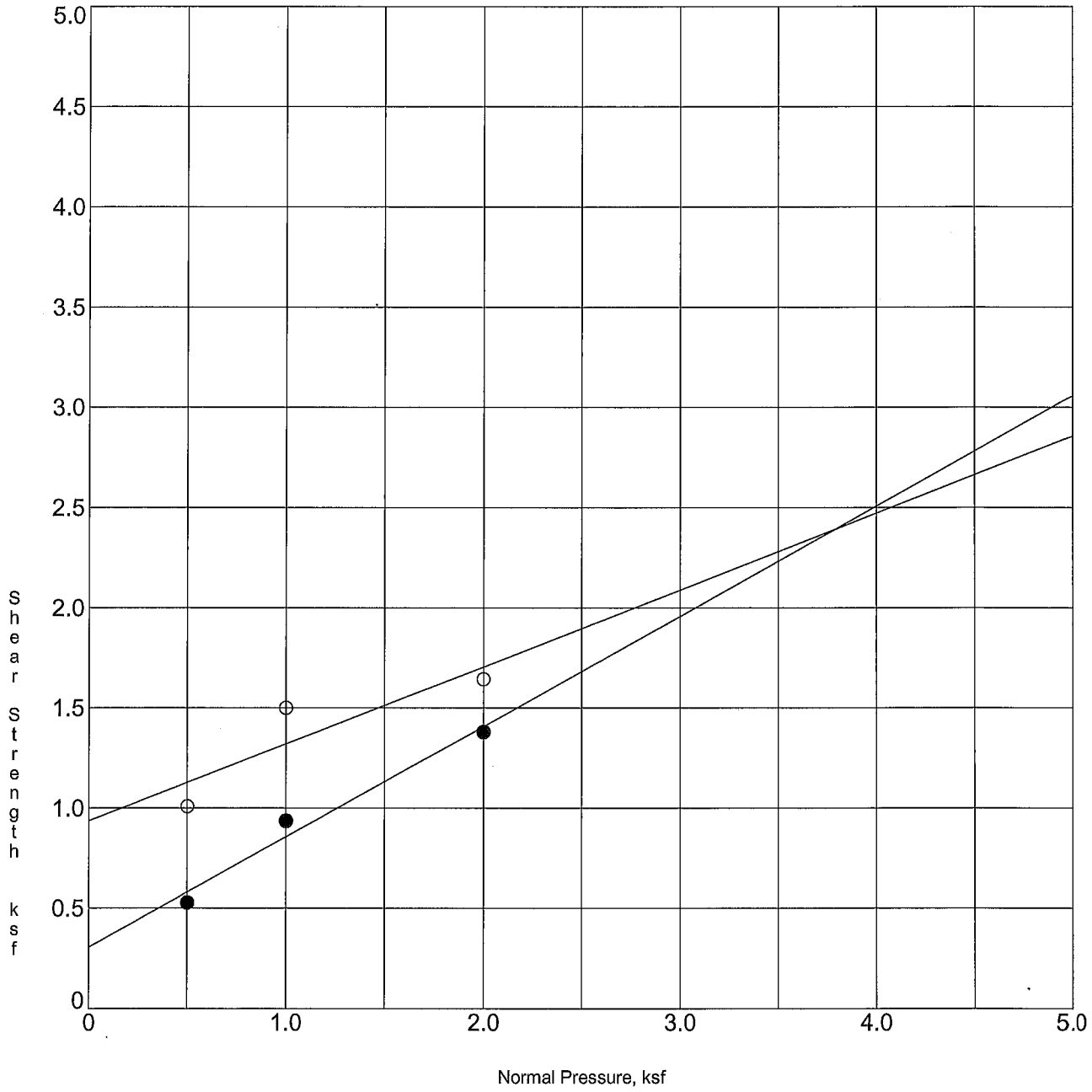
2.70

2.60

Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 7



○ - Peak Shear ● - Ultimate Shear △ - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-1	0.0	Moderate to Dark Yellowish Brown Silty Sandy CLAY	111.7	14.3	0.94	21
●	B-1	0.0	(Remolded)	111.7	20.4	0.31	29

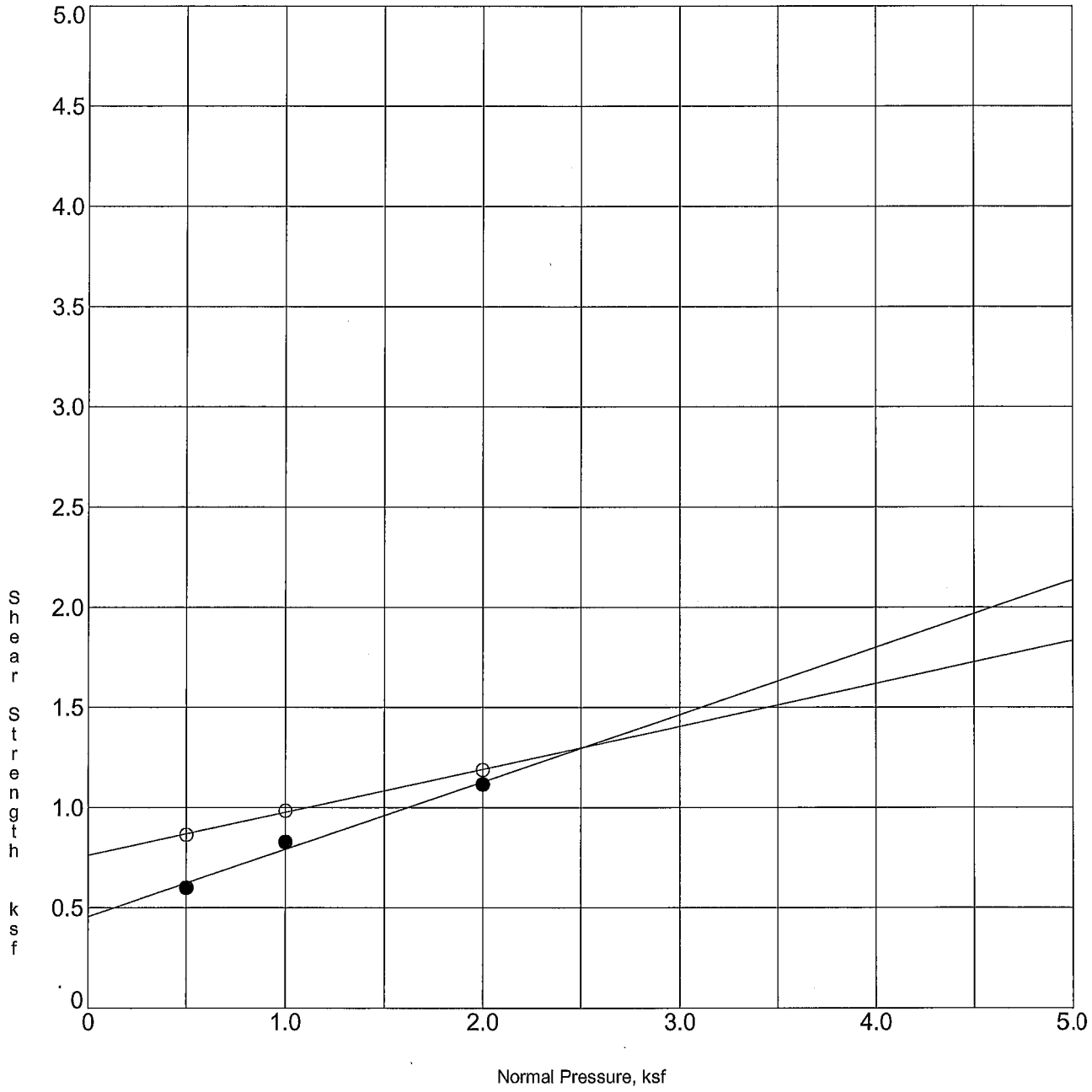
Project **Conejo Recreation and Park District - 1175**
Hendrix Avenue, Thousand Oaks

Client No. **5100**
Date **1/26/21**

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 8



○ - Peak Shear ● - Ultimate Shear △ - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-3	0.0	Dark Yellowish Brown Silty CLAY	94.7	19.1	0.76	12
●	B-3	0.0	(Remolded)	94.7	27.3	0.46	19

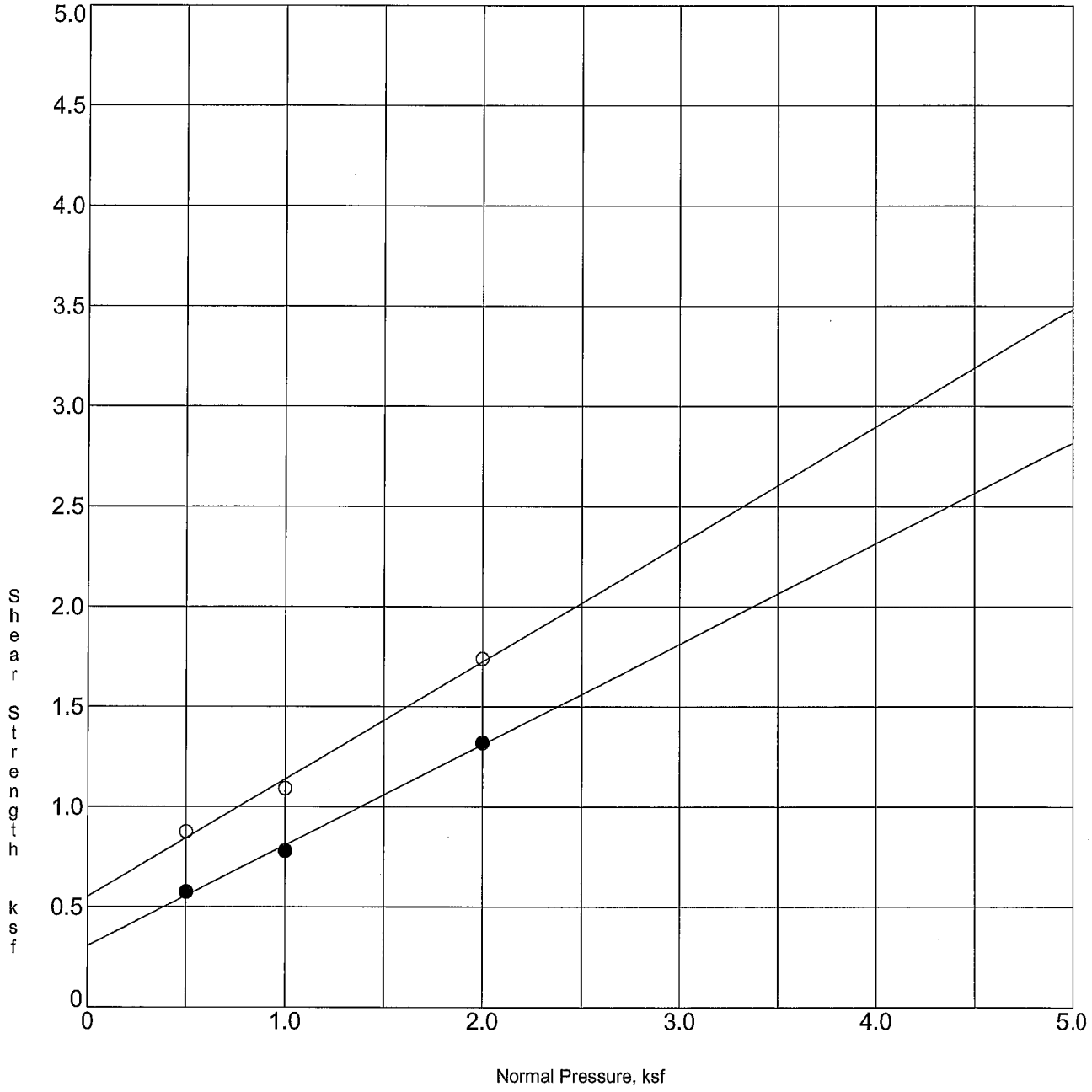
Project **Conejo Recreation and Park District - 1175**
Hendrix Avenue, Thousand Oaks

Client No. **5100**
Date **1/26/21**

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 9



○ - Peak Shear ● - Ultimate Shear △ - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-6	2.5	Dark Yellowish Brown Silty Sandy CLAY	94.9	25.2	0.55	30
●	B-6	2.5	(Undisturbed)	94.9	27.9	0.31	27

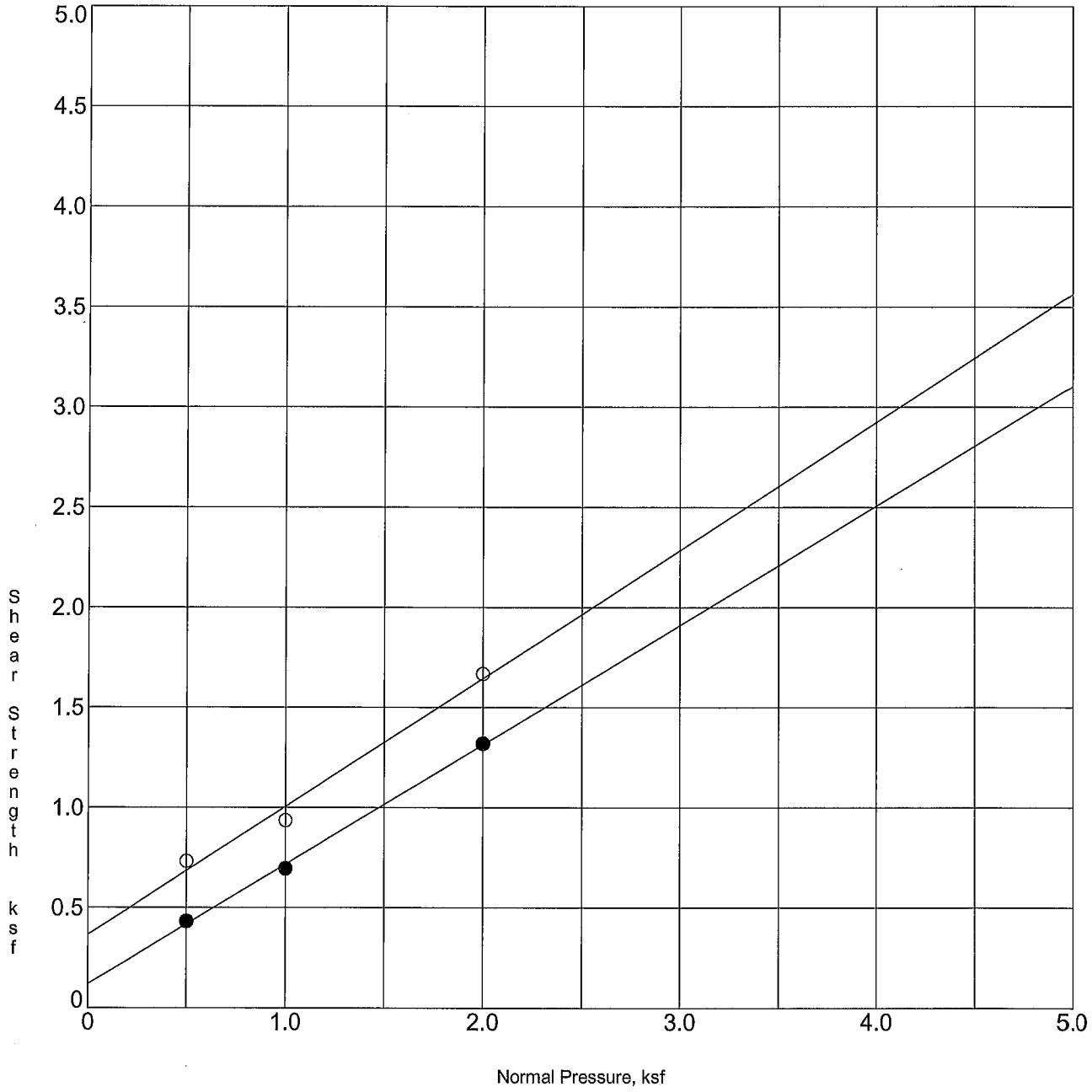
Project **Conejo Recreation and Park District - 1175**
Hendrix Avenue, Thousand Oaks

Client No. **5100**
Date **1/26/21**

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 10



○ - Peak Shear ● - Ultimate Shear △ - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-16	5.0	Light Gray Silty SAND	105.9	20.7	0.37	33
●	B-16	5.0	(Undisturbed)	105.9	21.5	0.12	31

Project **Conejo Recreation and Park District - 1175**
Hendrix Avenue, Thousand Oaks

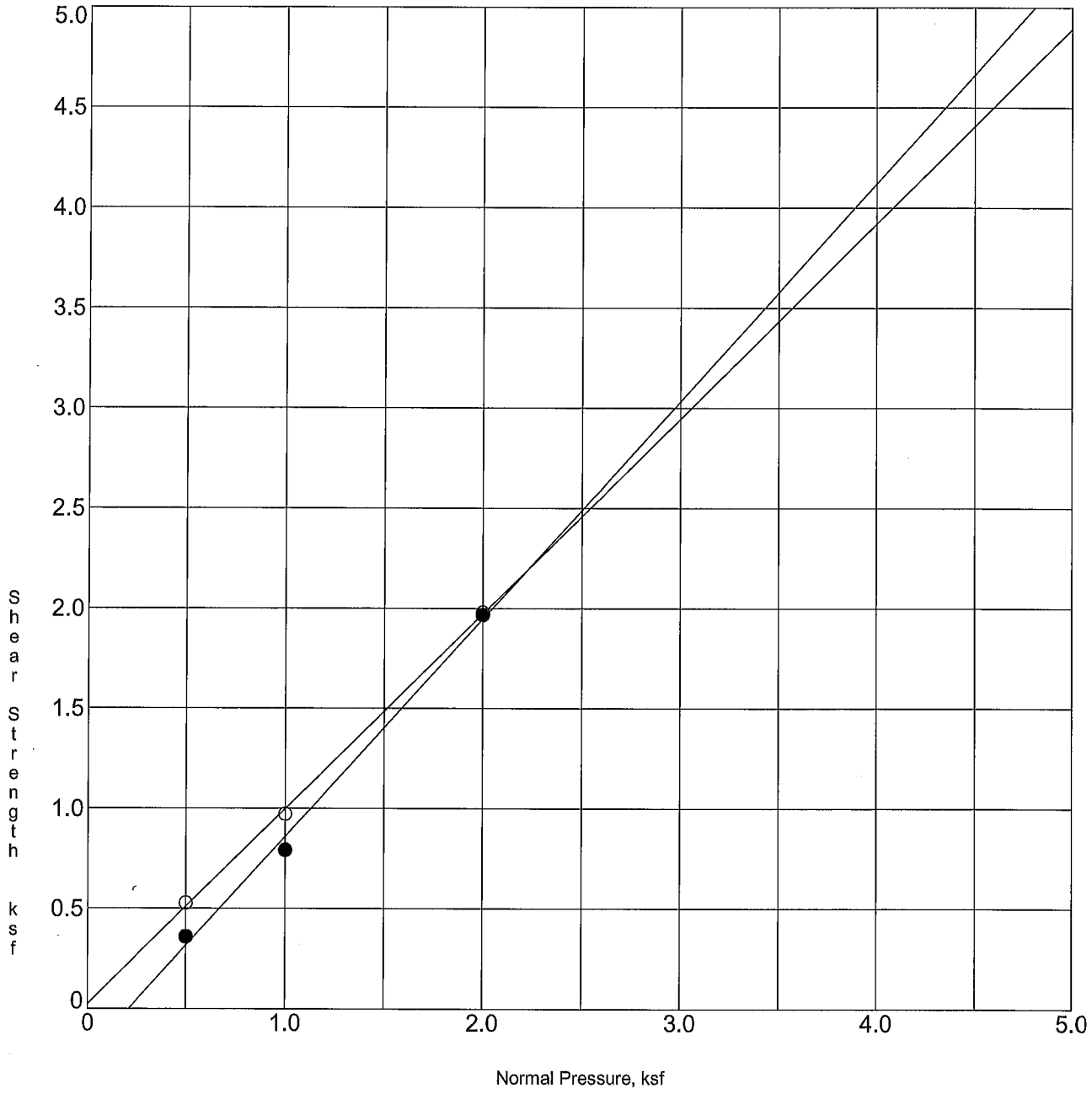
Client No. **5100**

Date **1/26/21**

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 11



○ - Peak Shear ● - Ultimate Shear △ - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-16	7.5	Moderate Yellowish Brown to Tan SILT	84.5	30.9	0.02	44
●	B-16	7.5	(Undisturbed)	84.5	35.6	0.00	43

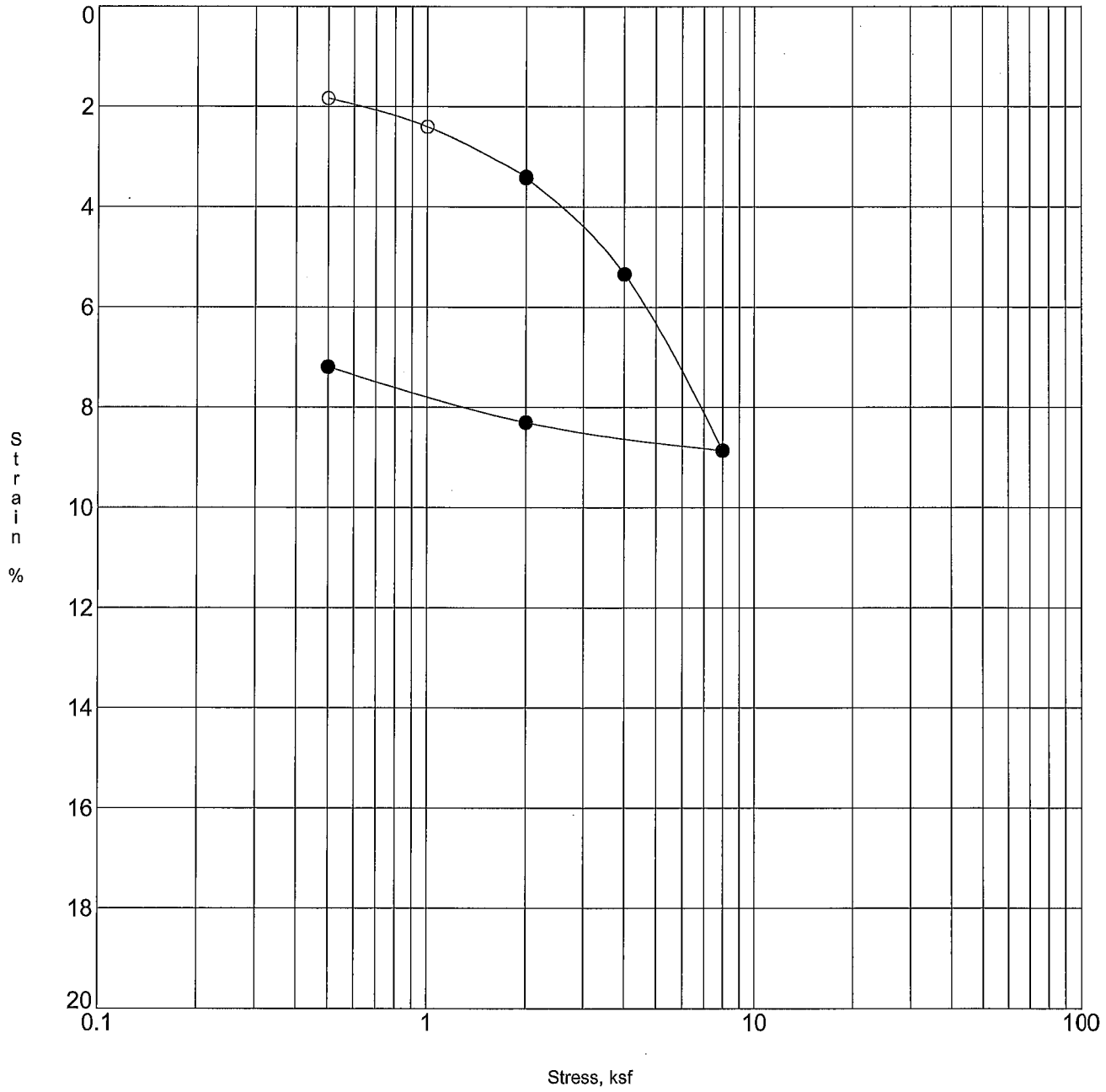
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No.: 5100
Date: 1/26/21

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 12



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-1	5.0	Moderate Yellowish Brown Silty Clayey SAND	97.5	23.1
●	B-1	5.0	(Undisturbed)	105.3	21.7

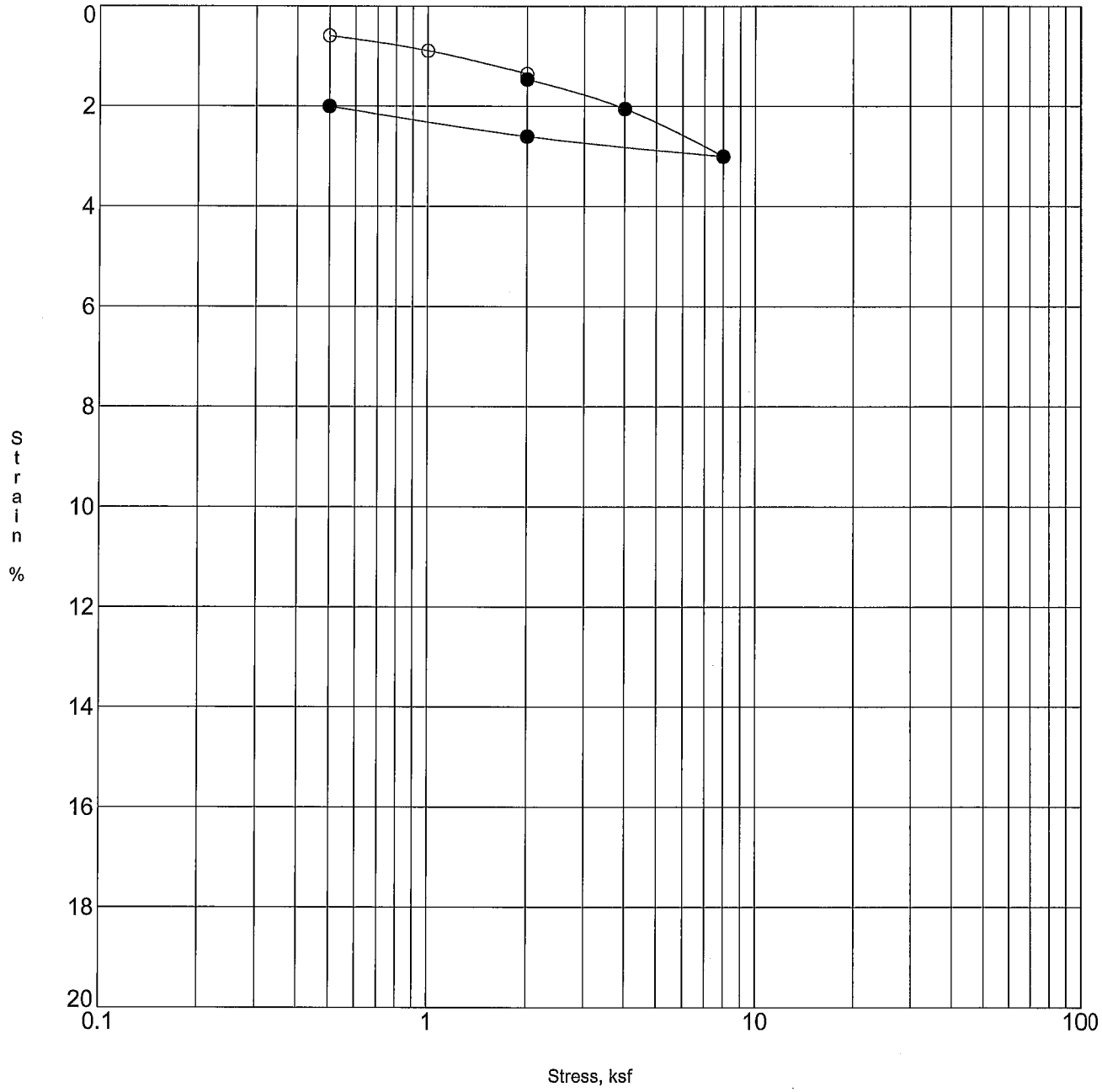
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 13



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-3	5.0	Light Brown SAND	113.6	12.9
●	B-3	5.0	(Undisturbed)	115.9	14.9

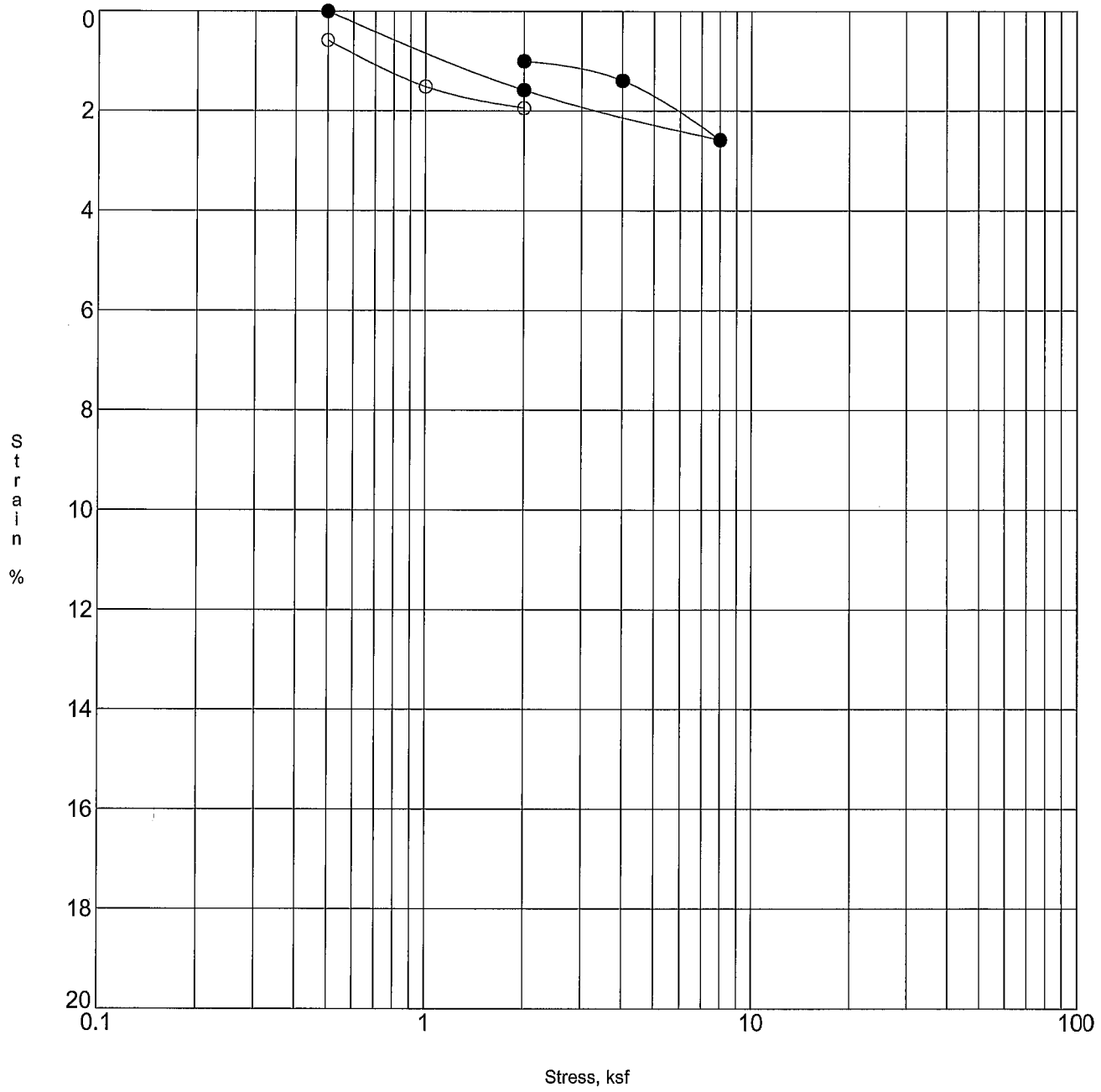
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 14



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-3	7.5	Light Brown SAND	96.8	24.9
●	B-3	7.5	(Undisturbed)	96.9	27.2

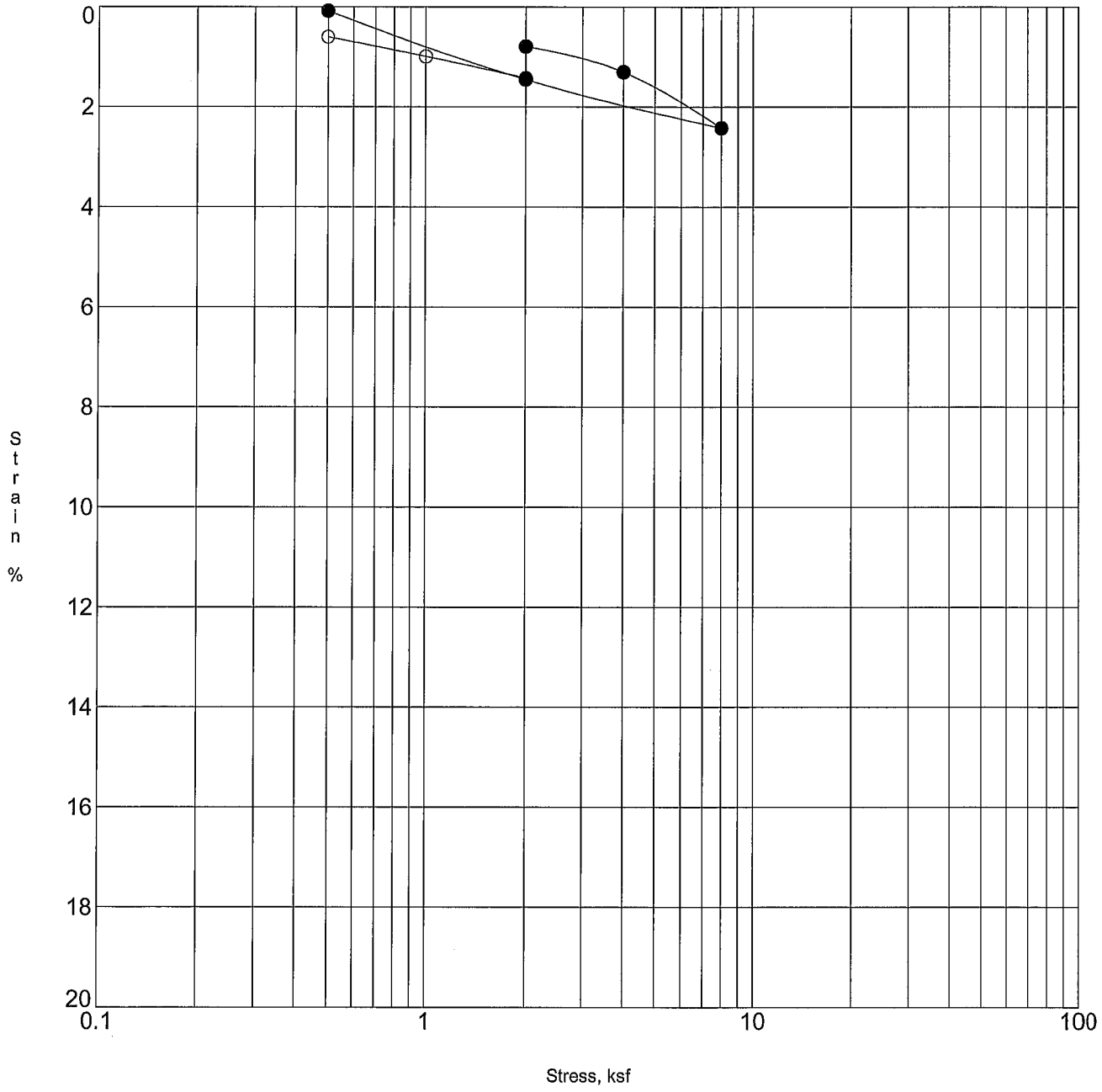
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 15



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-3	10.0	Dark Yellowish Brown Silty Sandy CLAY	96.2	24.0
●	B-3	10.0	(Undisturbed)	96.3	26.1

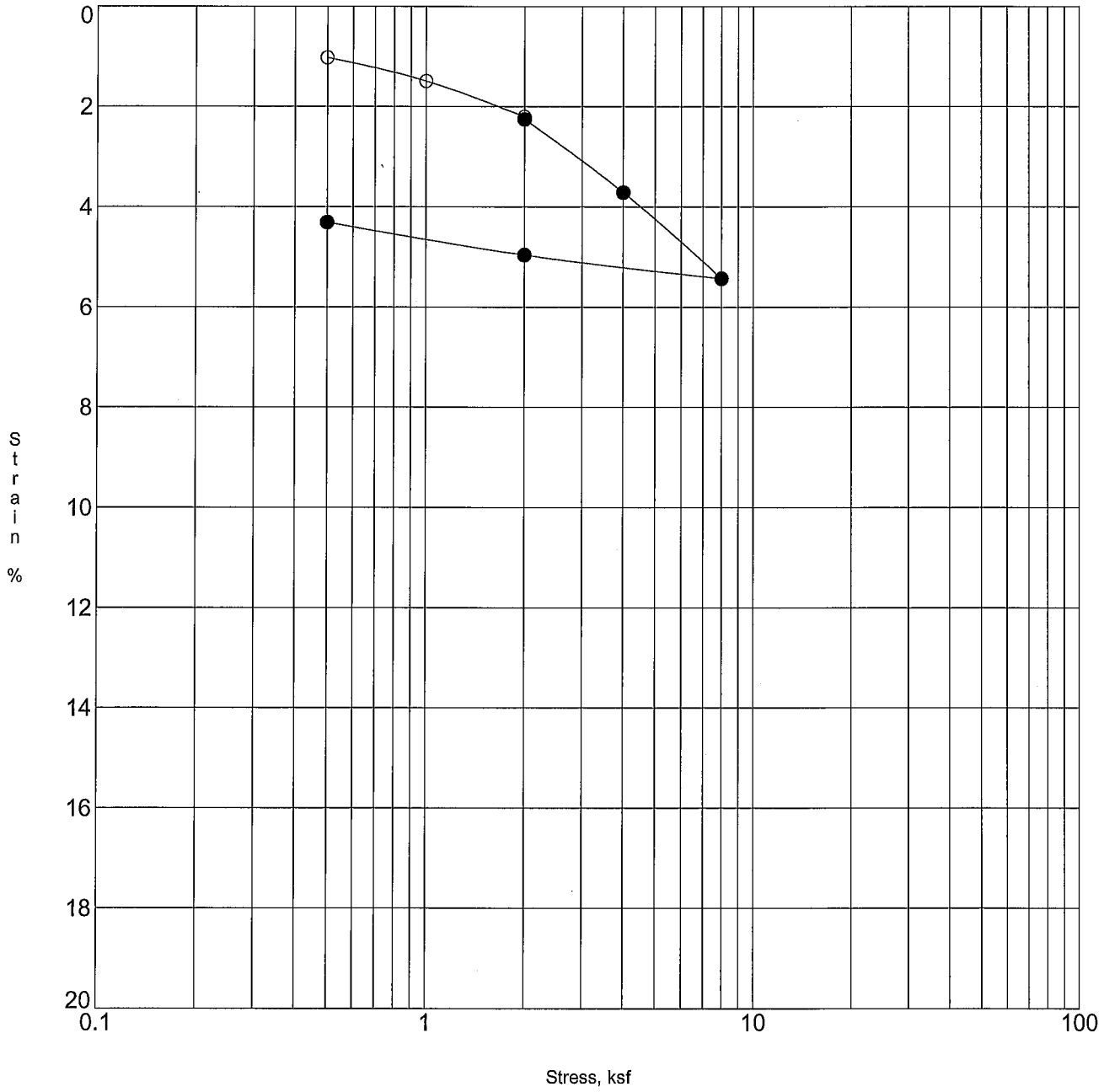
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 16



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

Specimen Identification			Classification	DD	MC%
○	B-4	5.0	Light Gray to Olive Sandy CLAY	111.8	16.9
●	B-4	5.0	(Undisturbed)	116.8	15.9

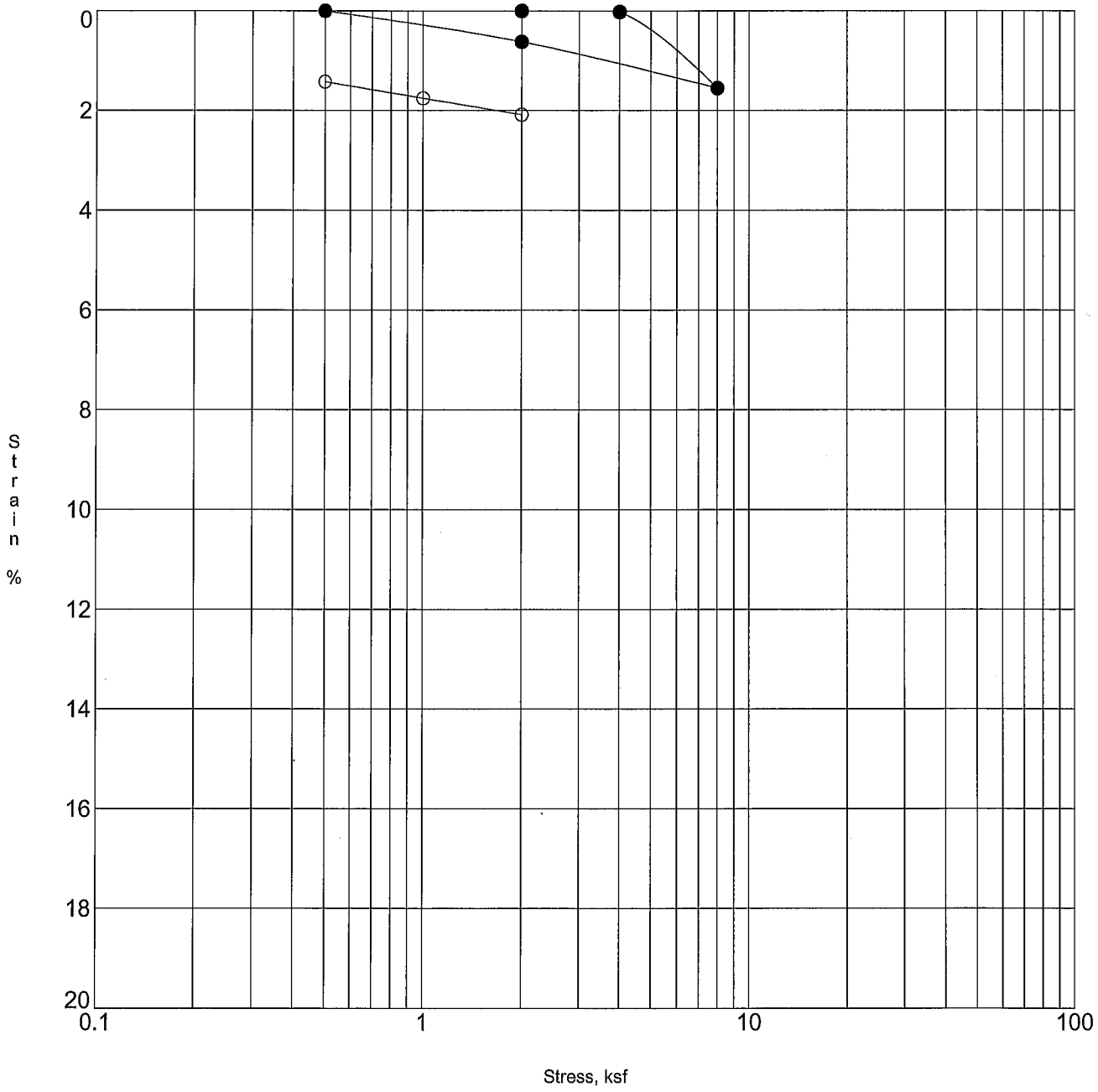
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 17



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-8	0.0	Dark Yellowish Brown Silty Sandy CLAY	114.0	12.8
●	B-8	0.0	(Remolded)	112.6	18.4

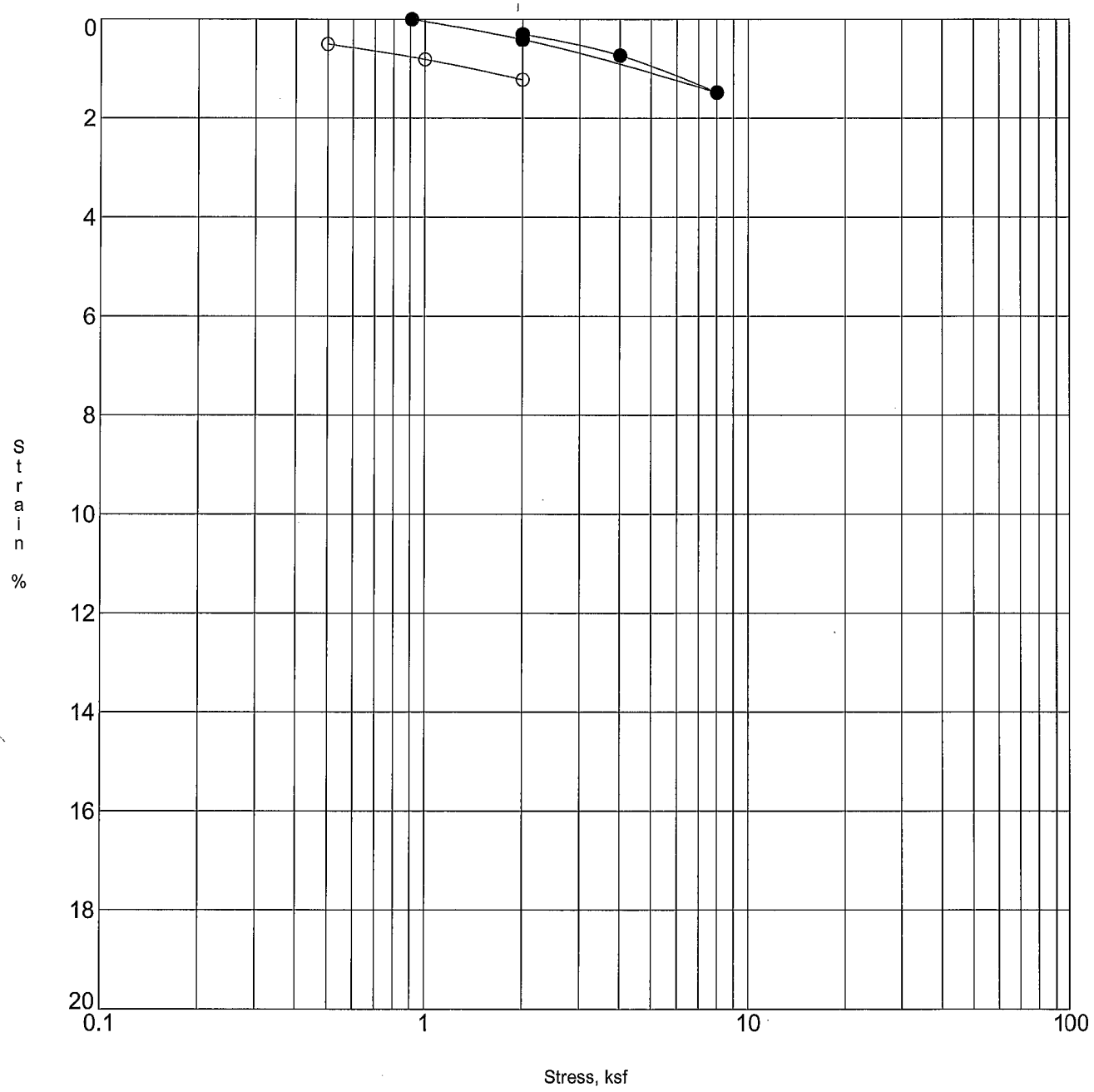
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 18



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-8	5.0	Dark Yellowish Brown Silty Sandy CLAY	102.1	16.8
●	B-8	5.0	(Undisturbed)	102.1	20.2

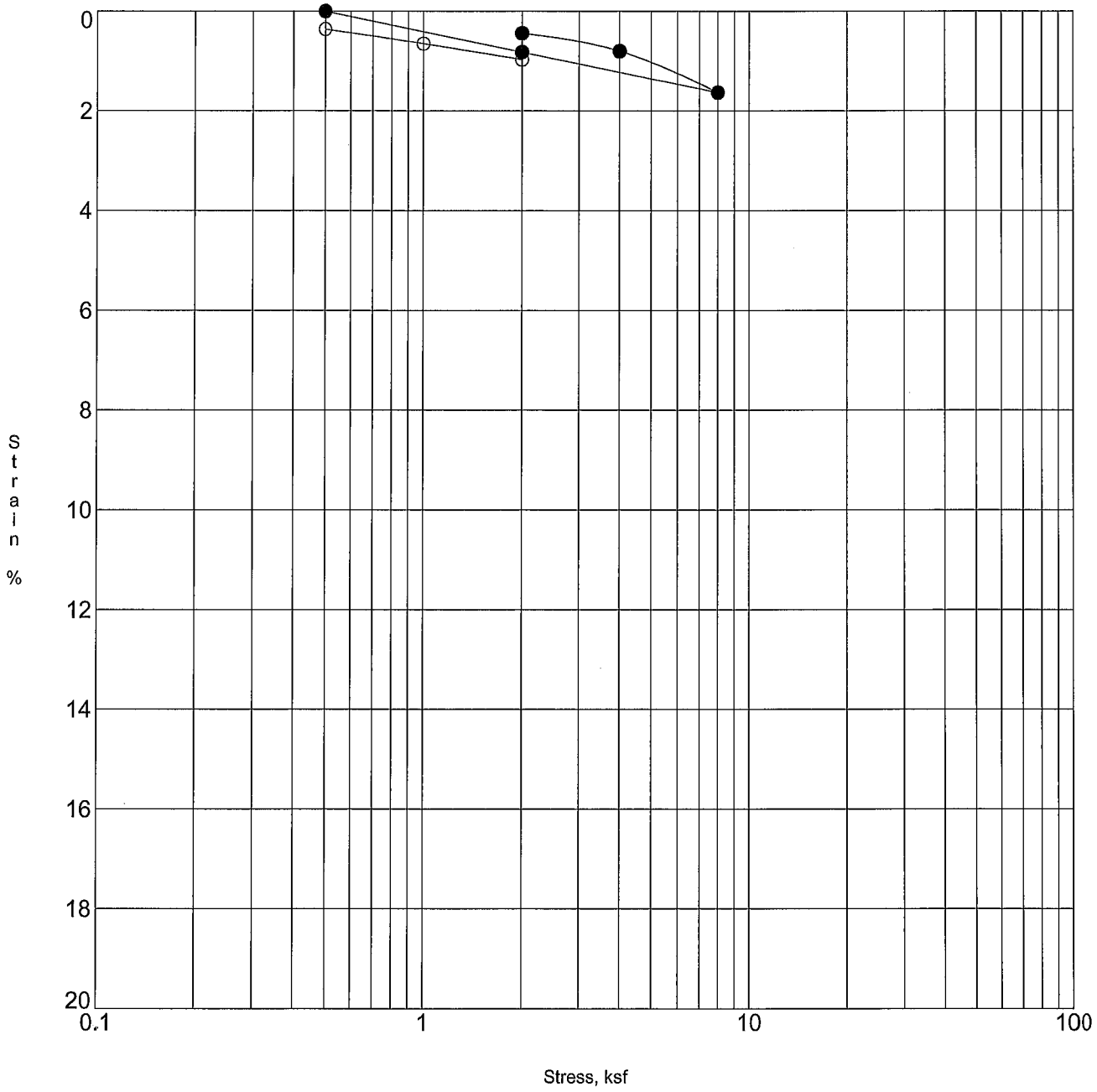
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 19



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-9	5.0	Dark Yellowish Brown Silty Sandy CLAY	102.6	19.2
●	B-9	5.0	(Undisturbed)	102.6	21.3

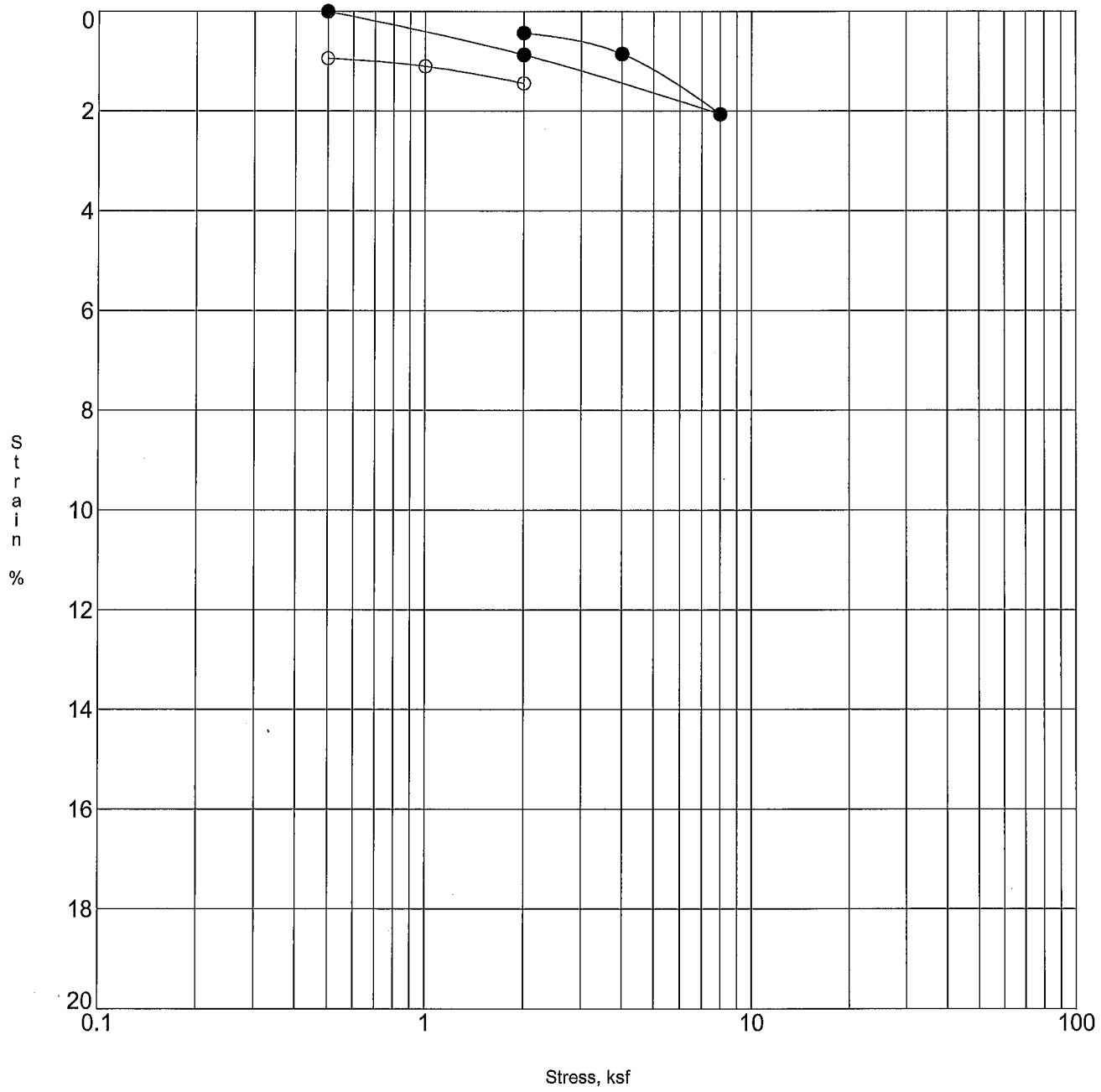
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 20



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-12	5.0	Moderate Yellowish Brown Sandy CLAY	95.0	24.3
●	B-12	5.0	(Undisturbed)	95.0	27.2

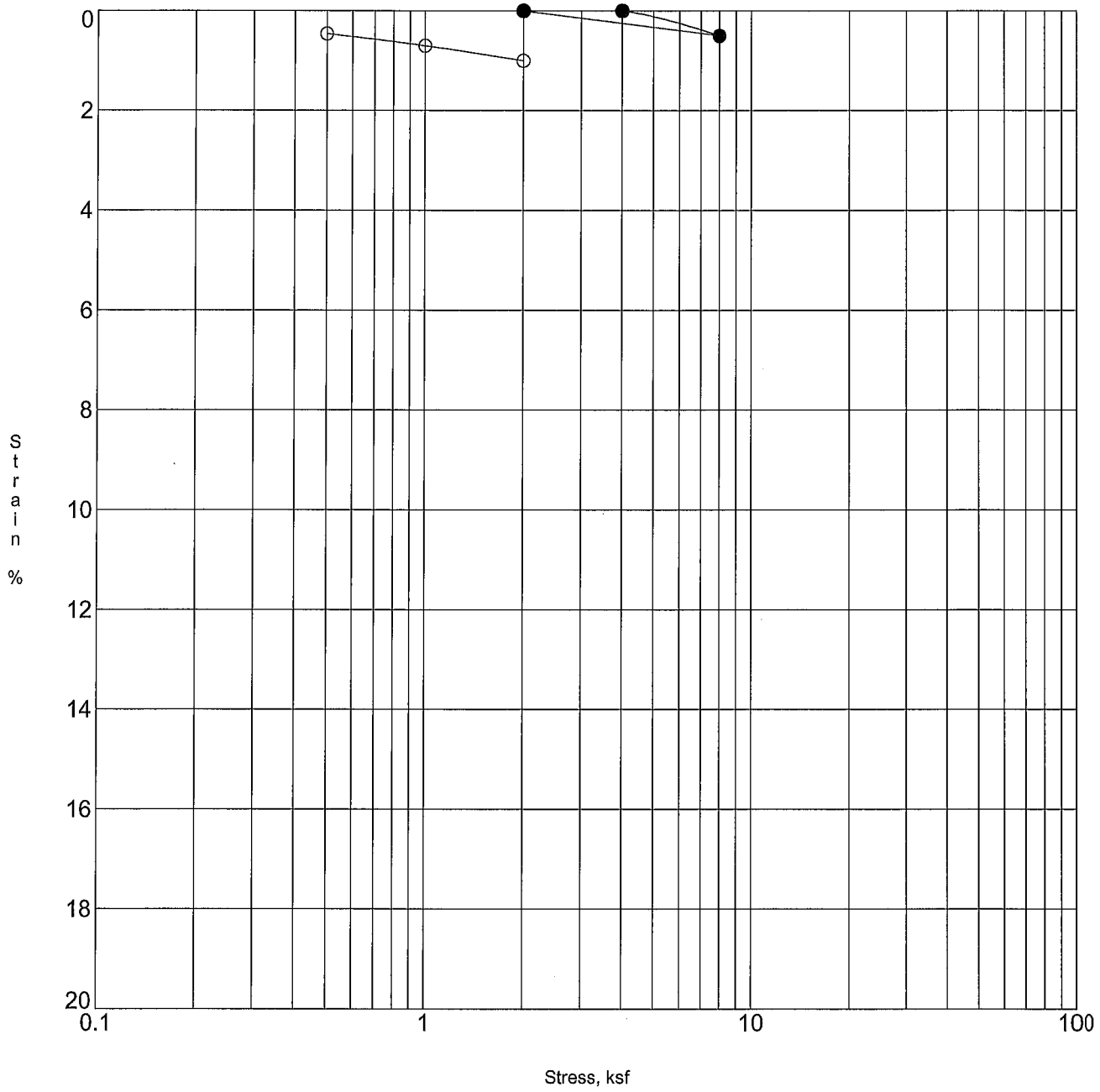
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 21



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-14	2.5	Dark Yellowish Brown Silty Sandy CLAY	99.6	20.0
●	B-14	2.5	(Undisturbed)	96.8	24.6

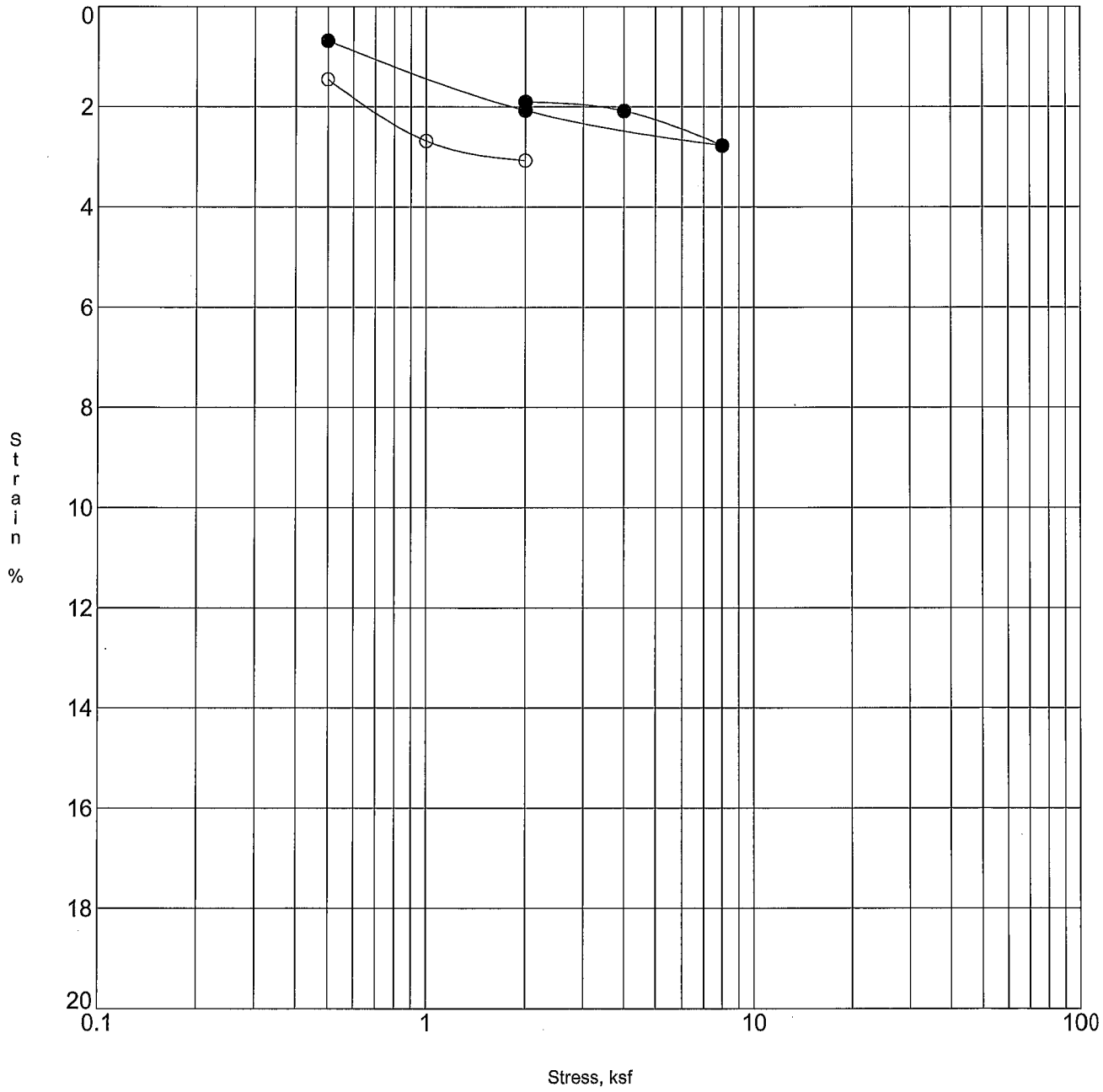
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 22



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	B-14	5.0	Dark Yellowish Brown Sandy CLAY	109.5	17.6
●	B-14	5.0	(Undisturbed)	110.3	19.9

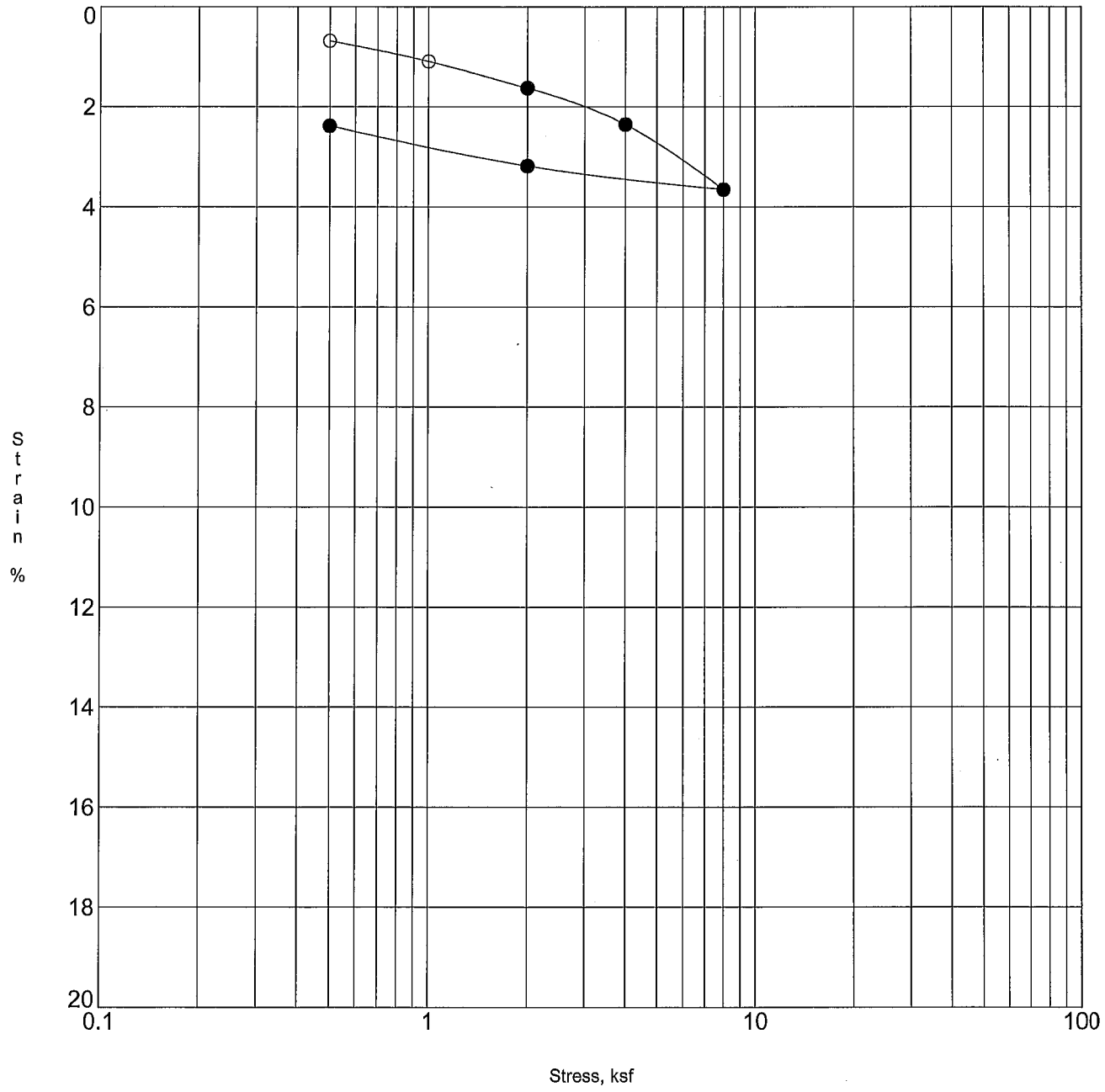
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 23



Open Symbol At Field Moisture, Solid Symbol After Submersion In Water

Specimen Identification			Classification	DD	MC%
○	B-16	2.5	Light Gray Clayey Sandy SILT	109.6	16.9
●	B-16	2.5	(Undisturbed)	112.3	17.8

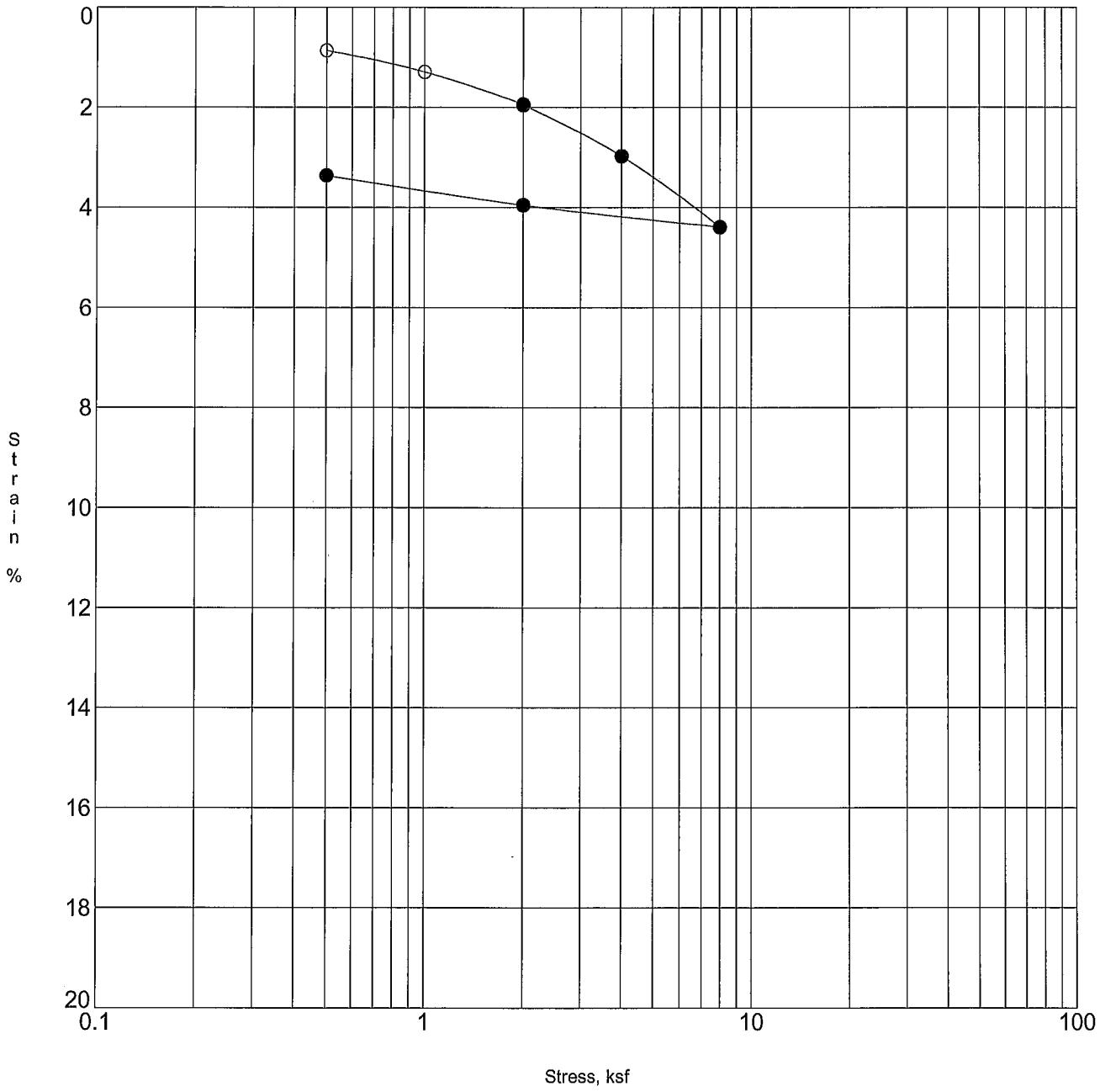
Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 24



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

Specimen Identification			Classification	DD	MC%
○	B-16	5.0	Light Gray Silty SAND	105.6	19.4
●	B-16	5.0	(Undisturbed)	109.3	19.2

Project: Conejo Recreation and Park District - 1175
Hendrix Avenue, Thousand Oaks

Client No. 5100
Date 1/26/21

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 25

CAPCO Analytical Services, Inc.

Environmental and Analytical Services-Since 1994
California State Accredited Laboratory in Accordance with ELAP Certificate # 2332

Prepared for: Advanced Geotechnical Services
5251 Verdugo Way, Suite L
Camarillo, CA 93012
Attn: Jim Bruss

Report Date: December 30, 2020
Laboratory Number: 202158
Project Name: Conejo Park & Recreation District
Sampled by: J. Bruss

Enclosed are the analysis results for samples received December 28, 2020 with the Chain of Custody document. The samples were received in good condition, at 17.6°C, and they were identified and assigned the laboratory ID numbers listed below:

SAMPLE DESCRIPTION	CAS LAB NUMBER ID
B-1@0-5'	202158-01
B-3@0-5'	202158-02

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health's Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Marcos Ramirez-Laboratory Director

If you have any further questions or concerns, please contact me at your convenience. This report consists of 3 pages excluding the cover letter and the Chain of Custody.

CERTIFICATE OF ANALYSIS

Client: Advanced Geotechnical Services
CAS LAB NO: 202158-01
Sample ID: B-1@0-5'
Analyst: GP

Date Sampled: 12/28/20
Date Received: 12/28/20
Sample Matrix: Soil

WET CHEMISTRY SUMMARY

COMPOUND	RESULTS	UNITS	DF	PQL	METHOD	ANALYZED
pH (Corrosivity)	8.1	S.U.	1	---	9045	12/28/20
Resistivity*	1700	Ohms-cm	1	---	SM 120.1M	12/28/20
Chloride	190	mg/Kg	1	0.3	300.0M	12/28/20
Sulfate	320	mg/Kg	1	0.3	300.0M	12/28/20

*Sample was extracted using a 1:3 ratio of soil and DI water.

DF: Dilution Factor
PQL: Practical Quantitation Limit
BQL: Below Quantitation Limit
mg/Kg: Milligrams/Kilograms(ppm)

CERTIFICATE OF ANALYSIS

Client: Advanced Geotechnical Services
CAS LAB NO: 202158-02
Sample ID: B-3@0-5'
Analyst: GP

Date Sampled: 12/28/20
Date Received: 12/28/20
Sample Matrix: Soil

WET CHEMISTRY SUMMARY

COMPOUND	RESULTS	UNITS	DF	PQL	METHOD	ANALYZED
pH (Corrosivity)	8.2	S.U.	1	---	9045	12/28/20
Resistivity*	5500	Ohms-cm	1	---	SM 120.1M	12/28/20
Chloride	35	mg/Kg	1	0.3	300.0M	12/28/20
Sulfate	66	mg/Kg	1	0.3	300.0M	12/28/20

*Sample was extracted using a 1:3 ratio of soil and DI water.

DF: Dilution Factor
PQL: Practical Quantitation Limit
BQL: Below Quantitation Limit
mg/Kg: Milligrams/Kilograms(ppm)

Quality Control Report

Client:	Advanced Geotechnical Services	Date Sampled:	12/28/20
Sample ID:		Date Received:	12/28/20
CAS LAB NO:	202158	Date Analyzed:	12/28/20
Sample Matrix:	SOIL	Analyst:	GP

Sample Name	Qualifier	Sample Result	QC Result	Unit	Spike Level	%REC	Control Limits
Chloride (by EPA 300)							
Method Blank			BQL	mg/L			
Lab Control Sample			29.73	mg/L	30	99	90-110
201228 Blank Spike		0.00	29.56	mg/L	30	99	80-120
201228 Blank Spike Duplicate		0.00	29.60	mg/L	30	99	80-120
Sulfate (by EPA 300)							
Method Blank			BQL	mg/L			
Lab Control Sample			29.36	mg/L	30	98	90-110
201228 Blank Spike		0.00	29.60	mg/L	30	99	80-120
201228 Blank Spike Duplicate		0.00	29.54	mg/L	30	98	80-120

*ALL QC SAMPLES ARE PREPARED IN LIQUID PHASE

mg/L:Milligrams/Liter(ppm)

%Rec:Percent Recovered

BQL:Below Practical Quantitation Limit

January 4, 2021
Lab No. 35849-3
File No. 21-7059-3

Advanced Geotechnical Services
5251 Verdugo Way, Suite L
Camarillo, CA 93012

SUBJECT: R-Value Testing
Sample Delivered to Laboratory

Gentlemen:

Pursuant to your request, R-Value testing was performed on the soil samples delivered to our laboratory. R-Value testing was performed in accordance with California Test 301-F criteria. The test results follow:

R-VALUE RESULTS

PROJECT: Conejo, #5100
LOCATION: B-7 @ 0 – 5'
Soil Description: Orange Brown Clay

ITEM	1	2	3
Compaction Pressure – psi	50/75	50/75	**
Initial Moisture - %	18.3	18.3	**
Moisture at Compaction - %	21.3	22.7	**
Density – pcf	102.4	98.5	**
R-Value	9	5	**
Exudation Pressure	624	447	**
Expansion Pressure thickness ft.	0.60	0.23	**

Assigned R-Value: 3, *, **

Footnote:
** Please verify R-value based upon expansion thickness (see California Test 301-F procedures)*
*** Material from exceptionally heavy clay test specimens will extrude from under the mold and around the follower ram during loading operation. When this occurs the R-value cannot be determined. Therefore, the very poor quality soil should be reported as an R-value less than 5.*

R-VALUE RESULTS

PROJECT: Conejo, #5100
LOCATION: B-10 @ 0 – 5'
Soil Description: Dark Brown Fine Sandy Clay with some Fine to Medium Gravel

ITEM	1	2	3
Compaction Pressure – psi	125/175	100/125	75/100
Initial Moisture - %	22.7	22.7	22.7
Moisture at Compaction - %	25.8	27.8	29.9
Density – pcf	95.1	90.0	88.5
R-Value	20	12	8
Exudation Pressure	798	590	289
Expansion Pressure thickness ft.	1.20	0.13	0.07

Assigned R-Value: 8*

R-VALUE RESULTS

PROJECT: Conejo, #5100
LOCATION: B-12 @ 0 – 5'
Soil Description: Brown Fine to Medium Sandy Clay with some fine to medium gravel

ITEM	1	2	3
Compaction Pressure – psi	150/175	125/150	100/125
Initial Moisture - %	24.2	24.2	24.2
Moisture at Compaction - %	26.3	27.3	28.3
Density – pcf	92.2	90.8	89.0
R-Value	23	16	12
Exudation Pressure	447	368	298
Expansion Pressure thickness ft.	0.17	0.10	0.00

Assigned R-Value: 12*

Footnote:
* *Please verify R-value based upon expansion thickness (see California Test 301-F procedures)*

R-VALUE RESULTS

PROJECT: Conejo, #5100
LOCATION: B-15 @ 0 – 5'
Soil Description: Black Brown Clay with some Fine Gravel

ITEM	1	2	3
Compaction Pressure – psi	75/125	75/100	50/75
Initial Moisture - %	24.2	24.2	24.2
Moisture at Compaction - %	28.9	30.4	32.5
Density – pcf	86.9	95.8	84.4
R-Value	14	10	5
Exudation Pressure	719	686	394
Expansion Pressure thickness ft.	0.53	0.27	0.07

Assigned R-Value: 4*,**

Footnote:
** Please verify R-value based upon expansion thickness (see California Test 301-F procedures)*
*** Material from exceptionally heavy clay test specimens will extrude from under the mold and around the follower ram during loading operation. When this occurs the R-value cannot be determined. Therefore, the very poor quality soil should be reported as an R-value less than 5.*

Thank you for allowing *Pacific Materials Laboratory, Inc.* to be of service. If we may be of further service regarding this or other geotechnical issues, please do not hesitate to call (805) 482-9801, write or email at pacificmaterialslab@msn.com.

Respectfully Submitted,
PACIFIC MATERIALS LABORATORY, INC.

Douglas C. Papay, CE 29,565
President

REGISTERED PROFESSIONAL ENGINEER
DOUGLAS C. PAPAY
CE 29565
Exp: 3/31/21
CIVIL
STATE OF CALIFORNIA

DCP:dkp
cc: Addressee (Email)

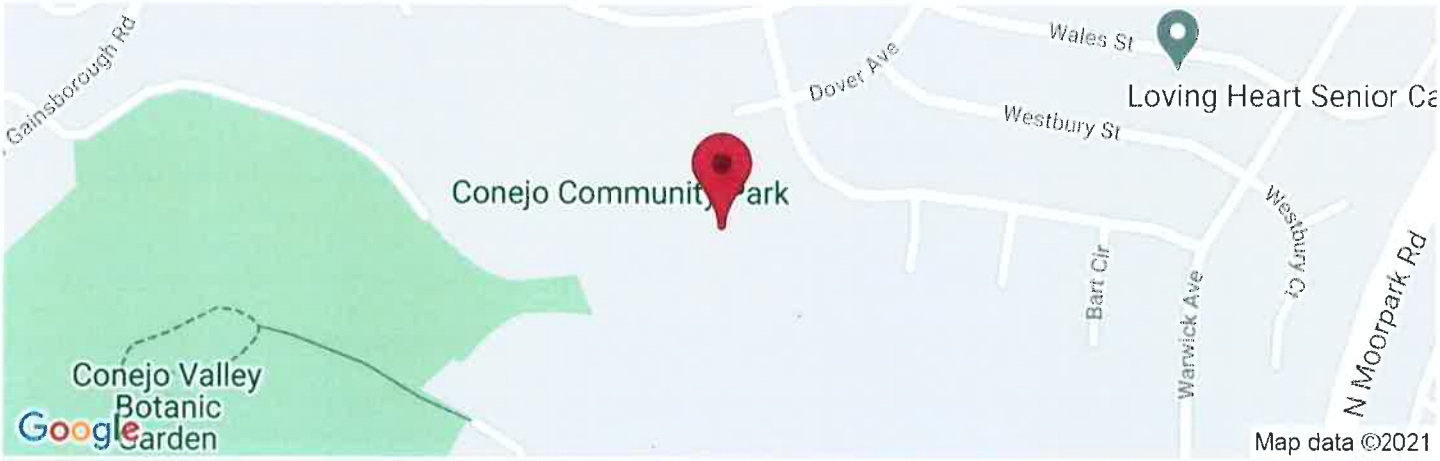
Appendix C

Seismicity Study

OSHPD

Conejo Community Center

Latitude, Longitude: 34.193032, -118.880188



Date	1/25/2021, 5:08:33 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.485	MCE_R ground motion. (for 0.2 second period)
S_1	0.535	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.485	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.99	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.564	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.621	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.485	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.624	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.535	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.59	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.564	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.914	Mapped value of the risk coefficient at short periods
C_{R1}	0.907	Mapped value of the risk coefficient at a period of 1 s

DISCLAIMER

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Appendix D

References

Appendix D
References

The following list includes the citations of references referred to in this report.

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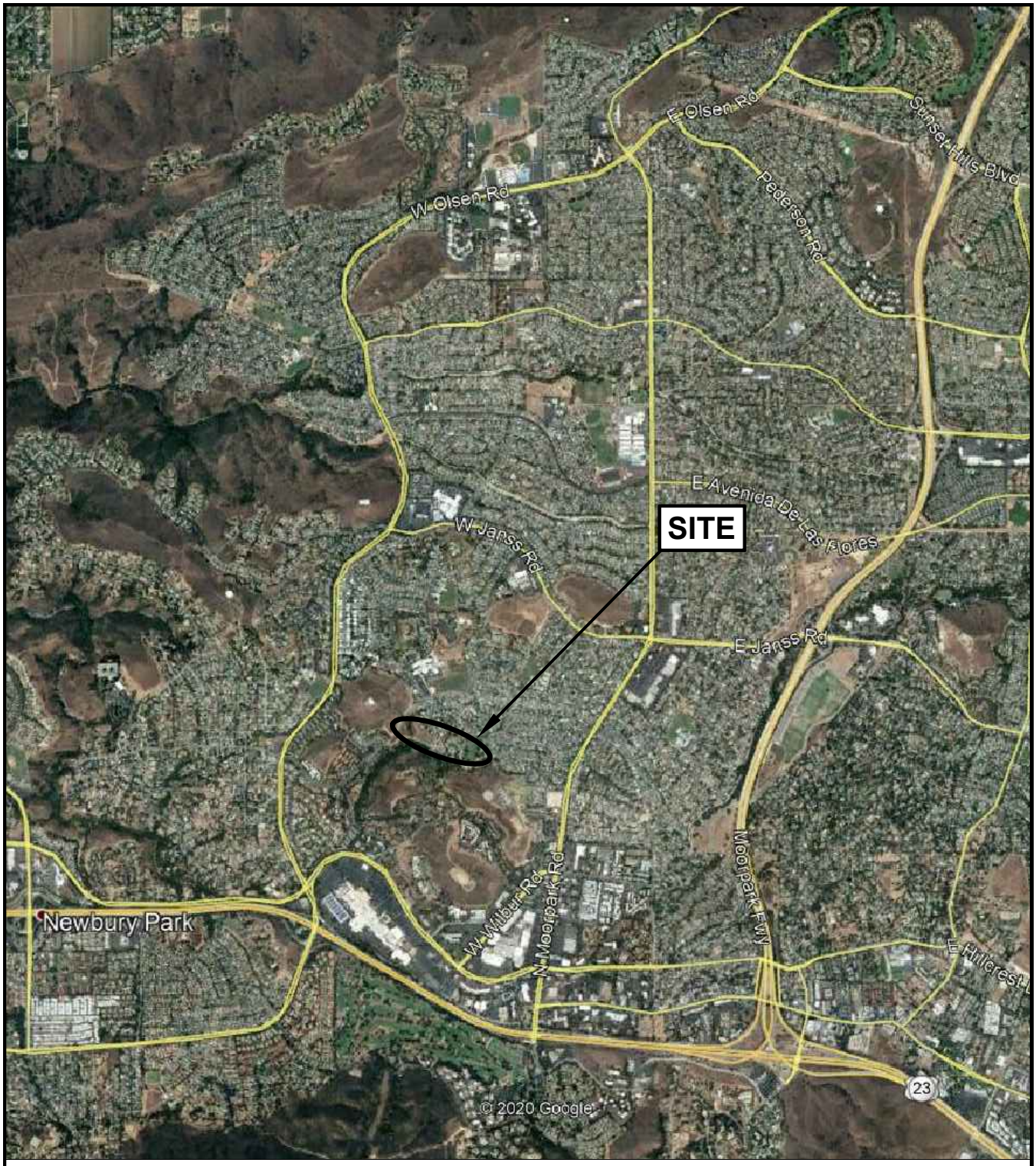
https://seismicmaps.org/

Appendix E

Report Figures and Plates



Reference: Google Earth 2021

N

No Scale

Advanced Geotechnical Services

SITE LOCATION MAP

Conejo Recreation and Park District
1175 Hendrix Avenue
Thousand Oaks, California

Client # 5100
Report # 10728

FIGURE 1

Reference: County View 2021

EXPLANATION

B-17 — APPROXIMATE LOCATION OF EXPLORATORY BORING

TP-7 — APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

P-4 — APPROXIMATE LOCATION OF PERCOLATION BORING

N

Scale: 1" = 400'

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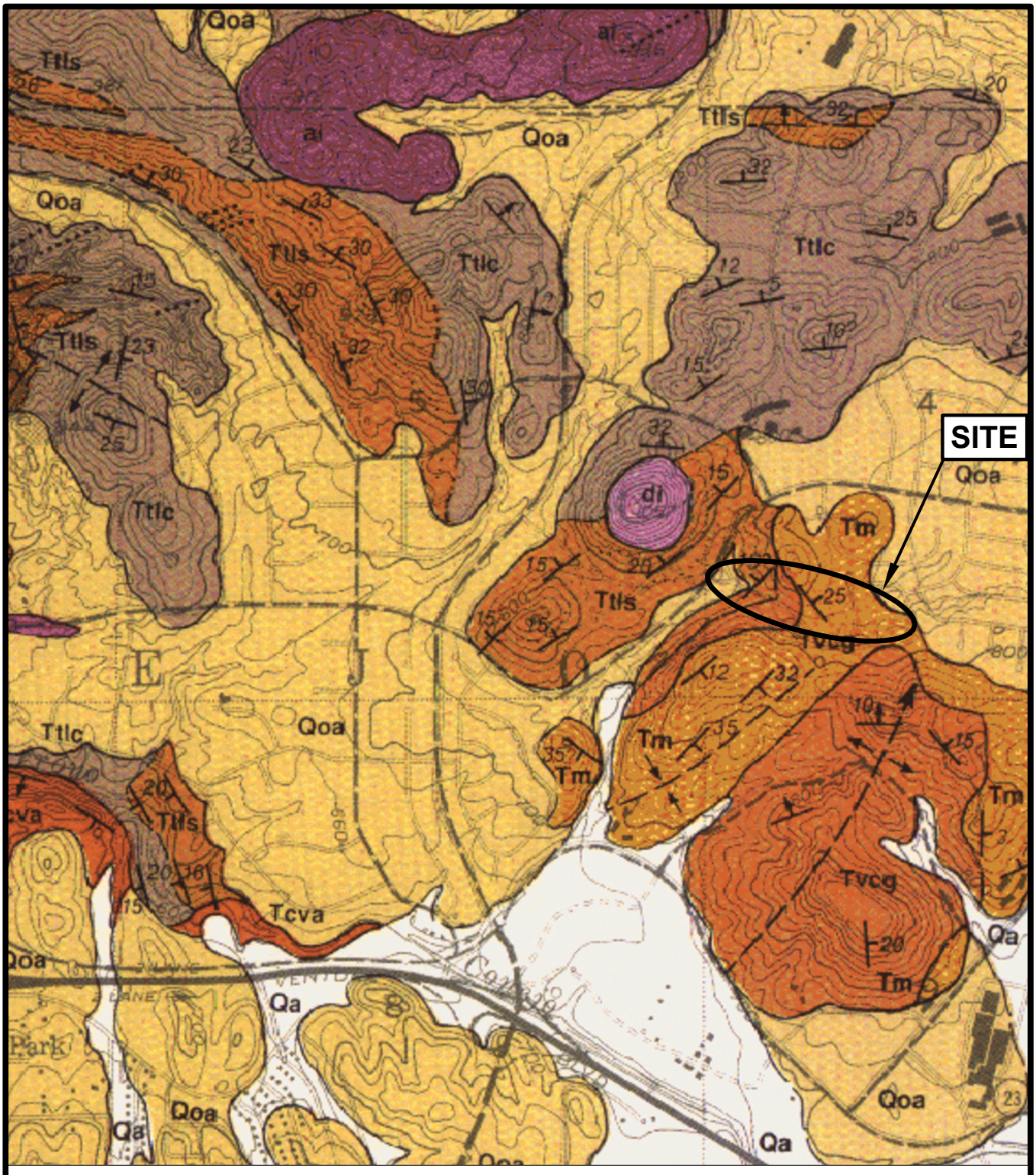
EXISTING SITE PLAN

Conejo Recreation and Park District
1175 Hendrix Avenue
Thousand Oaks, California

Client # 5100
Report # 10728

FIGURE 2



Reference: Dibblee, 1990, Geologic Map of the Camarillo and Newbury Park Quadrangles

N

Scale: 1" = $\frac{1}{4}$ mile

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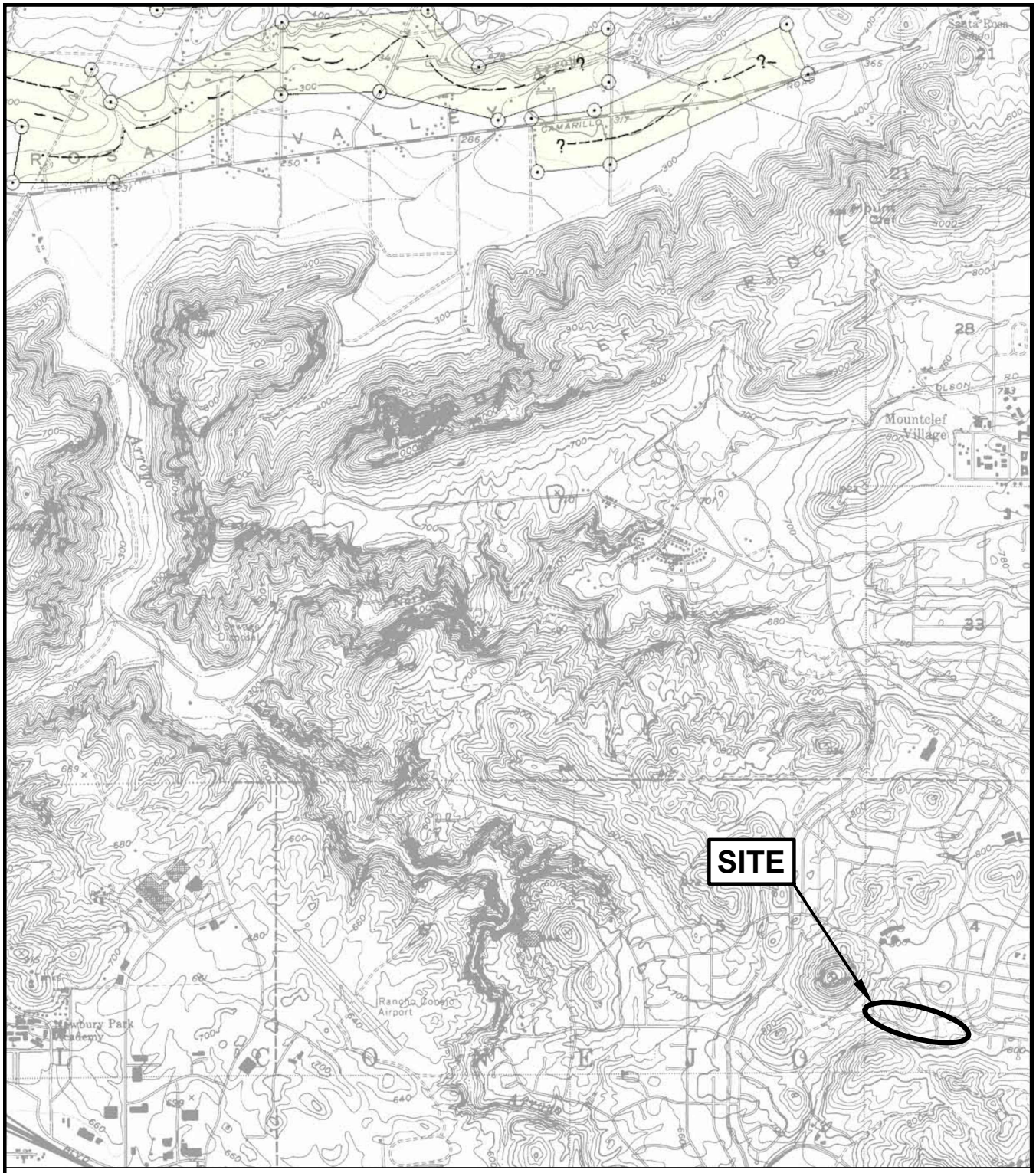
REGIONAL GEOLOGICAL MAP

Conejo Recreation and Park District
1175 Hendrix Avenue
Thousand Oaks, California

Client # 5100
Report # 10728

FIGURE 3



Reference: CDMG, 1999 - Earthquake Fault Zones, Newbury Park Quadrangle

N

Scale: 1" = $\frac{1}{2}$ mile

ags
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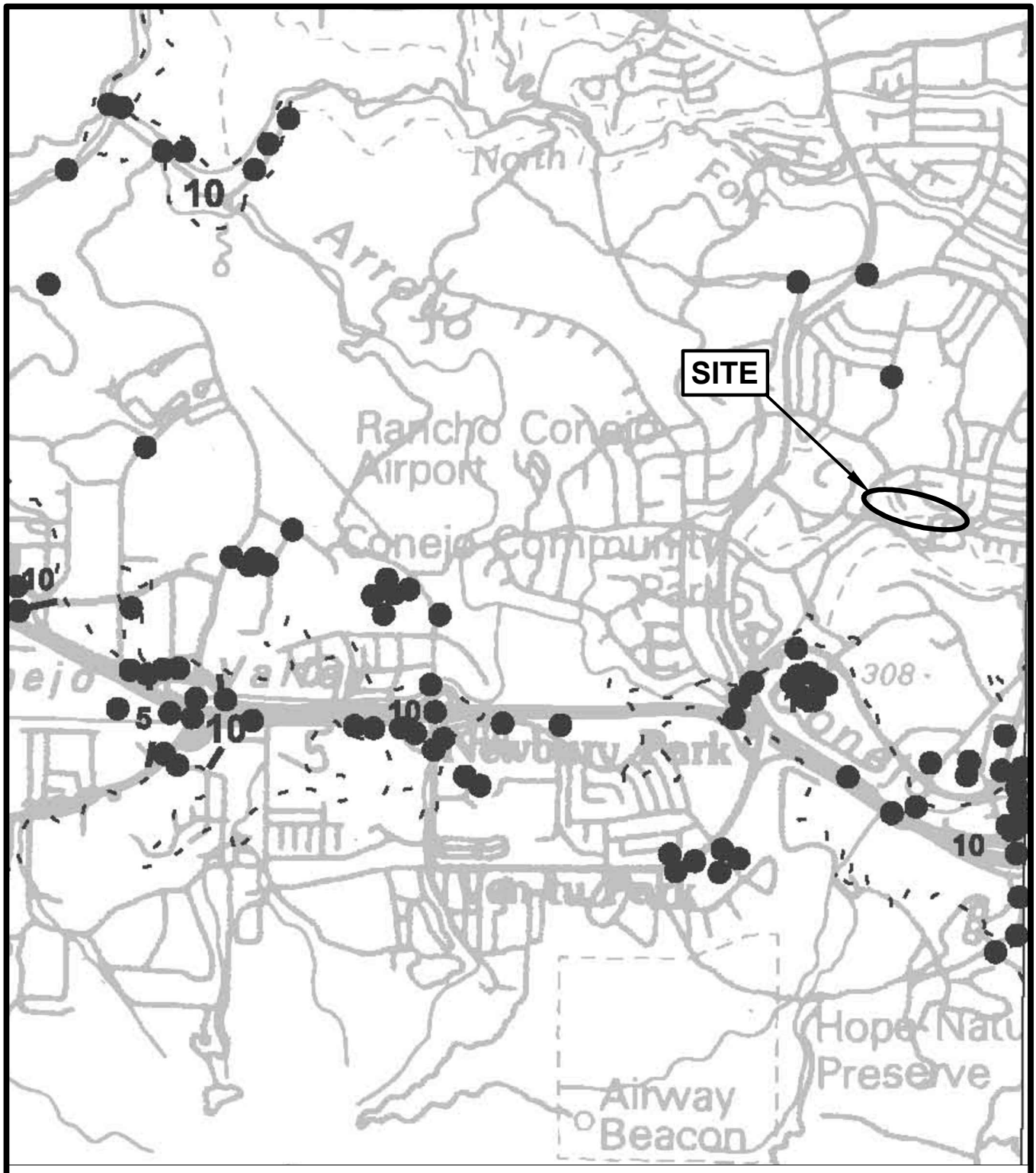
EARTHQUAKE FAULT ZONES MAP

Conejo Recreation and Park District
1175 Hendrix Avenue
Thousand Oaks, California

Client # 5100
Report # 10728

FIGURE 4



Reference: CDMG SHZR 055

N

Scale: 1" = $\frac{1}{2}$ mile

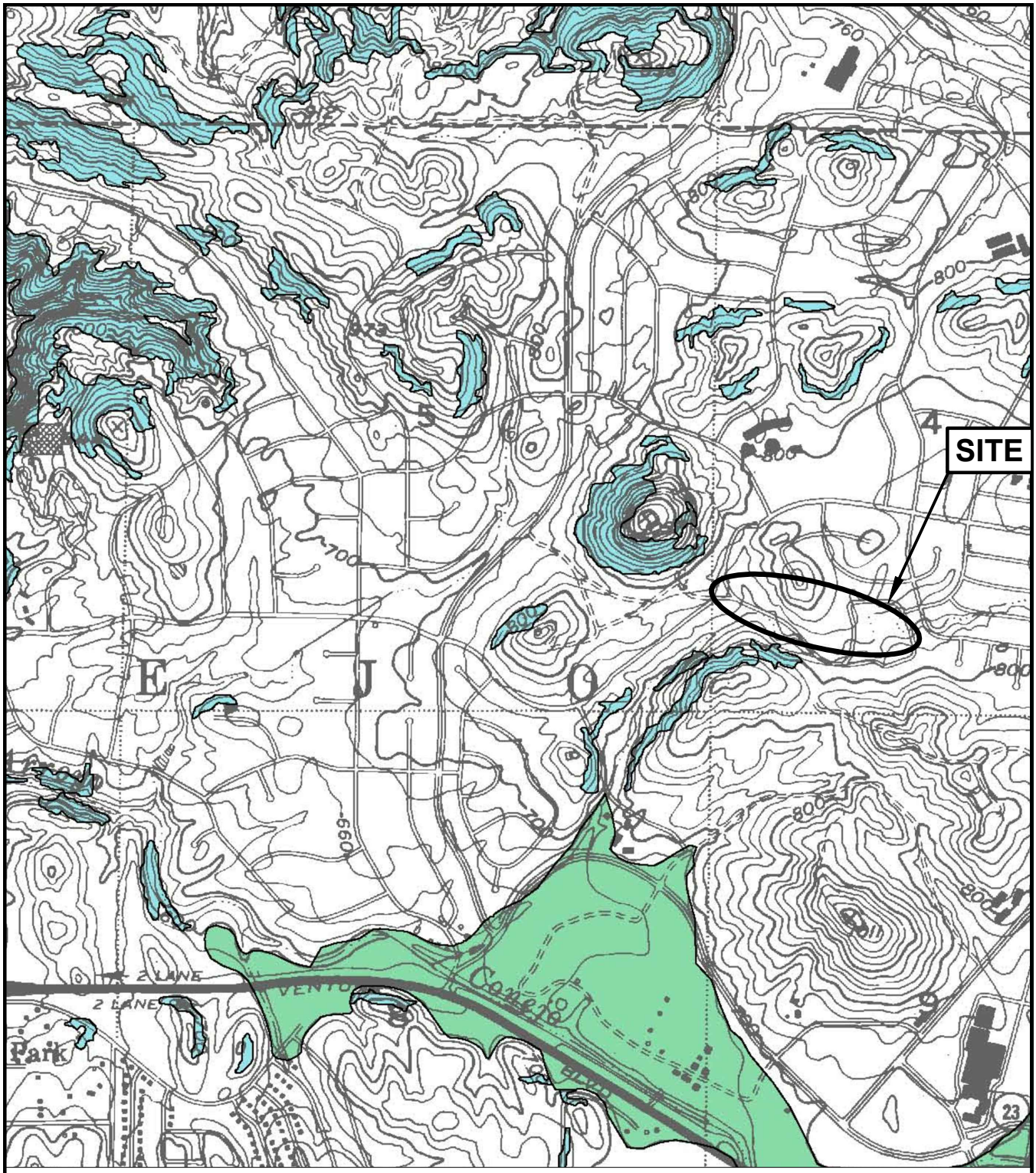
Advanced Geotechnical Services

DEPTH TO HISTORICALLY HIGH GROUNDWATER MAP

Conejo Recreation and Park District
1175 Hendrix Avenue
Thousand Oaks, California

Client # 5100
Report # 10728

FIGURE 5



Reference: CDMG, 2002 - Seismic Hazard Zones, Newbury Park Quadrangle

N

Scale: 1" = $\frac{1}{4}$ mile

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SEISMIC HAZARD ZONES MAP

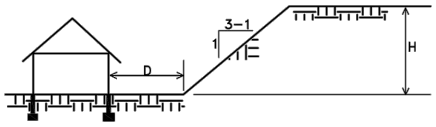
Conejo Recreation and Park District
1175 Hendrix Avenue
Thousand Oaks, California

Client # 5100
Report # 10728

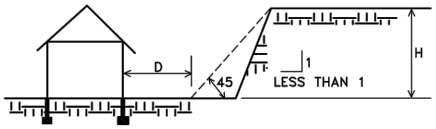
FIGURE 6

FOUNDATIONS ON OR ADJACENT TO SLOPES:

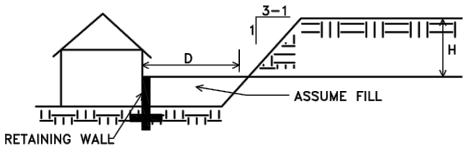
THE PLACEMENT OF BUILDING AND STRUCTURES ON OR ADJACENT TO SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL SHALL BE IN ACCORDANCE WITH THE FOLLOWING ILLUSTRATIONS. THE PROVISIONS ARE INTENDED TO PROVIDE PROTECTION FOR THE BUILDING FROM SLOPE DRAINAGE, EROSION AND MUDFLOW, LOOSE SLOPE DEBRIS, SHALLOW SLOPE FAILURES, AND FOUNDATION MOVEMENT.



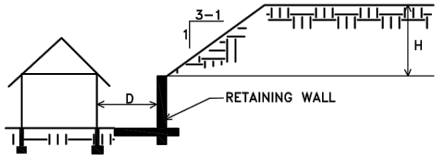
① $D=\frac{H}{2}$ D=3' MIN. D=15' MAX.



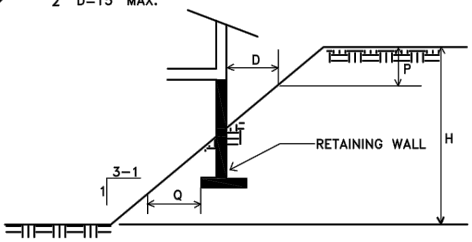
② $D=\frac{H}{2}$ D=3' MIN. D=15' MAX.



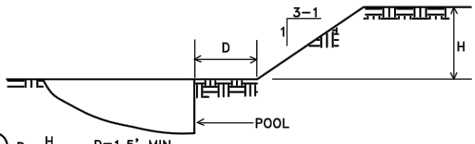
③ $D=\frac{H}{2}$ D=3' MIN. D=15' MAX.



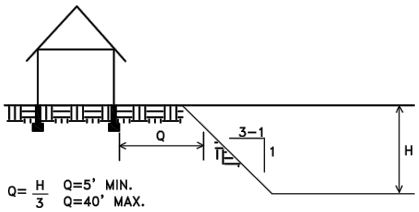
④ $D=\frac{H}{2}$ D=3' MIN. D=15' MAX.



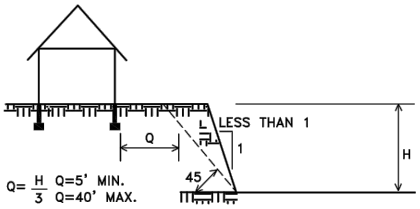
⑤ $Q=\frac{H}{3}$ Q=5' MIN. Q=40' MAX. $D=\frac{P}{2}$ D=3' MIN. D=15' MAX.



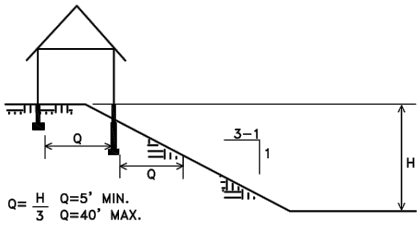
⑥ $D=\frac{H}{4}$ D=1.5' MIN. D=7.5' MAX.



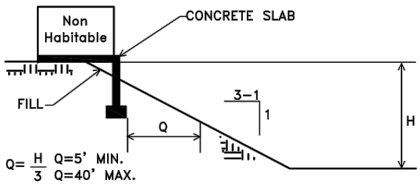
⑦ $Q=\frac{H}{3}$ Q=5' MIN. Q=40' MAX.



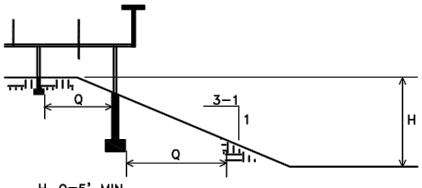
⑧ $Q=\frac{H}{3}$ Q=5' MIN. Q=40' MAX.



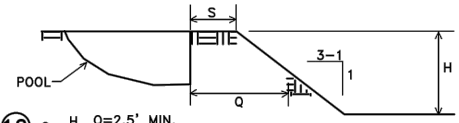
⑨ $Q=\frac{H}{3}$ Q=5' MIN. Q=40' MAX.



⑩ $Q=\frac{H}{3}$ Q=5' MIN. Q=40' MAX.



⑪ $Q=\frac{H}{3}$ Q=5' MIN. Q=40' MAX.



⑫ $Q=\frac{H}{6}$ Q=2.5' MIN. Q=20' MAX.

IF 'S' IS LESS THAN 7, THE POOL WALL SHALL BE CAPABLE OF SUPPORTING THE WATER IN THE POOL WITHOUT SUPPORT.

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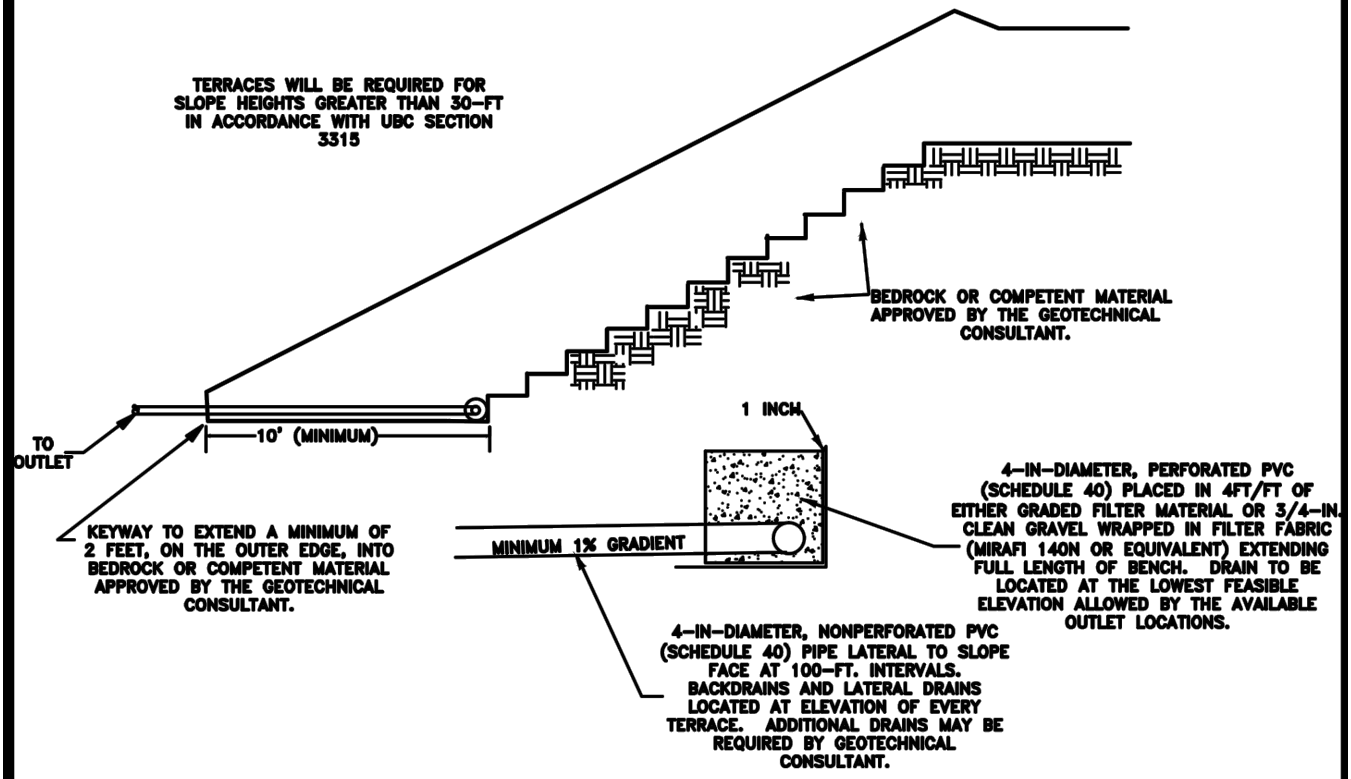
EXAMPLES OF SLOPE SETBACKS

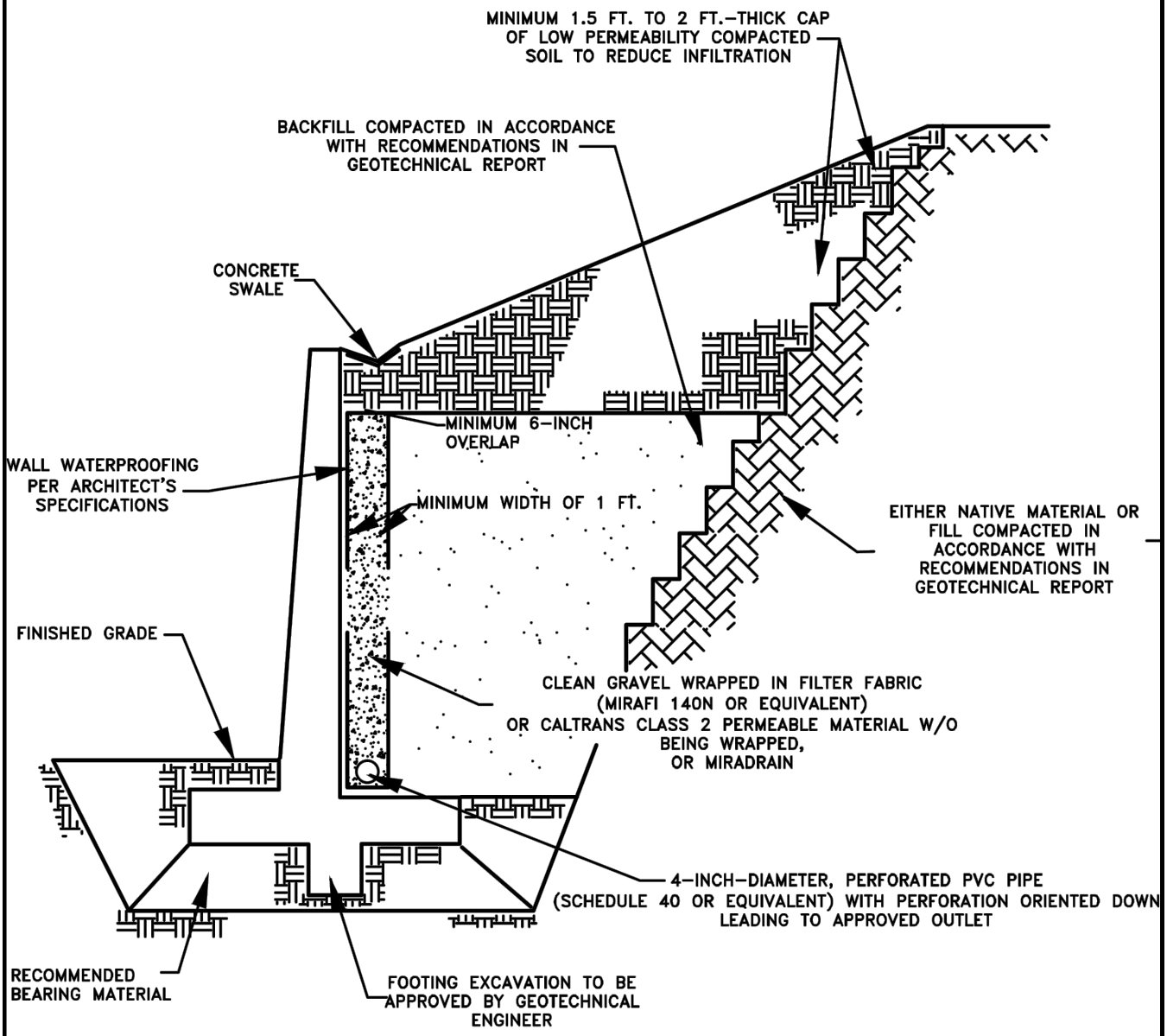
Conejo Recreation and Park District
1175 Hendrix Avenue
Thousand Oaks, California

Client # 5100
Report # 10728

FIGURE 7



Advanced Geotechnical Services	**TYPICAL KEYWAY, BENCHING, AND DRAINAGE DETAILS**	Conejo Recreation and Park District 1175 Hendrix Avenue Thousand Oaks, California	
		Client # 5100 Report # 10728	FIGURE 8



ags Advanced Geotechnical Services	**TYPICAL RETAINING WALL DRAINAGE DETAIL**	Conejo Recreation and Park District 1175 Hendrix Avenue Thousand Oaks, California	
		Client # 5100 Report # 10728	FIGURE 9

CONEJO COMMUNITY PARK

SCHEMATIC PLAN - L1.0 - MAIN PARK

0 50 100 200 300

NORTH

EXPLANATION

B-17 APPROXIMATE LOCATION OF EXPLORATORY BORING

TP-7 APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

P-4 APPROXIMATE LOCATION OF PERCOLATION BORING

50' 0' 50' 100'

SCALE: 1" = 50'

Advanced Geotechnical Services
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CONEJO RECREATION AND PARK DISTRICT

Geotechnical Engineering Study
Proposed Conejo Community Center and Public Park Improvements
1175 Hendrix Avenue
Thousand Oaks, California

Client No.	5100	PLATE
Report No.	10728	1
Date	1/28/2021	
Drawing No.	10728cn5100	

CONEJO COMMUNITY PARK

L5.0 - TARANTULA HILL TRAIL

0 60 120 240 360

NORTH

EXPLANATION

B-17 APPROXIMATE LOCATION OF EXPLORATORY BORING

TP-7 APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

P-4 APPROXIMATE LOCATION OF PERCOLATION BORING

60' 0' 60' 120'

SCALE: 1" = 60'

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CONEJO RECREATION AND PARK DISTRICT

Geotechnical Engineering Study
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PLATE 2