STONEY-MILLER CONSULTANTS, INC
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

FEASIBILITY GEOTECHNICAL INVESTIGATION
24600 La Plata Drive
Laguna Niguel, California

Prepared for:

Griffin Living LLC
24005 Ventura Boulevard
Calabasas , CA 91302

Prepared by:

Stoney-Miller Consultants, Inc.
14 Hughes, Suite B-101
Irvine, California 92618

Project No: 14283-00
Report No: 21-14594

April 8, 2021

STONEY-MILLER CONSULTANTS, INC
GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

April 8, 2021

Griffin Living LLC
24005 Ventura Boulevard
Calabasas, CA 91302

Project No.: 14283-00
Report No.: 21-14594

Attention: Mr. Richard Niec

Subject: Feasibility Geotechnical Evaluation of Southern Portion of Property
Proposed Grace Church Assisted Living and Memory Care Facility
Adjacent 24600 La Plata Drive
Laguna Niguel, California

References: See Appendix A

INTRODUCTION

Griffin Living, LLC (GL) is exploring the feasibility of developing the southwestern portion of the Laguna Niguel Grace Church Site (and former Grace Classical Academy Site) for development of a Senior Assisted Living and Memory Care Facility (ALMCF). The total site is approximately 5.35 total acres, located at 26400 La Plata Drive (APN: 653-012-12) located in the City of Laguna Niguel, County of Orange, California. Griffin Living specifically intends to develop approximately 3.3 acres of the property and the Grace Church building will remain in its' current location on approximately 2.0 acres.

The overall project site will remain the home of the Grace Church, whereas the existing Christian Education Building will be removed to make room for the new Grace ALMCF. The Grace Church will be expanded and remain on 2.0-acres of the existing parcel. The Grace ALCMF and driveway and parking areas will then be developed on the remaining 3.35 acres of the property. The Grace ALCMF development is to include a new 108,000 square foot building plus a 30,000 square foot basement garage, a first floor footprint of 40,000 square feet, second floor footprint of 38,000 square feet, a new access drive off of Crown Valley Parkway; and adjacent parking areas.

The purpose of this Feasibility Geotechnical Assessment scope of work is to provide Griffith Living with a preliminary geotechnical feasibility review of the subject property for development of the planned Grace ALMCF. <u>Based on this study, the planned development is considered to be feasible from a geotechnical standpoint.</u>

Scope of Investigation

The scope of our services included:

1. Review and compilation of pertinent published regional geologic/topographic maps and reports, site-specific and regional geotechnical data and reports, and stereo-paired vertical and oblique aerial photographs of the area, refer to Appendix A.
2. Compilation of our previous exploration data, supplemented with the drilling, sampling, and down-hole logging of five large-diameter exploratory borings, refer to Appendix B. Samples obtained from the drilling were transferred to the laboratory and utilized in the testing program.
3. Onsite testing at three locations for water infiltration rates in accordance with the "Technical Guidance Document (TGD) for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans in South Orange County," Appendix D, Guidelines for Infiltration Evaluation, Version 1.1, dated December 21, 2018. We followed procedure D.2.2 Simple Open Pit Infiltration Test in the TGD.
4. Review of previous laboratory test results from adjacent projects, supplemented with the testing of the additional representative samples to determine in-situ moisture and density, shear strength, Atterberg limits, corrosion properties, particle size analysis, shear strength, and compression properties, refer to Appendix C.
5. Preparation of our geologic map and cross section with current site topography, including the upslope and downslope areas and adjacent terrain, refer to Plates 1 to 2.
6. Geotechnical engineering analysis to evaluate gross stability of the proposed building pad area and to provide recommendations for remedial grading and construction.
7. Review of CEQA Guidelines, refer to Appendix H.
8. Preparation of this report and its illustrations.

Accompanying Illustrations and Appendices

Figure 1	-	USGS Geologic Location Map
Figure 2	-	CGS Seismic Hazard Map
Figure 3	-	Retaining Wall Subdrain Detail
Figure 4	-	Subdrain Detail at Shoring
Figure 5	-	Subdrain Below Slab
Plate 1	-	Geologic Map
Plate 2	-	Geotechnical Cross-Section A-A’
Appendix A	-	References
Figure A-1	-	Conceptual Site Plan
Appendix B	-	Boring Logs
Appendix C	-	Field and Laboratory Test Data
Appendix D	-	Slope Stability Analyses
Appendix E	-	Standard Grading Guidelines
Appendix F	-	Utility Trench Backfill Guidelines
Appendix G	-	Historical Documents
Appendix H	-	CEQA Guidelines – Geology and Soils

Site Description and Development History

The Grace Church site is located at 24600 La Plata Drive south of the intersection of Crown Valley Parkway and La Plata Drive in the City of Laguna Niguel, California as shown in Plate 1. The total site is approximately 5.35 total acres. The property is currently developed with the existing Grace Church, an existing school facility, and a large open area to the south for school and sports activities. The site is bounded by La Plata Drive and an existing commercial pre-school facility on the north-northeast; an ascending slope, Via Valverde and residential housing on the southeast; an ascending slope supporting residential development on the south-southwest; and crown Valley Parkway on the west. Ascending slope heights on the east and south sides range from about 10 to 50 feet with maximum slope ratios of 2 to 1 (horizontal to vertical). Descending slope heights on the west and north sides range from about 10 to 50 feet at slope ratios of 2 to 1 (horizontal to vertical) or flatter.

The property has been developed in three phases spanning from 1973 to 2013. The first phase of historical development (circa 1973) supports the existing church building and parking areas as shown in Figure G-1 (Appendix G). This work was observed and tested by Geolabs (References 17 through 26). The church pad and main parking lot are located off La Plata Drive and an ancillary lower parking area was created nearer to Crown Valley Parkway. Finish pad grades ranged from Elevation 284 feet above mean sea level (amsl) on the church pad to Elevation 262 on lower ancillary parking area. This first phase of development left the southern portion of the site as open space terrain sloping down from south to north with natural grades ranging from 330 to 250 feet amsl. The first phase of grading was performed to the standards of the time in 1973, which includes using a lower compaction standard for fill placement. The grading notes indicate that the church building pad was overexcavated approximately 3 feet due to a cut-fill transition in the building pad.

The second phase of historical development (circa 1987) was performed in conjunction with the grading and development of Tract 13306 located south and east of the church property. This work was observed and tested by Leighton and Associates (References 27 through 30). The grading performed at that time resulted in the pad and slope grades that generally exist today on the southern portion of the property. This grading was generally conducted using grading practices and standards comparable to current practice. Slopes were generally constructed at a slope ratio of 2 to 1 (horizontal to vertical). A shear key was constructed starting 10 feet off the street right-of-way along Crown Valley Parkway and excavating down at a 45 degree angle to expose competent bedrock materials. The lowest density test indicates the base of the shear key is located at about elevation 225 feet amsl. With a southern pad elevation of about 290 feet amsl the maximum total depth of fill placed on the southern church property is estimated to be about 65 feet. Slopes created on the east and south flank of the church property are shown as stabilized fill over cut slopes. The slope that ascends from crown Valley Parkways is a fill slope.

The third phase of historical development (circa 2013) is shown in Figure G-3. This work was generally limited to construction of modular classrooms and restrooms. It is expected that only limited over- excavation and recompaction of the existing fill soil material was performed to prepare the building units for construction. No historic reports were found or reviewed for this work.

Subsurface Exploration Program

Geotechnical

Our subsurface investigation was conducted during January 12 through January 14, 2021 and consisted of the drilling of five 30-inch diameter bucket-auger borings (LB-1 through LB-5), at the approximate location shown on Plate 1. The depth of exploration ranged from 10.3 to 86 feet below existing grade. Bucket-auger borings LB-4 and LB-5 were down-hole logged by engineering geologists with our office. The logs of our observations are presented in the Excavation Logs, Appendix B. The approximate locations of the borings are depicted on Plate 1. Soil and rock samples obtained from the drilling were transported to the laboratory for testing.

Infiltration Testing

Borings LB-1 through LB-3 were used to perform an onsite study of infiltration. Infiltration testing of the site material was performed to evaluate the feasibility of onsite infiltration of stormwater. Three site locations are to be assessed herein using three 30-inch diameter to depth between 10 and 20 feet deep holes. Our work was performed in accordance with the "Technical Guidance Document (TGD) for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans in south Orange County," Appendix D, Guidelines for Infiltration Evaluation, Version 1.1, dated December 21, 2018. We followed procedure D.2.2 Simple Open Pit Infiltration Test in the TGD. The results of this testing showed that water never dropped more than 0.01 inches during the study.

Laboratory Testing Program

Laboratory testing was conducted on samples collected during the drilling of the borings. The testing of representative ring and bulk samples included in-situ moisture and density determinations, soil and rock strength properties through direct shear testing, classification testing with Atterberg limits determinations and particle size analysis, corrosion testing, and compression testing of the in-place fill soils. The results of this program and the previous laboratory results are presented in Laboratory Test Results, Appendix C.

Geotechnical laboratory information from previous investigations in the area, including offsite data from the Laguna Summit development (Reference 31) and from Tract 13306 by Leighton Associates for the adjoining tract (References 27 through 30), were reviewed for this study. A site map for Tract 13306 and a summary of Expansion Index test results are provided as Figures G-6 through G-8 (Appendix G).

GEOTECHNICAL CONDITIONS

Landslide Screening

The seismic hazard map in Figure 2 indicates that the site is located in a zone of required investigation for landsliding. Landslides have occurred in the Sulphur Creek area in the geologic and historic past. Commonly these have been limited to surficial failures, but ancient, deep-seated landslides that were likely associated with the climate and topography of the last glaciation are also identified in geologic reports published by the State of California. Based on the Leighton investigation near the southern boundary, Leighton and Associates indicated the presence of landsliding, but their mapping (see Figure G-4) indicates the landsliding was shallow and of limited extent. The as-graded Cross Section F-F' in the area (see Figure G-5) indicates an absence of landsliding and the presence of relatively horizontal Capistrano formation bedrock materials. Our exploration was consistent with Leighton and Associates, and found the property to be underlain with intact Capistrano formation bedrock materials.

Earth Materials

Our interpretation of earth materials on the project site are shown in Plates 1 and 2.

The site and vicinity are underlain at depth by bedrock strata assigned on the basis of regional geologic mapping to the Plio-Pleistocene age Capistrano Formation. Where weathered, the bedrock consists of light brown to dark grey-brown siltstone and silty claystone, with interbedded gray brown fine sandstone. These materials become very dark gray to black where unoxidized at depths of over 30 to 50 feet below grade. Leighton and Associates (Reference 28) indicates:

"The general structure of the Capistrano formation onsite appears to be generally dipping in a southeasterly direction at inclinations of 2 to 4 degrees. However, some minor undulations were measured in areas during our field mapping. The Capistrano formation siltstone was observed to be generally massive with few, if any, bedding planes. Our determination of the general onsite structure was based on field mapping of several sandstone beds and clay seams which have been utilized as marker beds."

Engineered fill deposits occur throughout the southern pad area and are relatively shallow on the east side of the southern pad and then increase up to 65 feet on the west side of the pad area. The engineered fill generally consists of silty clay and clayey silt material generated from the local bedrock materials excavated during previous site grading. Overall the fill materials are firm to stiff, and fully-wetted (i.e., saturations of 80 percent or more), with an estimated maximum thickness of 65 feet along the top of slope paralleling Crown Valley Parkway. This excepts the upper five to ten feet of the engineered fill soil which is drier than fill materials below a depth of 10 feet.

Leighton and Associates mapped shallow alluvial materials to exist along the toe of slope which borders Crown Valley Parkway. These materials are anticipated to consists of materials from the local bedrock materials, but with local lenses of silty sand and sand (Reference 27).

Residual soil, colluvium, and/or slopewash are the natural weathering products of the near surface rock. This material consists of organic-rich silt and clay in varying proportions which mantle the upper portions of the bedrock encountered in the existing parking area above the commercial learning center facility. The thickness of these soils varies from several inches to a foot in Boring LB-2.

Geologic Structure

Based on our down-hole logging, we concur with Leighton and Associates work during grading of the adjacent tract which showed the Capistrano formation siltstone was generally massive with few, if any, bedding planes. Further, we will adopt the bedrock structure to be generally dipping in a southeasterly direction at inclinations of 2 to 4 degrees, with some minor undulations. The bedrock structure for purposes of slope stability will be modelled as dipping into or out of slope at 5 degrees.

Groundwater

We observed no groundwater in our borings while drilling. Leighton and Associates conclusions during grading of the adjacent tract were as follows: "Minor groundwater was observed in temporary excavations made during rough grading of the subject lots and streets. Minor to moderate seepage was encountered in the existing fill and alluvium in the frontcut along Crown Valley Parkway, and minor seepage was observed widely-scattered places along sandstone beds encountered onsite. Subdrains were installed in areas of prominent seepage and in buttress areas as recommended in the project soil report…. In our opinion, groundwater will not be a constraint to site development as currently planned."

We concur that groundwater will not be a constraint for the planned development provided drainage facilities including subdrains and backdrains are installed and outlet as recommended.

Seismic Considerations

Published Studies

One of the principals of seismic analyses and prediction is the premise that earthquakes are more likely to occur on geologically younger faults, and less likely to occur on older faults. For many years studies have described faults with Holocene movement (within the last 11,000 years) as "Active", and faults with documented Pleistocene movement (within the last 1.6 million years) and with undetermined Holocene movement as "Potentially Active". Informally, many studies have described faults documented to have no Holocene movement as "Inactive". Recent geologic and seismic publications are attempting to clarify the nomenclature describing faults to more accurately represent the potential affects from earthquakes.

Reports by the California Division of Mines and Geology indicate faults with documented Holocene or Historic (within the last 200 years) movement should be considered Active. However, Potentially Active faults are more appropriately characterized in terms of the last period of documented movement. The Fault Activity Map of California (Jennings, C.W.; 1994) defines four categories for onshore Potentially Active faults. The categories are associated with the time of the last displacement evidenced on a given fault and are summarized in Table 1.

Table 1, Definitions of Fault Activity in California

Activity	Category	Recency of Movement
Active	Historic	Within the last 200 years
	Holocene	Within the last 11,000 years
Potentially Active	Late Quaternary	Within the last 700,000 years
	Quaternary	Within the last 1.6 million years
	Late Cenozoic	Possibly within the last 1.6 million years
	Pre-Quaternary	Before the last 1.6 million years

It is important to note these categories embrace all Pre-Holocene faults as Potentially Active, and provide no methodology to designate a given fault as “Inactive”. Although the likelihood of an earthquake or movement to occur on a given fault significantly decreases with inactivity over geologic time, the potential for such events to occur on any fault cannot be completely eliminated within the current level of understanding.

Local and Regional Faults

The closest published active fault to the site is the San Joaquin Hills blind thrust fault, approximately 3.6 miles from the site (Blake, T.F., 2000, CDMG/2004). Other active faults in the vicinity of the site include the offshore extension of the Newport-Inglewood Fault Zone, approximately 5.1 miles west, the Palos Verdes Fault, approximately 20.4 miles to the northwest, the Coronado Bank Fault, approximately 21.2 miles to the south, and the San Andreas Fault, approximately 51.2 miles to the northeast.

The California Geological Survey updated the Fault Parameters and Earthquake Catalog for the probabilistic Seismic Hazards Maps, (Cao, T., et. al., 2002). This update included the addition of the “San Joaquin Hills” blind thrust fault, located from Newport Beach to Dana Point, and ramping up inland to the Irvine area, essentially underlying the site. Earthquakes of significant magnitude (M7.1 to M7.5) are presently postulated for this fault. Under such conditions this blind thrust fault is calculated as the most significant seismic source to affect this site.

The Newport-Inglewood Fault zone is indicated in published reports as being a Potentially Active and Quaternary fault, (Jennings, C.W.; 1994). This interpretation is not universally shared, as portions of the Newport-Inglewood Fault are included as a potential seismic source in the computer programs utilized to model ground motions for this study, (Blake, T.F.; 2000). Earthquakes of significant magnitude (M7.1 to M7.4) are presently postulated for this fault. With the fault’s location approximately 5.1 miles to the west and given the present level of understanding of this structure it is, in our opinion, appropriate to include this portion of the fault as a causative seismic feature.

Ground Motion Analyses

The potential ground motions from earthquakes that could impact the sites were analyzed through probabilistic methods. The probabilistic method considers the regional seismic history and the slip rates of faults within a 100-mile radius of the subject site. Utilizing attenuation relationships (Bozorgnia, et al.; 1999, unconstrained/pleist. soil), one can estimate the ground motion history of the site and attempt to predict the probability of future accelerations within a given period of time. The study indicates the maximum site acceleration from 1800 to 2004 was approximately 0.13g and occurred during a magnitude 6.3 Long Beach Earthquake 16.1 miles from the site on March 11, 1933. This earthquake is believed to have occurred on the Newport-Inglewood fault. For the purposes of prediction, the peak accelerations with a 10 percent probability of exceedance in 50 years were determined to range from 0.35 to 0.40g.

It is noted that the estimation of peak ground accelerations presented above is provided for the interest of the client and is required by local (City or County) review agencies. The values derived are not directly utilized in structural design of residential structures. Seismic parameters for use by the structural engineer in accordance with 2019 California Building Code in design of the proposed structure(s) are presented in the recommendations portion of this report.

Secondary Seismic Hazards

Review of the Seismic Hazards Zones Map (CDMG, 1998) for the San Juan Capistrano Quadrangle, Figure 2, indicates the site is not located within an Alquist-Priolo Fault Zone or a “zone of required investigation” for liquefaction, but is located in a zone of investigation for earthquake induced landslides. Our review of the Leighton reports (References 27 and 28) and our subsurface drilling and downhole logging, indicates no landslides are present beneath or immediately adjacent the site.

Other secondary seismic hazards can include deep rupture, shallow ground cracking, and settlement. With the absence of active faulting daylighting on the site, the potential for deep fault rupture is not present. The San Joaquin Hills fault, although located below the site, occurs at a low angle above horizontal with no fault break daylighting at the current ground surface; a fault break onsite is considered to have no to remote possibility. The potential for shallow ground cracking to occur during an earthquake is a possibility at any site, but does not pose a significant hazard to site development. Given the structure will be underlain by competent fine-grained fill and bedrock deposits, the potential for seismically induced settlement to occur is considered remote for the site.

ENGINEERING ANALYSES

Strength Properties

Strength parameters utilized for the stability analyses were based upon results of shear testing of onsite samples, correlations with liquid limit and clay fraction, review of testing for nearby projects, as well as local experience in similar soils and engineering judgment. Strength parameters currently utilized are considered reasonable and within an appropriate range for the materials encountered.

Engineering Stability Analysis

Engineering stability analyses were performed to assess gross stability of the site for static and seismic conditions. Analyses were performed on the geometries depicted on Cross Sections A-A’ using computer program (SLIDE2) which is based upon the limit equilibrium method.

The calculated factors-of-safety against failure for the existing building pad conditions and for possible seismic loading are presented in Appendix D, and exceed the minimum code requirements of 1.5 for static conditions or 1.1 under seismic loading. The building pad area will require structural stabilization to achieve the required factors of safety, as generally depicted on the cross sections and described in the recommendations. The building area will possess adequate engineering factors of safety in accordance with the City of Laguna Niguel provided the remedial grading and construction recommendations are implemented.

CONCLUSIONS

1. The proposed development is considered feasible and suitable for its intended use from a geotechnical viewpoint provided the recommendations of this and subsequent design reports are followed during design, construction, and long-term maintenance of the subject property. Proposed development should not adversely affect adjacent properties, provided appropriate engineering design, construction methods, and care are utilized during construction. We have reviewed the CEQA guidelines for Geology and Soils and find such issues are all less than significant with mitigation or better (see Appendix H).

2. The site is not in an Alquist-Priolo Fault Zone or in a “zone of required investigation” for seismic hazard from liquefaction, but is in a “zone of required investigation” for seismic hazards from landsliding. Our review of the Leighton reports (References 27 and 28) and our subsurface drilling and downhole logging, indicates no landslides are present beneath or immediately adjacent the site. The site has a low and limited potential for ground settlement (less than 1/2-inch) due to seismic ground motion. Seismic design of structures should be in accord with the California Building Code.

3. Engineered compacted fill soils should exhibit reasonable foundation support characteristics after grading is accomplished. Conventional spread and continuous foundations are suitable for support of the planned two-story over podium/garage structure. Additional subsurface investigation should be performed prior to final structural design to assess the consistency and depth variation of the existing engineered fill soil deposits, and their impact on grading and foundation design.

4. Groundwater was not encountered below the site during our subsurface exploration to a depth of 86 feet and is not considered to be a design or construction constraint.

5. Onsite materials have a medium to high expansion potential, severe soluble sulfate concentrations with respect to concrete deterioration, and a severe potential for corrosion of buried metal based upon laboratory testing (see Appendix C). Implementation of recommendations for site grading, foundation embedment, and construction materials will mitigate the impact of these issues on the planned construction.

6. Onsite infiltration testing indicates that the onsite bedrock and engineered fill soil is not suitable for stormwater infiltration due to the fine-grained and plastic nature of the local silt and clay materials. Stormwater infiltration into coarse-grained sand and gravel material planned below pavement areas will be suitable provided infiltration waters are collected and drained away from the influence of descending slopes and property.

7. With proper slope laybacks and design and construction of shoring and retaining walls, the planned excavation should not cause unusual settlement or stability of temporary excavations.

8. Adverse surface discharge onto or off the site is not anticipated provided proper engineering design and site grading are implemented.

9. Vibration monitoring of peak particle velocities during the demolition, drilling and excavation is recommended.

RECOMMENDATIONS

Site Preparation and Grading

1. General

Grading of the site should be performed in accordance with the Standard Grading Specifications of Appendix E. All excavations should be supervised and approved in writing by a representative of this firm. Grading is anticipated to primarily consist of the excavation and export of onsite soils to achieve proposed pad grades for the subterranean parking garage. Excavations adjacent to the property boundaries may require temporary perimeter slopes to facilitate site excavations will need to be slope at 1:1 (horizontal: vertical) or flatter, or shoring will be needed to provide stability. Over-excavation and re-compaction of the site soils should extend at least 5 feet below proposed footings and 5 feet below existing or finished grade (whichever is deeper) over the remainder of the site. The compacted fill layer should extend a minimum distance of five feet horizontal beyond footing lines where possible. The base of the over-excavation may be scarified, moisture-conditioned to above optimum moisture content, and compacted in-place to that required in the Compaction Standard section.

The impact of deformation of temporary excavation slopes on adjoining property should be considered when setting excavation limits. The condition of existing structures located along the site perimeter should be evaluated and documented prior to the start of grading. Due caution should be exercised by the grading contractor to avoid impacting existing structures during removal and re-compaction operations.

2. <u>Removal of Existing Improvements</u>

All deleterious materials, including organic materials and trash, should be removed and disposed of offsite. Site clearing prior to grading will involve removal and possibly recycling of the onsite concrete and asphalt concrete materials. The building concrete slab and footings, if not removed during demolition of existing improvements, will also generate some material that will need to be disposed of or properly incorporated into the fill soils. Crushed asphalt concrete and concrete may be suitable for use in pavement or flatwork areas provided the particles are reduced to 3-inch maximum size or less.

3. <u>Compaction Standard</u>

Onsite soil materials are anticipated to be suitable for use as compacted fill. All materials should be placed at 110 percent or more of optimum moisture content and compacted under the observation and testing of the soil engineer. The recommended minimum density for compacted material is 90 and 95 percent of the maximum dry density as determined by ASTM D 1557 for fine-grained and coarse-grained materials, respectively.

4. <u>Temporary Construction Slopes</u>

Temporary slopes exposing onsite materials should be excavated in accordance with Cal/OSHA Regulations. It is anticipated that the exposed onsite earth materials may be classified as Type C soil. The material exposed in temporary excavations should be evaluated by the contractor during construction. Shoring should be anticipated.

The safety of temporary construction slopes is deferred to the general contractor, who should implement the safety practices as defined in Section 1541, Subchapter 4, of Cal/OSHA T8 Regulations (2006).

5. Shoring

The current plans (see Figure A-1) indicate only limited shoring may be needed for support near the southern site boundary. It is anticipated that shoring may be integrated into permanent retaining wall construction. Shoring should consider topographic and structural surcharges of the adjacent properties.

Final selection of an appropriate system must include consideration of the subsurface materials, plus potential effects of vibrations, caving, deflections, and footing area disturbance on the neighboring structures. Shoring should not be removed following construction as it will create void spaces and possible ground settlement. However, it should be recognized that vibrations induced by shoring installation alone may be sufficient to cause distress to nearby improvements. Vibration monitoring is recommended.

Temporary cantilever shoring may be designed using an equivalent fluid density of 30 and 45 pounds per cubic feet for level and 2 to 1 ascending slopes, respectively. Possible caissons utilized for shoring should be at least twenty-four-inch diameter. Lateral resistance may be computed utilizing 250 pounds per square foot per foot of depth, acting on a tributary area of twice the caisson diameter. Lagging should be designed for a uniform pressure of 200 psf.

Shoring and retaining walls should be designed for lateral loads due to adjacent surcharge loads. Typical parking surcharge pressure may be determined using a constant lateral pressure of 1/3 and ½ of the vertical surcharge pressure for active and restrained wall conditions. Lateral pressures for specific design conditions can be provided upon request.

Structural Design of Conventional Foundations and Slabs

We understand that a multi-story wood-frame building and concrete podium structure will be constructed at the site. We assume the maximum structural loads as follows: 300 kips (column loads) and 8 kips/foot (wall loads). These assumptions form the basis for the conclusions and recommendations presented below. If the assumptions mentioned above are not in accordance with the final structural design, our office should be notified.

Earth materials exposed at finish grades exhibit a medium to high expansion potential. We recommend that foundation and slabs be designed to resist the effects of expansive soils in accordance with Section 1808.6 of the 2019 California Building Code, utilizing a conventional foundation system. Foundations and slabs should be designed for the intended use and loading by the Structural Engineer. The design should consider the expansion potential of the subgrade soils and other appropriate soil related criteria.

Our recommendations are considered to be generally consistent with the standards of practice. They are based on both analytical methods and empirical methods derived from experience with similar geotechnical conditions. These recommendations are considered the minimum necessary for the likely soil conditions and are not intended to supersede the design of the Structural Engineer or criteria of governing agencies.

Although there is no known economical method of <u>totally</u> preventing movement due to expansive soils, current state-of-the-practice in the Southern California area dictates substantial reinforcement, slab thickening, moisture barriers, and pre-soaking of subgrade soils as methods of minimizing the effects of expansive soils. Reasonable mitigation of expansive soil effects is considered feasible from a geotechnical viewpoint utilizing such methods, although it is noted that some future distress cannot be precluded when building on expansive soils.

1. <u>Conventional Foundations and Slabs-on-Grade</u>

   Conventional foundations and slabs-on-grade should be designed in accordance with Section 1808.6 of the 2019 California Building Code utilizing an effective plasticity index of 30. The minimum recommended slab thickness is 5 inches, with No. 4 bars at a spacing of 16 inches, placed in both directions. It is recommended that interior footings be interconnected so that the structure will respond relatively monolithically to differential soil movement. Slabs should be underlain by 4 inches of ½ to ¾ inch open graded gravel. In moisture sensitive areas, slabs should also be underlain by a 15-mil thick vapor retarder/barrier (Stego Wrap or equivalent) placed over the gravel in accordance with the requirements of ASTM E:1745 and E:1643. Due to the very low infiltration rates determined during our field testing, it is recommended that a subdrain system be installed below the lowest garage level. This subdrain system should generally follow the details provided in Figure 3, Slab Subdrain Detail. Subdrain spacing should be determined by the architect in conjunction with the waterproofing system, and should not exceed 15 feet.

   Conventional spread footings in competent fill may be designed for an allowable bearing value of 2,500 pounds per square foot with a minimum width of 15 inches and a minimum embedment of 24 inches below the lowest adjacent grade. The design value may be increased one-third for short duration wind or seismic loading. Settlement may be on the order of ¾ inch total and ½ inch differential, over a distance of 20 -25 feet.

The allowable passive pressure forces may be computed using an equivalent fluid density of 200 pounds per cubic foot for fill. Resistance to sliding can be calculated using an adhesion of 130 pounds per square foot on the contact area. Lateral forces may be resisted by combining passive pressure and adhesion without reduction.

2. Moisture Content of Slab Subgrade Soils

Presoaking of slab subgrade soils is required prior to construction of slabs. We recommend that subgrade soils be maintained at or be soaked to at least 110 percent of optimum moisture content to a minimum depth of 18 inches prior to placing gravel.

3. Slope Setback

All footings should be setback a minimum of H/3 from the slope face, where H is the slope height, with a minimum setback of 10 feet. Deepened footings or piers may be necessary in near slope areas.

Structural Design of Pier Foundations

Minimum 12-inch diameter piers embedded a minimum of 10 feet into competent bedrock may be designed for a dead plus live load skin friction of 1,000 pounds per square foot. Lateral resistance may be computed utilizing 200 and 400 pounds per cubic foot equivalent fluid density for fill soil and bedrock, respectively. For piers spaced at least two diameters, the passive resistance may be assumed acting on a tributary area of twice the pier diameter. Settlement is anticipated to be less than ½ inch.

Drilled, cast-in-place concrete piers shall be installed by a contractor experienced in drilled shaft work. Shafts shall be drilled to the embedment required to resist loads as designed by the Structural Engineer. Excavation shall be advanced in a manner that will not adversely affect the integrity and performance of completed piers or damage adjacent facilities and property. Shafts should not be excavated within 10 feet of previously completed piers until the concrete has been allowed to cure for at least seven days. If high early strength concrete is utilized, the set time should be defined by the Structural Engineer.

As caving conditions may occur locally within the fill deposits, casing of the pier shafts may be required in some areas. Care should be taken to minimize the extent of caving within the drilled shafts. Ground water seepage into open shafts may also occur. Shaft excavations shall be maintained in an essentially dry condition, by pumping if necessary, until just prior to concreting.

The bottom surface must be relatively clean of loose or softened materials, debris or other substances. The Geotechnical Consultant will provide on-site observation during the duration of the pier excavation. The Contractor shall cooperate with the Consultant during this process and assist in securing the construction documentation specified herein.

Design of Retaining Walls

1. Structural Design of Retaining Walls

   Active pressure forces acting on walls retaining level backfill may be designed using an equivalent fluid density of 30 pounds per cubic foot for walls supporting granular, non-expansive backfill (refer to Figure 4 for backcut and backfill geometry). Walls supporting level and 2:1 ascending onsite highly expansive soils should utilize equivalent fluid pressures of 100 and 120 pounds per cubic foot, respectively. Wall rotation on the order of 0.1 percent of the wall height should be anticipated and considered in design of walls and adjacent hardscaping. Restrained walls should be designed for a pressure of 60 pounds per cubic foot equivalent fluid pressure for level granular backfill, and 100 pounds per cubic foot for level onsite soils. Retaining wall design must consider topographic and structural surcharges.

   The site is classified as being in Seismic Design Category D. Seismic design of retaining walls may be based on the Mononobe-Okabe method, as discussed by Seed and Whitman (1970), using an additional dynamic load of 15 pounds per cubic foot equivalent fluid pressure, and acting at one-third the wall height above the base of the wall.

2. Subdrains

   The drainage scheme depicted on Figure 4 or a geotechnically approved alternative should be used to control seepage forces behind retaining walls. Waterproofing of retaining walls is recommended and should be applied in accordance with the architect's specifications or those of a waterproofing consultant.

3. Wall Excavations

   The wall excavation details shown on Figure 4 apply to vertical cuts of 4 feet or less in competent earth materials. Shoring may be necessary where space limitations preclude slope layback.

Seismic Structural Design

Based on the geotechnical data and site parameters, the following is provided by following ASCE 7-16 and the 2019 California Building Code:

Site and Seismic Design Criteria for 2007 CBC

Design Parameters	Recommended Values
Site Class	D (Stiff Soil)
Site Longitude (degrees)	-117.7017
Site Latitude (degrees)	33.5323
Ss (g) B	1.233
S1 (g) B	0.441
SMs (g) D	1.242
SM1 (g) D	0.820
SDs (g) D	0.828
SD1 (g) D	0.547
Fa	1.007
Fv	1.86
Seismic Design Category	D

The Structural Engineer should perform their own independent evaluation of these parameters applying exceptions allowed by knowledge of the structural period.

Construction Materials

Soils derived from Capistrano Formation siltstone and claystone commonly have a severe soluble sulfate content. It is recommended that a concrete expert be retained to design an appropriate concrete mix to address soil soluble sulfate content and structural requirements. In lieu of retaining a concrete expert, it is conservatively recommended that the 2019 California Building Code, Section 1904 be utilized, which refers to ACI 318, and typically recommends a maximum water-cement ratio of 0.45, a minimum compressive strength of 4500 psi, and Type V cement. Concrete additives such as flyash, natural pozzolans, silica fume, or blast furnace slag have also been shown to improve the sulfate resistance of concrete, and may be appropriate as recommended by a concrete expert.

Current testing for chlorides and minimum resistivity indicates the on-site soils have a moderate to severe potential for corrosion of buried metal elements. Mitigation measures include providing corrosive protection to metal elements or substituting non-corrosive materials in place of metal elements.

Hardscape Design and Construction

Hardscape improvements may utilize conventional foundations embedded in bedrock or recompacted fill and should be designed in accordance with the recommendations presented herein. Footings should be a minimum of 24 inches deep. Concrete flatwork should be divided into as nearly square panels as possible. Joints should be provided at maximum 6 feet intervals to give articulation to the concrete panels. Landscaping and planters adjacent to concrete flatwork should be designed in such a manner as to direct drainage away from concrete areas to approved outlets. Planters located adjacent to principle foundation elements should be sealed and drained; this is especially important if located upon retaining wall backfills.

Flatwork elements should be a minimum 5 inches thick (actual) and reinforced with No. 4 bars 16 inches on center both ways. Subgrade presaturation to 120 percent of optimum is recommended to a depth of 18 inches.

Pavement Design

1. General

   Pavement areas for vehicle traffic may consist of concrete, asphalt concrete, or concrete pavers. For design, we have used an assumed R-value of 5. In general, the site subgrade soils are expected to be mostly comprised of silts and clays with a medium to high expansion potential. A Traffic Index of 4.5 to 5 has been used for the design.

   The upper 2-foot of subgrade soils directly supporting any structural section should be compacted to a minimum 90 percent of the maximum dry density at moisture contents at least above optimum moisture content (ASTM: D1557). This 2-foot layer of fill soils subgrade should be founded on competent engineered fill or bedrock.

   The untreated base material should consist of crushed aggregate base, crushed miscellaneous base, or processed miscellaneous base as defined in the Standard Specification for Public Works Construction. Base materials should be compacted to at least 95 percent relative compaction (ASTM: D1557) at or above optimum moisture content.

1. Concrete

   We recommend the following concrete section:
   Portland Type V Cement Concrete Slab: 6-inches thick
   Reinforcing: No. 3 rebar each way in middle third of section at 24-inch spacing
   Minimum Concrete Modulus of Rupture: 550 psi

2. Asphalt Concrete

Typical or stamped asphalt concrete pavement sections at the site should be in accordance with those in the following table.

TABLE 1 – PAVEMENT SECTIONS

Area	Assumed Traffic Indices	R-Value (assumed)	AC/AB/SG (Inches)	Full Depth AC/SG (Inches)
Drive Areas	5	5*	4/6	6.5
Parking Area	4.5	5*	4/4	5.5

Explanation: AC is Asphalt Concrete; AB is Aggregate Base; SG is Competent Subgrade
* R-value testing of the subgrade soils should be performed at grading completion to affirm the given designs

3. Concrete Pavers

Typical concrete pavers for use in driveways and parking areas should be approximately 3-inches thick and underlain by 1 to 1.5-inches of clean sand. The pavers and sand should be supported on a minimum of 12-inches of untreated base material placed in three 4-inch thick lifts. All lifts should be placed at 95 percent relative compaction (ASTM:D1557). The base should be at or above optimum moisture content.

Concrete pavers for use in pedestrian traffic areas located at least 20 feet from the top of slope should be underlain with 1 to 1.5 inches of clean sand and 4-inches of base compacted to 95 percent relative compaction.

Concrete pavers for use in pedestrian traffic areas located less than 20 feet from a top of slope should be underlain with 1 to 1.5 inches of clean sand and 6-inches of base compacted to 95 percent relative compaction.

Slope Maintenance Guidelines

1. Drainage Devices

Graded berms, swales, area drains, and slopes are designed to convey surface water from pad areas, and should not be blocked or destroyed. Water should not be allowed to pond in pad areas, or overtop and flow down graded or natural slopes. Sources of uncontrolled water, such as leaky water pipes or drains, should be repaired.

Devices constructed to drain and protect slopes, including brow ditches, berms, and down drains should be maintained regularly, and in particular, should not be allowed to clog such that water can flow unchecked over slope faces. Drain outlets located at the base of retaining walls are important for adequate long-term performance, and should not be blocked or filled over. In no case should water be allowed to flow to or on a slope face in an uncontrolled manner.

2. Slopes

Slopes in the southern California area should be planted with appropriate drought-resistant vegetation as recommended by a landscape architect. Slopes should not be over-irrigated. Heavy ground cover combined with overwatering is a primary source of surficial slope failures. Animal burrows can serve to collect normal sheet flow on slopes and cause rapid and destructive erosion, and should be controlled or eliminated. Modification to slopes, including all placement of fill materials or excavations that steepen or otherwise modify designed slope angles should not be attempted without direction or approval of the geotechnical engineer.

Plan Review

In order to assess conformance with recommendations of this report and as a condition of the use of this report, the undersigned should review final plans and specifications prior to submission of such to the building official for issuance of permits. Such review is to be performed only for the limited purpose of checking for conformance with the design concept and the information provided herein. This review shall not include review of the accuracy or completeness of details, such as quantities, dimensions, weights or gauges, fabrication processes, construction means or methods, coordination of the work with other trades or construction safety precautions, all of which are the sole responsibility of the Contractor. Stoney-Miller Consultants (SMC's) review shall be conducted with reasonable promptness while allowing sufficient time in our judgment to permit adequate review. Review of a specific item shall not indicate that SMC has reviewed the entire system of which the item is a component. SMC shall not be responsible for any deviation from the Construction Documents not brought to our attention in writing by the Contractor.

SMC shall not be required to review partial submissions or those for which submissions of correlated items have not been received.

Pre-Construction Meeting

A pre-job meeting should be held with representatives of the owner, contractor, geotechnical engineer/engineering geologist, and building official prior to commencement of activities to clarify any questions related to the intent of these recommendation or additional recommendations.

Observation and Testing

The 2019 California Building Code requires geotechnical observation and testing during construction to verify proper removal of unsuitable materials, that foundation excavations are clean and founded in competent material, to test for proper moisture content and proper degree of compaction of fill, to test and observe placement of wall and trench backfill materials, and to confirm design assumptions. It is noted that the CBC requires continuous verification and testing during placement of fill, pile driving, and pier/caisson drilling.

A SMC representative shall visit the site at intervals appropriate to the stage of construction, as notified by the Contractor, in order to observe the progress and quality of the work completed by the Contractor. Such visits and observation are not intended to be an exhaustive check or a detailed inspection of the Contractor's work but rather are to allow SMC, as an experienced professional, to become generally familiar with the work in progress and to determine, in general, if the work is proceeding in accordance with the recommendations of this report.

SMC shall not supervise, direct, or have control over the Contractor's work nor have any responsibility for the construction means, methods, techniques, sequences, or procedures selected by the Contractor nor the Contractor's safety precautions or programs in connection with the work. These rights and responsibilities are solely those of the Contractor.

SMC shall not be responsible for any acts or omission of the Contractor, subcontractor, any entity performing any portion of the work, or any agents or employees of any of them. SMC does not guarantee the performance of the Contractor and shall not be responsible for the Contractor's failure to perform its work in accordance with the Contractor documents or any applicable law, codes, rules or regulations.

It is the responsibility of the owner or his representative to provide data or recommendations contained herein to contractors or subcontractors as necessary. The responsibility for timely notification of the start of construction is that of the owner and his contractor. Typically, at least 24 hours notice is required. These observations are beyond the scope of this investigation and budget and are conducted on a time and material basis.

Jobsite Safety

Neither the professional activities of SMC, nor the presence of SMC's employees and subconsultants at a construction/project site, shall relieve the General Contractor of its obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending and coordination the work in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. SMC and its personnel have no authority to exercise any control over any construction contractor or its employees in connection with their work or any health or safety programs or procedures. The General Contractor shall be solely responsible for jobsite safety.

LIMITATIONS

This investigation has been conducted in accordance with generally accepted practice in the engineering geologic and soils engineering field. No further warranty is offered or implied. Conclusions and recommendations presented are based on subsurface conditions encountered, and are not meant to imply a control of nature. As site geotechnical conditions may alter with time, the recommendations presented herein are considered valid for a time period of one year from the report date.

The recommendations are also specific to the current proposed development. Changes in proposed land use or development may require supplemental investigation or recommendations. Also, independent use of this report in any form cannot be approved unless specific written verification of the applicability of the recommendations is obtained from this firm.

Thank you for this opportunity to be of service. If you have any questions, please contact this office.

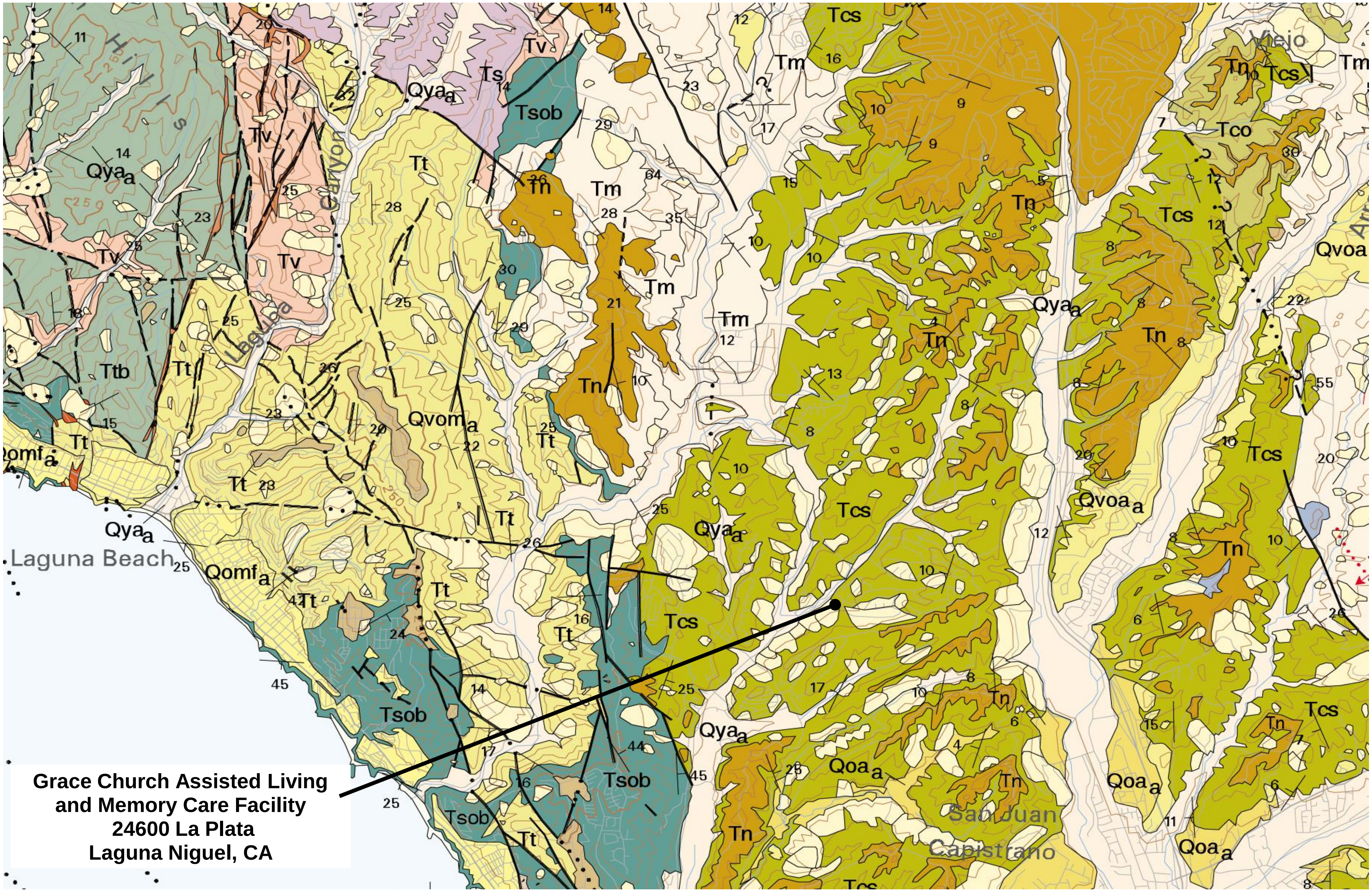
Sincerely,

STONEY-MILLER CONSULTANTS, INC.

Kevin A. Trigg, P.G.
Engineering Geologist, E.G. 1619
Date signed 4 / 8 /2021

Russell C. Lamb, P.E.
Geotechnical Engineer, G.E. 2207

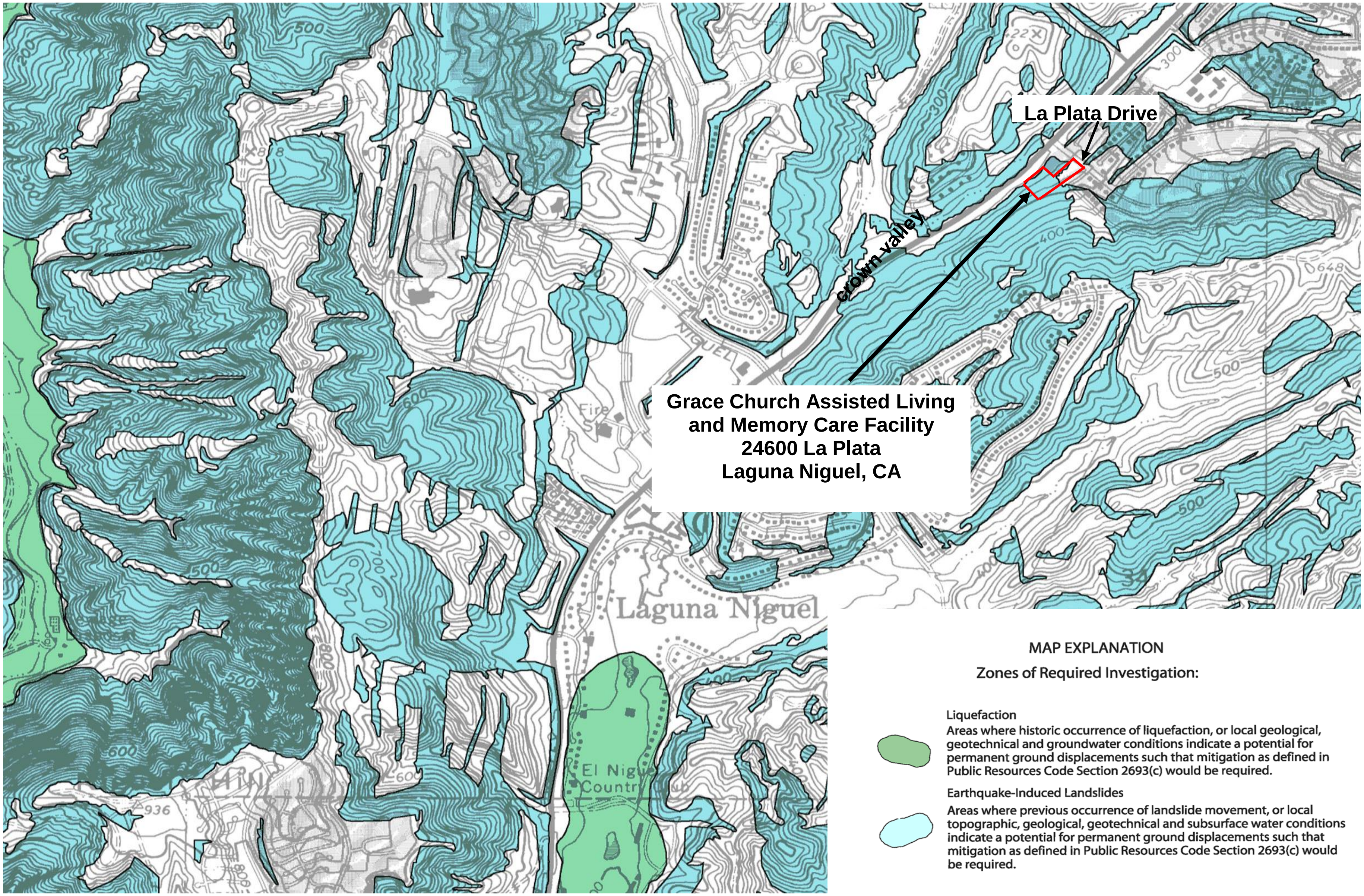
KAT/RCL:hsm



STONEY-MILLER CONSULTANTS, INC.

USGS Geologic Location Map, Santa Ana 30' x 60' Quadrangle

JOB NO.:	DATE:	FIGURE:
14283-00	April 2021	1



MAP EXPLANATION

Zones of Required Investigation:

Liquefaction

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

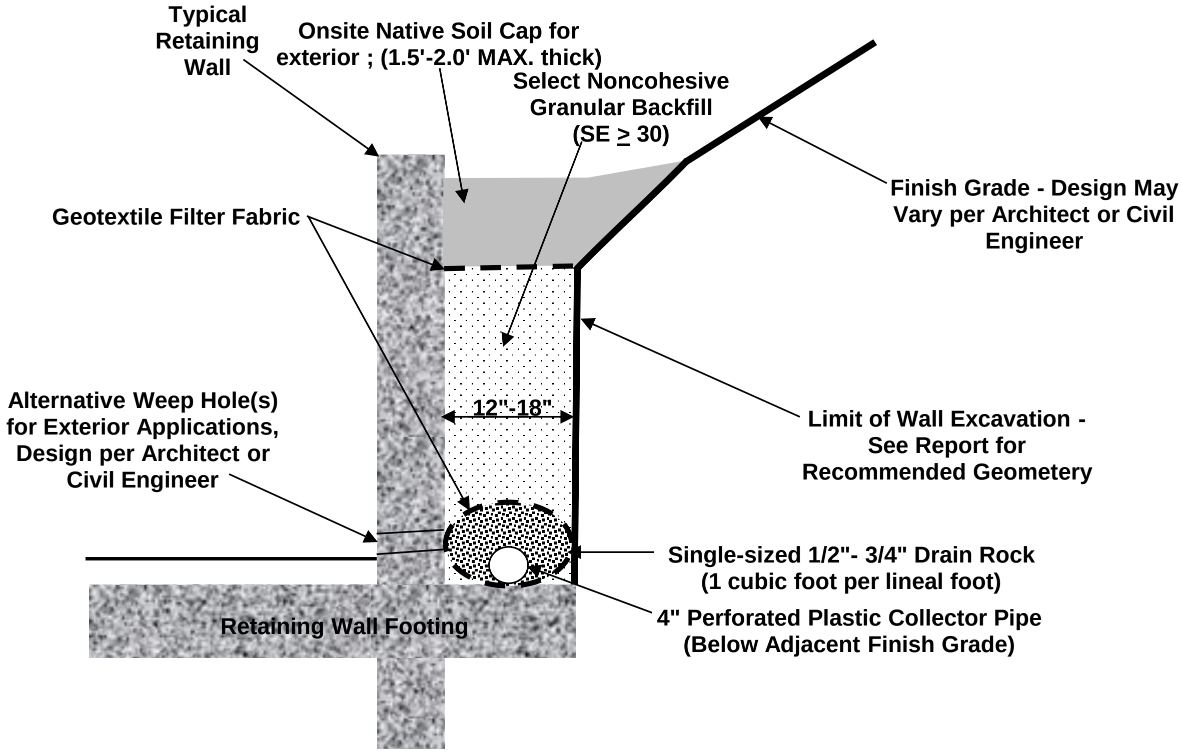
Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

STONEY-MILLER CONSULTANTS, INC.

CGS Seismic Hazards Map, San Juan Capistrano Quadrangle

JOB NO.:	DATE:	FIGURE:
14283-00	April 2021	2

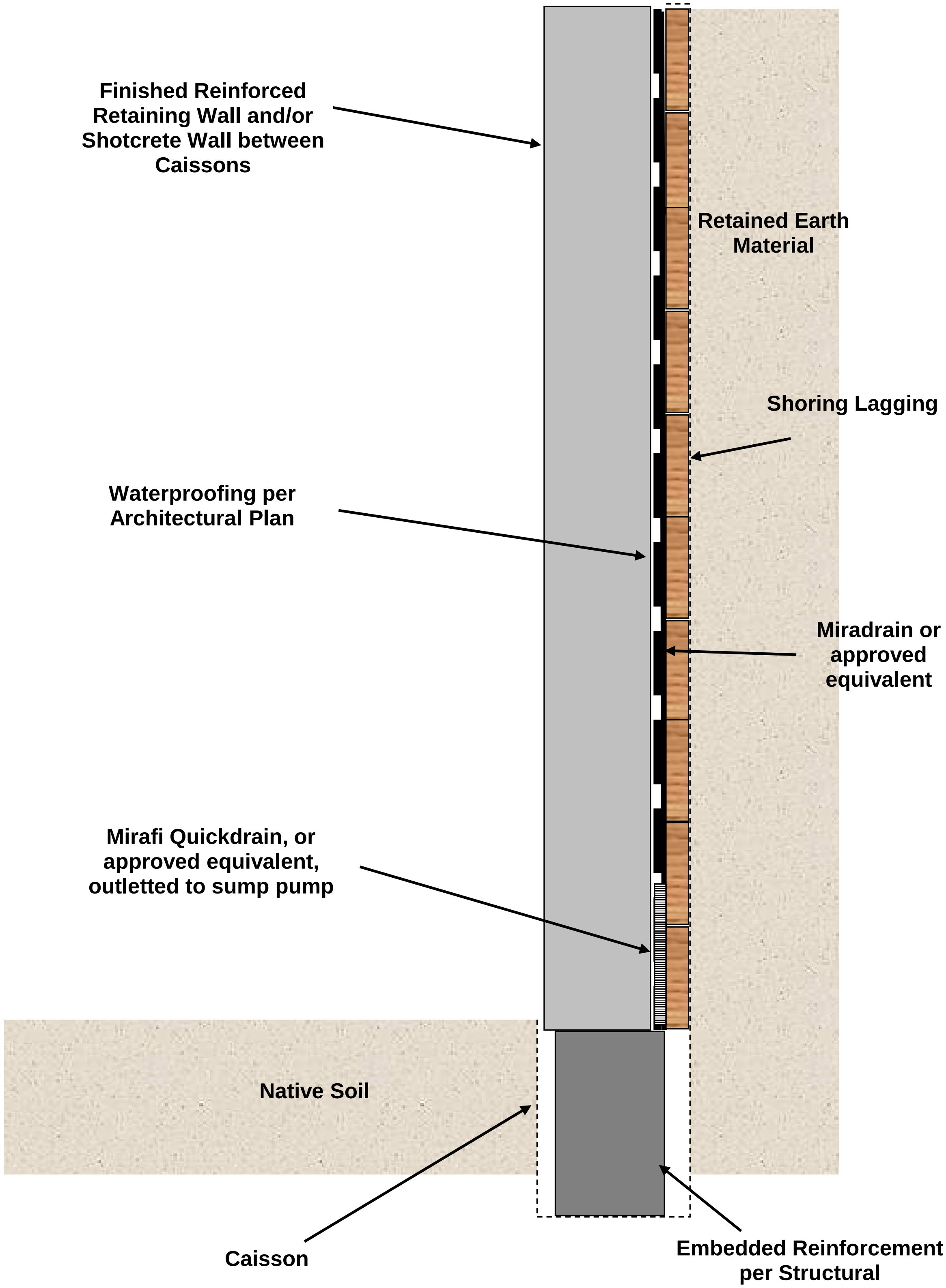


Notes: This system consists of a geotextile fabric-wrapped gravel envelope. Collection is with a 4-inch diameter perforated plastic pipe embedded in the gravel envelope and tied to a 4-inch diameter non-perforated plastic pipe which discharges at convenient locations. The outlet pipe should be placed such that the flow gradient is not less than 2.0 percent. The geotextile fabric-wrapped gravel envelope should be placed at a similar gradient

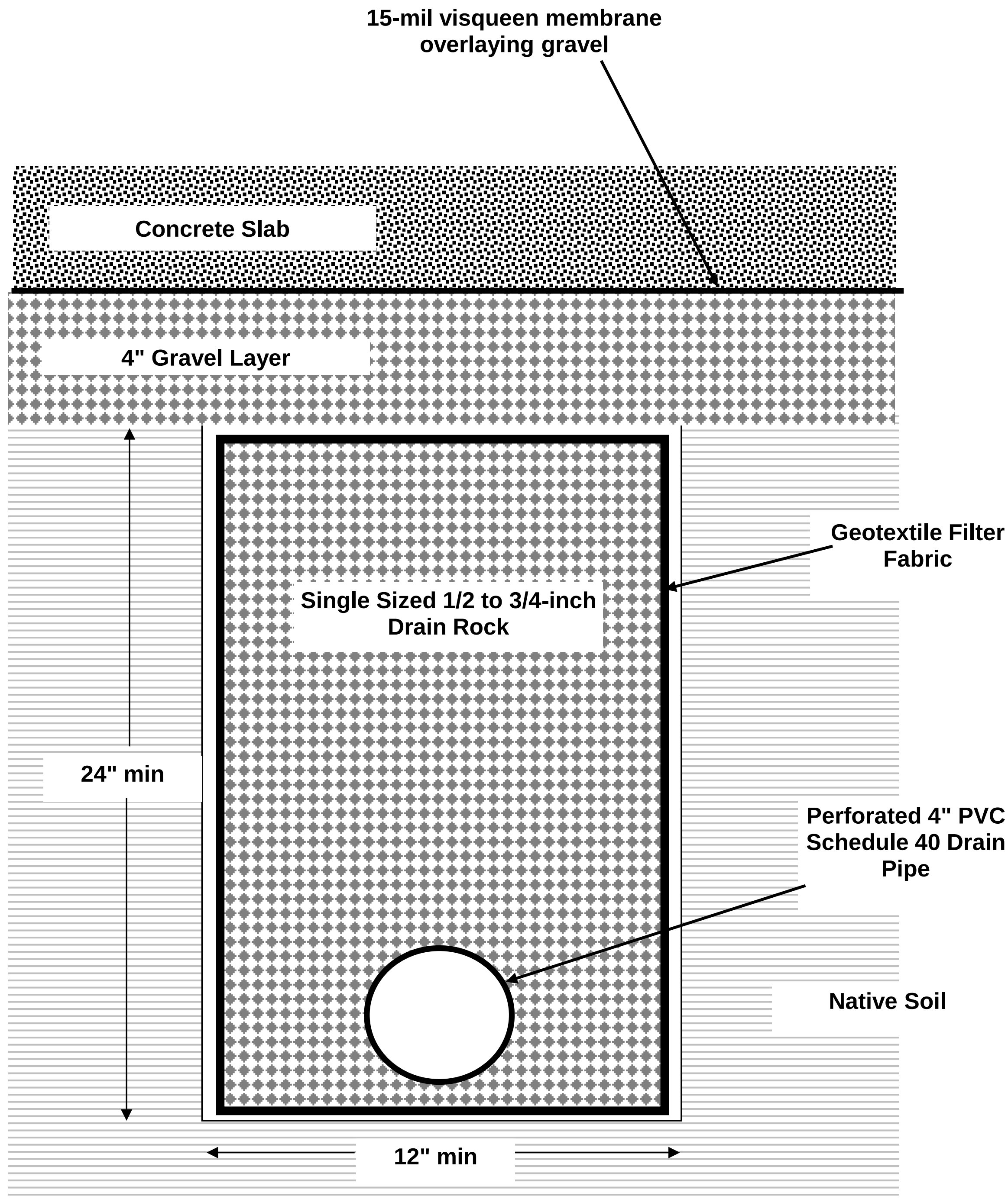
All drain pipes should be Schedule 40 PVC or ABS SDR-35. Perforations may be either bored 1/4-inch diameter holes or 3/16-inch slots placed on the bottom one-third of the pipe perimeter. If the pipe is to be bored, a minimum of 10 holes should be uniformly placed per foot of length. If slots are made, they should not exceed 2-1/2 inches in length and should not be closer than 2 inches. Total length of slots should not be less than 50 percent of the pipe length and should be uniformly spaced.

The fabric pore spaces should not exceed equivalent 30 mesh openings or be less than equivalent 100 mesh openings. The fabric should be placed such that a minimum lap of 8-inches exists at all splices.

SMC	**Retaining Wall Subdrain Detail**		
	JOB NO.: 14283-00	DATE: April 2021	FIGURE: 3



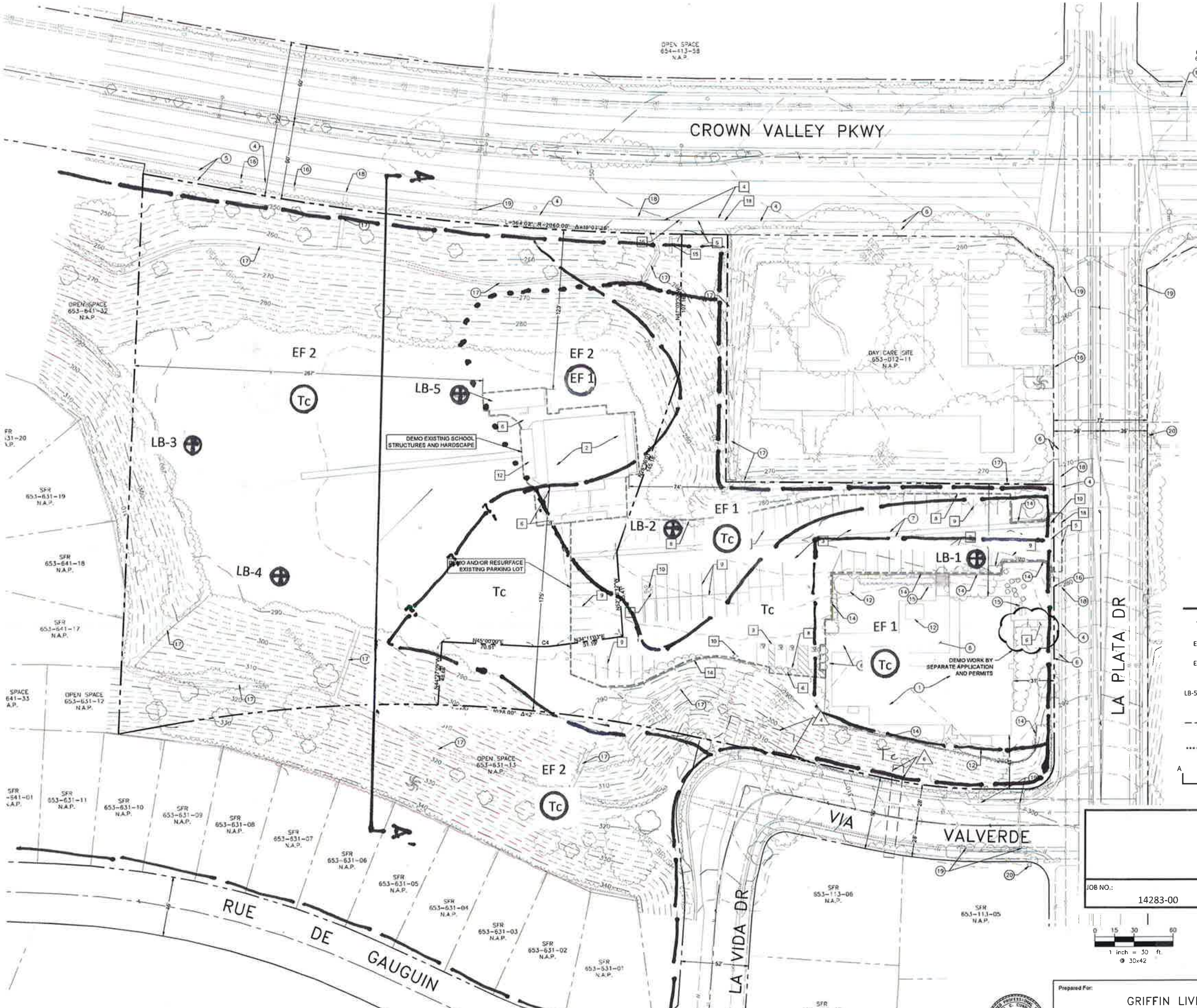
SMC	**Subdrain Detail at Shoring**		
	JOB NO.: 14283-00	DATE: April 2021	FIGURE: 4



Geofirm

Subdrain Below Slab

JOB NO.:	DATE:	FIGURE:
14283-00	April 2021	5



LEGEND:

- Subject Parcel Boundary
- Existing Right-of-Way
- Existing Parcels from Orange County GIS
- Existing Easements
- Existing Street Centerlines
- Building Setback
- Existing Block/Retaining Wall
- Storm Drain (Existing)
- Sanitary Sewer (Existing)
- Water (Existing)
- Recycled Water (Existing)
- Natural Gas (Existing)
- Communications (Existing)
- Telephone (Existing)
- Existing Contour
- Storm Drain Inlet
- Fire Hydrant
- Public Electrolier
- Private Light Pole
- Sign
- Valve
- Existing Building
- Existing Shade Structure
- Existing Tree
- Existing Shrub
- Callout - To Remain
- Callout - To Be Removed

NOTES:

1. EXISTING CONDITIONS AND CONTOURS/ELEVATIONS SHOWN PER A BOUNDARY AND TOPO SURVEY PREPARED BY GUIDA SURVEYING, INCLUDING AN AERIAL SURVEY CONDUCTED BY ROBERT J. LUNG & ASSOCIATES, ON JULY 31, 2020.
2. PROPERTY LINES BEYOND THE SUBJECT PROPERTY, AS WELL AS CENTERLINES AND EXISTING UTILITIES ARE DEPICTED BASED ON GIS AND OTHER PUBLICLY AVAILABLE INFORMATION.
3. ACCORDING TO THE CITY OF LAGUNA NIGUEL, THIS PARCEL IS WITHIN THE FEMA FLOOD ZONE "X".

BASIS OF COORDINATES:

THE BEARINGS SHOWN HEREON ARE BASED UPON THE BEARING BETWEEN O.C.S. HORIZONTAL CONTROL STATION GPS NO. 7581R1 AND STATION GPS NO. 7577R1 BEING NORTH 61°25'00" WEST, PER RECORDS ON FILE IN THE OFFICE OF THE COUNTY SURVEYOR.

DATUM STATEMENT:

COORDINATES SHOWN ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, (CCS83), ZONE VI, 1983 NAD, (2017.50 EPOCH OCS GPS ADJUSTMENT). ALL DISTANCES SHOWN ARE GROUND, UNLESS OTHERWISE NOTED. TO OBTAIN GRID DISTANCES, MULTIPLY GROUND DISTANCE BY 0.99994373 (MEAN VALUE).

BENCHMARK:

THE ELEVATIONS SHOWN HEREON ARE BASED ON ORANGE COUNTY SURVEY VERTICAL CONTROL NUMBER "3U-35-70", ELEVATION 248.770 (NAVD88) 1995 OCS ADJ.

EXCEPTION ITEM NOTES:

(NUMBER CORRESPONDS TO ITEM IN PRELIMINARY TITLE REPORT)

4 AN EASEMENT OR EASEMENTS AND RIGHT TO MAINTAIN, OPERATE, REPLACE, REMOVE, AND RENEW ALL NOW EXISTING SANITARY SEWERS AND STORM DRAINS AND APPURTENANT STRUCTURES, IN, UPON AND OVER SAID HIGHWAY AND ALL PORTIONS THEREOF, AND PURSUANT TO ANY EXISTING FRANCHISE OR RENEWAL THEREOF TO MAINTAIN, OPERATE, REPLACE, REMOVE, RENEW AND ENLARGE ALL NOW EXISTING LINES OF PIPE, CONDUITS, CABLES, POLES AND OTHER CONVENIENT STRUCTURES, EQUIPMENT AND FIXTURES FOR THE OPERATION OF AS PIPE LINES, TELEGRAPHIC AND TELEPHONE LINES, RAILROAD LINES, AND OF THE TRANSPORTATION OR DISTRIBUTION OF ELECTRIC ENERGY, PETROLEUM AND ITS PRODUCTS, AMMONIA, WATER, AND FOR INCIDENTAL PURPOSES, AS RESERVED IN THE INSTRUMENT VACATING A PORTION OF LA VIDA DRIVE, RECORDED BOOK 9007, PAGE 855 OF OFFICIAL RECORDS.

THE EXACT LOCATION AND/OR EXTENT OF SAID EASEMENT IS NOT DISCLOSED IN THE PUBLIC RECORDS

6 EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:

GRANTED TO: SAN DIEGO GAS & ELECTRIC COMPANY, A CORPORATION
PURPOSE: UNDERGROUND CONDUITS
RECORDING NO: IN BOOK 10413, PAGE 229 OF OFFICIAL RECORDS

EXPLANATION OF SYMBOLS

Tc	CAPISTRANO FORMATION BEDROCK, CIRCLED WHERE BURIED
EF 1	ENGINEERED FILL PLACED IN 1972-1973 GRADING GEOLABS, CIRCLED WHERE BURIED
EF 2	ENGINEERED FILL PLACED IN 1989 GRADING LEIGHTON
LB-5	30-INCH DIAMETER BUCKET AUGER BORING BY STONEY-MILLER CONSULTANTS, INC.
	GEOLOGIC CONTACT
	BURIED GEOLOGIC CONTACT
A A'	GEOLOGIC CROSS SECTION A-A'

GEOLOGIC MAP
24600 LA PLATA DRIVE
LAGUNA NIGUEL, CALIFORNIA

JOB NO.:	DATE:	PLATE NO.:
14283-00	FEBRUARY 2021	1

EXISTING CONDITIONS PLAN

LAGUNA NIGUEL SENIOR ASSISTED LIVING

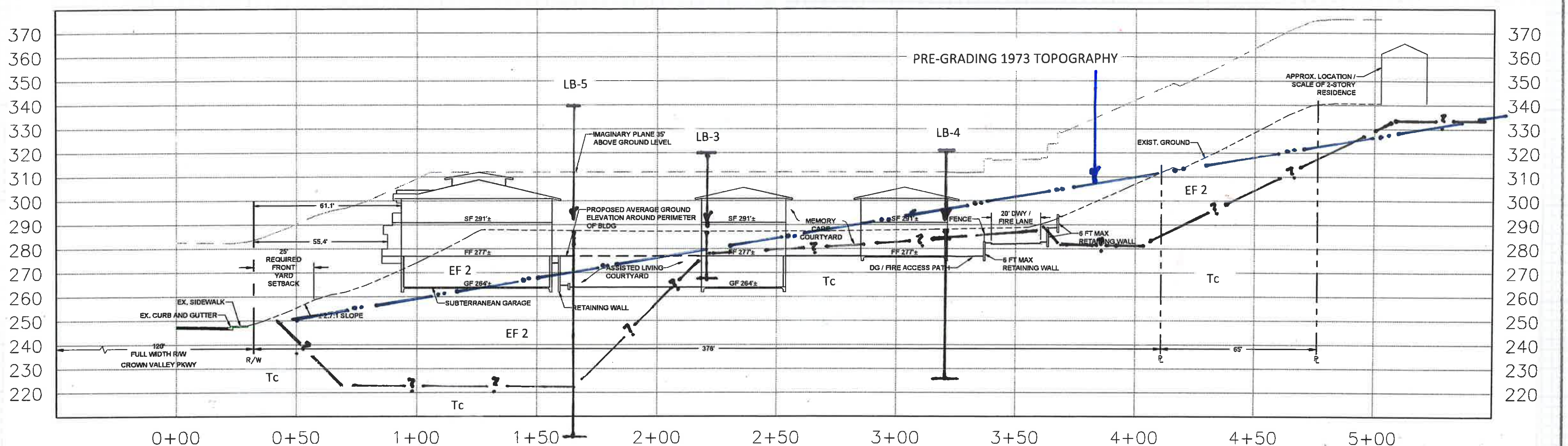
Prepared For:
GRIFFIN LIVING
24005 VENTURA BLVD.
CALABASAS, CA 91302
(818)436-5100

Project Address:
24600 LA PLATA DR
LAGUNA NIGUEL, CA 92677
APN: 653-012-12

PREPARED BY:
DW DIAMOND WEST
civil engineering • land surveying • land planning
24005 Ventura Boulevard, Suite 100
Calabasas, CA 91302
Phone (818) 591-1950
www.diamondwest.net

for review

DATE: 10/23/2020 SHEET 3 OF 6



SCALE 1 INCH = 40 FEET
HORIZONTAL & VERTICAL

CROSS SECTION A-A'
24600 LA PLATA DRIVE
LAGUNA NIGUEL, CALIFORNIA

JOB NO.: 14283-00	DATE: FEBRUARY 2021	PLATE NO.: 2

APPENDIX A

<u>REFERENCES</u>

APPENDIX A

REFERENCES

Published Documents

1. Blake, T.F., 2000a, "EQSEARCH, Version 3.0b, A Computer Program for the Estimation of Peak Horizontal Acceleration from California Historical Earthquake Catalogs."

2. Blake, T.F., 2000b, "EQFAULT, Version 3.0b, A Computer Program for the Deterministic Prediction of Peak Horizontal Acceleration from 3-D Fault Sources", User's Manual" (Windows 95/98 Version).

3. Bozorgnia, Y., Campbell, K.W., and Niazi, M. M., 1999, "Vertical Ground Motion: Characteristics, Relationship with Horizontal Component, and Building Code Implications", Proceedings of the SMIP99 Seminar on Utilization of Strong-Motion Data, pp. 23-49, dated September 15.

4. <u>California Building Code</u>, 2019 Edition

5. California Divisions of Mines and Geology, 1997, "Guidelines for Evaluating and Mitigating Seismic Hazards in California," Special Publication 117.

6. California, Division of Mines & Geology, 1998, "Seismic Hazards Zones Map, San Juan Capistrano Quadrangle."

7. California Geological Survey, 2003, "Seismic Hazards Mapping Homepage" at http://gmw.consrv.ca.gov/shmp/index.htm

8. Cao, T., Bryant, W.A., Rowshandel, B., Branum, D. and Wills, C.J., 2003, "The Revised 2002 California Probabilistic Seismic Hazard Maps, dated June.

9. Edgington, W.J. and Morton, P.K., 1974, "Geology and Engineering Aspects of the San Juan Capistrano Quadrangle, Orange County, California," California Division of Mines and Geology, Special Report 112.

10. Grant et al, 1999, "Late Quaternary Uplift and Earthquake Potential of the San Joaquin Hills, South Los Angeles Basin, California." Geology, November 1999, V. 27, No. 11, P1031-1034.

11. Jennings, Charles W., et al, 1994, "Fault Activity Map of California and Adjacent Areas," California Division of Mines and Geology, Geologic Data Map No. 6.

12. Noorany, I., Sweet, J. A., and Smith, I. M. 1992, "Deformation of Fill Slopes Caused by Wetting", in Stability and Performance of Slopes and Embankments – II, Volume 2, ASCE Geotechnical Engineering Division Specialty Conference Proceedings, P1244-1257.

13. Post-Tensioning Institute, 2004, "Recommendations for Prestressed Rock and Soil Anchors.

14. Schnabel, H., Jr., 1982, Tiebacks in Foundation Engineering and Construction, McGraw-Hill, Inc.

15. Stark, Timothy D.; Choi, Hangseok; McCone, Sean; "Drained Shear Strength Parameters for Analysis of Landslides", Journal of Geotechnical and Geoenvironmental Engineering, Vol. 131, No. 5, May 1, 2005.

16. U.S.G.S., 2008. "Earthquake Hazards Program" website, (http://earthquake.usgs.gov/research/hazmaps/design/), Java Ground Motion Parameter Calculator-Version 5.0.8.

Private Consultant Reports

17. Geolabs, Inc., 1969, "Geologic and Soils Investigation, A Portion of Lot 39 in the Niguel Rancho Development, Crown Valley Parkway and La Plata Drive, Laguna Niguel, Orange county, California", W.O. 2450, dated July 2.
18. Geolabs, Inc., 1969, "Geologic and Soils Investigation, A Portion of Lot 39 in the Niguel Rancho Development, Crown Valley Parkway and La Plata Drive, Laguna Niguel, Orange County, California", W.O. 2450, dated September 11.
19. Geolabs, Inc., 1972, "Soils Engineering and Geologic Grading Plan Review, Tract 6944, Lake Forest, Orange County, California", W.O. 209-50, dated May 4.
20. Geolabs, Inc., 1972, "Pregrading Meeting, Church Site, 24600 La Plata, Laguna Niguel, California", W.O. 209-50, dated May 22.
21. VTN Engineers, 1972, Rough Grade Certification, Permit No. 197,698, 24600 La Plata Drive, dated June 16.
22. Geolabs, Inc., 1972, "Final Compaction and Geological Engineering Report, Church Site, 24600 La Plata Drive, Laguna Niguel, California", W.O. 209-50, dated June 21.
23. Geolabs, Inc., 1973, "Final Soils Report, Parking Lot and Exterior Trenches, Church Site, Laguna Niguel, County of Orange, California", W.O. 209-50, dated February 23.
24. Geolabs, Inc., 1973, "Final Soils Report, Retaining Wall Backfill and Interior Trenches, Church Site, Laguna Niguel, California", W.O. 209-50, dated March 2.

25. VTN Engineers, 1973, Fine Grading Rough Grade Certification, Permit No. 197,698, 24600 La Plata Drive, dated February 27.

26. VTN Engineers, 1973, Grading Plan R.S.T. 4438, Crown Valley Covenant Church, date finaled July 5.

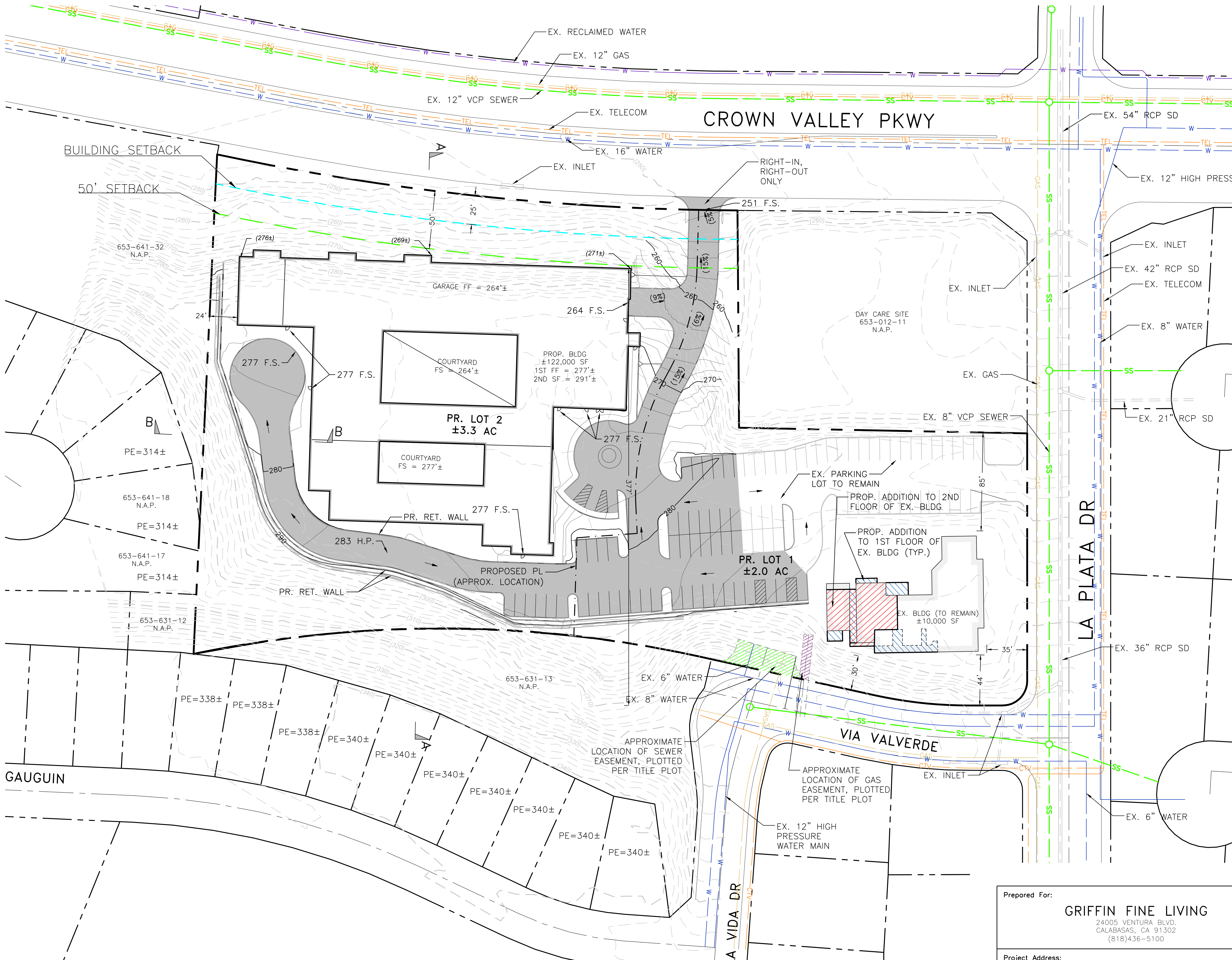
27. Leighton and Associates, 1987, "Preliminary Geotechnical evaluation, Tentative Tract 13306, Crown Valley Parkway, Laguna Niguel, California," Project No. 8870471-02, dated December 30.

28. Leighton and Associates, 1989, "Interim As-Graded Report of Rough Grading for Lots 28 through 60, Lots 66 through 69, and Lots 99 through 120, Tract 13306, 29758A Crown Valley Parkway, Laguna Niguel, California," Project No. 8870471-04, Grading Permit No. 89-222675 dated June 30. [actual Grading Permit is 199,820].

29. Leighton and Associates, 1991, "Revised Geotechnical Update Letter, Lots 1 Through 6 and Lots 82 Through 93, Tract No. 13306, Laguna Niguel, California," Project No. 4870471-07, Grading Permit No. 91-G0072, dated November 21.

30. Leighton and Associates, 1991, “Revised Geotechnical Update Letter, Lots 1 Through 6 and Lots 82 Through 93, Tract No. 13306, Laguna Niguel, California,” Project No. 4870471-07, Grading Permit No. 91-G0072, dated November 21.

31. SMC, 2009, “Updated Geotechnical Investigation of Site Distress and Recommendations for Slope Stability, Laguna Summit Apartment Complex, Laguna Niguel, California,” Volumes I through 4, Project No: 71753-05, Report No: 08-6422, dated July 28.



LEGEND:

- Subject parcel boundary
- Existing parcels from from Orange County GIS
- Existing centerlines from Orange County GIS
- Proposed subdivision lot line
- Building setback line
- Existing building
- Proposed building
- Proposed retaining wall
- Existing storm drain pipe/inlet
- Existing sanitary sewer
- Existing water service
- Existing recycled water service
- Existing natural gas pipe
- Existing telephone/communications conduit
- Proposed 1st floor addition to ex.. bldg
- Proposed 2nd floor addition to ex.. bldg

NOTES:

1. THERE HAS BEEN NO SURVEY PERFORMED FOR THIS PROJECT. AVAILABLE INFORMATION WAS OBTAINED THROUGH ORANGE COUNTY GIS DATA AND DRAWN FROM AUTOCAD AERIAL IMAGERY.
2. ACCORDING TO THE CITY OF LAGUNA NIGUEL, THIS PARCEL IS WITHIN THE FEMA FLOOD ZONE "X".
3. THIS PARCEL IS WITHIN ZONING CODE "PI" OR PUBLIC/INSTITUTIONAL DISTRICT.
4. PARKING IS PROVIDED AS FOLLOWS:
   - LOT 1 (CHURCH): 86 SPACES (4 ACCESSIBLE)
   - LOT 2 (ASSISTED LIVING): 70 SPACES (3 ACCESSIBLE)

SUBJECT PROPERTY
24600 LA PLATA DR
LAGUNA NIGUEL, CA 92677
APN: 653-012-12

CONCEPTUAL SITE PLAN

GRACE CHURCH ASSISTED LIVING

Prepared For:

GRIFFIN FINE LIVING
24005 VENTURA BLVD.
CALABASAS, CA 91302
(818)436-5100

Project Address:

24600 LA PLATA DR
LAGUNA NIGUEL, CA 92677
APN: 653-012-12

Prepared By:

DIAMOND WEST INCORPORATED
24005 Ventura Boulevard, Suite 100
Calabasas, California 91302
Voice: (818) 444-1800
Facsimile: (818) 223-9215
civil engineering • land surveying • land planning
www.diamondwest.net

Date: 12/04/2019 | Figure A-1

APPENDIX B

BORING LOGS

Date(s) Logged: 1/12/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#

BORING NO.: LB-1

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
0							**FILL:** Silty CLAY, moist, dark brown.		0
1									
2									
3									
4		1	X		16.0	111.8	4-5 ft Silty CLAY, Moist, stiff, brown. Some fine sand.		
5									5
6									
7									
8		1	X		20.2	109.7	8-9 ft Silty CLAY, moist, stiff, brown.		
9									
10									10
11									
12							Total Depth 10.3 feet No Groundwater Conducted Infiltration Test. Backfilled With Cuttings		
13									
14									
15									15
16									
17									
18									
19									
20									20

Project No.: 14283-00L

LOG OF BORING

Figure No.: B-1

Stoney-Miller Consultants Inc.

Date(s) Logged: 1/12/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	**BORING NO.: LB-1** **Description**	Geologic Attitude	Depth (feet)
20									20
21									
22									
23									
24									
25									25
26									
27									
28									
29									
30									30
31									
32									
33									
34									
35					25.1				35
36									
37									
38									
39									
40									40

Date(s) Logged: 1/12/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#

BORING NO.: LB-2

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
0							**FILL:** Silty CLAY, moist, dark brown.		0
6		1	X		11.2	104.8	6-7 ft Clayey SILT with fine sand, moist, stiff, dark brown.		
12		1	X		15.5	105.7	12-13 ft **Alluvium:**.Silty CLAY with fine sand, moist, stiff, brown. Caliche stringers. Pinhole porosity.		
13					19.6				
15							Total Depth 13 feet No Groundwater Conducted Infiltration Test. Backfilled With Cuttings		15

Project No.: 14283-00L

LOG OF BORING

Figure No.: B-3

Stoney-Miller Consultants Inc.

Date(s) Logged: 1/12/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#

BORING NO.: LB-3

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
0							**FILL:** Sandy SILT with some clay, moist, olive brown to brown.		0
1									
2									
3									
4									
5									5
6									
7									
8									
9							@9 ft **Weathered Bedrock:** Clayey SANDSTONE, moist, hard, light brown. Some iron staining. Rear of sample hard unoxidized SILTSTONE, dark gray.		
10		2	X		16.9	116.0			10
11									
12									
13									
14									
15									15
16									
17									
18									
19		2	X		23.7	100.5	19-20 ft SILTSTONE, damp, hard, dark gray. Micaeous.		
20									20

Date(s) Logged: 1/12/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	**BORING NO.: LB-3** **Description**	Geologic Attitude	Depth (feet)
20									20
21									
22									
23									
24									
25							Total Depth 20 feet No Groundwater Conducted Infiltration Test. Backfilled With Cuttings		25
26									
27									
28									
29									
30									30
31									
32									
33									
34									
35									35
36									
37									
38									
39									
40									40

Date(s) Logged: 1/13/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#, 27'-52' 3500#, 52'-80' 2500#

BORING NO.: LB-4

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
0							**FILL:** Silty CLAY, moist, dark brown.		0
4							@ 4 ft **Weathered Bedrock:** SILTSTONE, moist, soft,olive brown to brown. Contact is horizontal. Gypsum line fractures.		
5		1	X		30.3	94.0	5-6 ft Weathered SILTSTONE, hard, moiost, brown.		5
8							@7.8 ft Gypsum line fracture. F:N36E 68SE @8 ft Bedrock becoming hard.		
10		2	X		29.3	91.7	10-11 ft Siltstone, hard, moist, brown/gray. Fractures with iron staing and gypsum. @10.25 ft Faint bedding on silty sand layer. B:N58E 6-9NW		10
15		2	X	X	23.9 23.4	105.6	15-16 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		15
19							@19.3 ft Thin Silty SAND bed. Continuopus around hole. B:N35E 6 NW		
20									20

Date(s) Logged: 1/13/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#, 27'-52' 3500#, 52'-80' 2500#

BORING NO.: LB-4

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
20		2	X		24.3	100.1	20-21 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		20
21									
22							@22.5 ft Minor seepage around hole. Siltstone becoming massive.		
23									
24									
25		2	X		26.9	95.2	25-26 ft Siltstone, hard, moist, gray to dark gray. Micaeous. Fish scales.		25
26									
27									
28									
29									
30		4	X	X	27.0	94.7	30-31 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		30
31									
32									
33									
34									
35		4	X		26.1	92.8	35-36 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		35
36									
37									
38									
39									
40									40

Date(s) Logged: 1/13/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#, 27'-52' 3500#, 52'-80' 2500#

BORING NO.: LB-4

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
40		4	X		25.7	97.0	40-41 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		40
41									
42									
43									
44									
45		5	X		25.4	99.3	45-46 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		45
46									
47									
48									
49									
50		6	X		25.8	100.2	50-51 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		50
51									
52									
53									
54									
55		8	X		25.6	94.0	55-56 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		55
56									
57									
58									
59									
60									60

Date(s) Logged: 1/13/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0'-27' 4500#, 27'-52' 3500#, 52'-80' 2500#

BORING NO.: LB-4

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
60		8	X		23.4	102.3	60-61 ft Siltstone, hard, moist, gray to dark gray. Micaeous.		60
61									
62									
63									
64									
65							Total Depth 61 Feet Minor Seepage At 22.5 Feet No Groundwater Visually logged to 56 Feet Backfilled With Cuttings		65
66									
67									
68									
69									
70									70
71									
72									
73									
74									
75									75
76									
77									
78									
79									
80									80

Date(s) Logged: 1/14/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0-27' (4500); 27-52' (3500); 52-80 (2500); 80-104' (1000)

BORING NO.: LB-5

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude
0							**FILL:** Silty CLAY, moist, dark brown.	
5		1	X	X	18.6 21.0	95.2	5-6 ft Silty CLAY, moist, soft, dark brown.	
7							7-11 ft Voids in fill. Soft.	
10		1	X		12.3	119.4	10-11 ft Silty CLAY, medium stiff, moist, mottle light brown/olive brown/gray. Some gypsum crystals.	
15		2	X		17.2	110.3	15-16 ft Sandy SILT with CLAY, moist, stiff, mottle brown/dark brown.	
20								

Project No.: 14283-00L

LOG OF BORING

Figure No.: B-10

Stoney-Miller Consultants Inc.

Date(s) Logged: 1/14/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0-27' (4500); 27-52' (3500); 52-80 (2500); 80-104' (1000)

BORING NO.: LB-5

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
20		2	X		17.5	115.5	20-21 ft Piece of bedrock in sample.		20
21									
22									
23									
24									
25		2	X	X	18.5 22.1	106.7	25-26 ft Silty Clay to Clayey SILT, stiff, moist, mottled dark brown/gray/light brown. Siltstone pieces in sample.		25
26									
27									
28							@28 - 30 ft Soft zone entire hole.		
29									
30									30
31									
32									
33									
34									
35		2	X		19.5	106.9	35-36 ft Silty Clay to Clayey SILT, stiff, moist, mottled dark brown/gray/light brown. Siltstone pieces in sample.		35
36									
37									
38									
39									
40									40

Date(s) Logged: 1/14/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0-27' (4500); 27-52' (3500); 52-80 (2500); 80-104' (1000)

BORING NO.: LB-5

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
40									40
41									
42									
43									
44									
45		3	X	X	23.2 22.5	101.9	45-46 ft Silty Clay to Clayey SILT, stiff, moist, mottled dark brown/gray/light brown. Siltstone pieces in sample.		45
46									
47									
48									
49									
50									50
51									
52									
53									
54									
55		3	X		32.2	95.1	55-56 ft Silty Clay to Clayey SILT, stiff, moist, mottled dark brown/gray/light brown. Siltstone pieces in sample.		55
56									
57									
58									
59									
60									60

Date(s) Logged: 1/14/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0-27' (4500); 27-52' (3500); 52-80 (2500); 80-104' (1000)

BORING NO.: LB-5

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
60									60
61									
62									
63									
64							@63.8 ft **Bedrock:** SILTSTONE, hard, damp, dark gray. Contact is horizontal. @64 ft Minor seepage on south side of hole.		
65		8	X		29.7	93.8	65-66 ft SILTSTONE, hard, damp, dark gray. Micaeous.		65
66							@66.5 ft 1/16th inch intact wavy clay seam N5E, 4E		
67									
68									
69									
70									70
71									
72									
73									
74							@74.75 ft 1/8th inch thick wavy clay seam. N7W. 4E		
75		10	X		28.1	95.3	75-76 ft SILTSTONE, hard, damp, dark gray. Micaeous.		75
76									
77									
78									
79									
80									80

Date(s) Logged: 1/14/2021
Logged By: BR
Address: 24600 La Plata Drive;Laguna Niguel

Method of Drilling: 30-inch Bucket Auger
Drilling Company: Dave's Drilling
Drop: 12"
Weight(s): 0-27' (4500); 27-52' (3500); 52-80 (2500); 80-104' (1000)

BORING NO.: LB-5

Depth (feet)	USCS	Normalized Blows/12"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
80									80
81									
82									
83									
84									
85		20	X		25.4	102.8	85-86 ft SILTSTONE, hard, damp, dark gray. Micaeous.		85
86									
87									
88									
89									
90							Total Depth 86 Feet No Groundwater Visually logged to 81 Feet Backfilled With Cuttings		90
91									
92									
93									
94									
95									95
96									
97									
98									
99									
100									100

APPENDIX C

FIELD EXPLORATION AND LABORATORY TESTING

APPENDIX C

FIELD EXPLORATION AND LABORATORY TESTING

I. Field Exploration Procedures

A. Field Exploration

The subsurface field exploration was conducted with a truck mounted 30-inch diameter bucket auger rig. The large diameter excavations were directly investigated with down-hole logging by an Engineering Geologist. The logs of the subsurface exploration are presented in Appendix B.

B. Sampling

1. Core samples of subsurface materials were obtained from the borings by driving a steel barrel drive sampler with an effective weight of the Kelly bar that is raised and permitted to fall 12 inches (bucket auger) . Drive weights are identified with depth on the boring log for bucket auger borings.

   The soil sampler has an outside diameter of 3.0 inches and is lined with a series of 1-inch high brass rings having an inside diameter of 2.43 inches. A drive shoe is placed on the tip of the sampler to hold the liners in place during sampling. The samples were removed from the sample barrel in the brass rings, placed in moisture tight containers and transported to the laboratory for testing. Records of the number of blows required to effect each 6 inches of penetration were made.

2. Large bulk samples of typical soil type were bagged from the drill cuttings and were transported to the laboratory for classification and physical testing.

II. Laboratory Testing Procedures

A. Moisture and Density Testing

The dry unit weight and field moisture content was determined from core specimens obtained from the test sampler by measuring the volume and weight of the specimen. The moisture determination was made in accordance with ASTM test methods. The results are summarized on the Boring Logs, in Appendix B, and in the Figure C-1.

B. Direct Shear Tests

Direct shear tests were performed in general accordance with ASTM D 3080 on specimens of in-situ material inundated before and during testing. Testing was conducted in our laboratory. The direct shear machines employed were conventional single shear, strain-controlled device. Strain rates of 0.005 to 0.0001 inch/minute were utilized. The shear strength parameters were obtained by fitting a straight line through three points of peak and residual shearing strength versus total normal stress. The total normal stress range used was 1,000 to 8,000 pounds per square foot. Results from the tests are presented on Figures C-10 through C-14.

C. Atterberg Limits Tests

Atterberg limits tests were performed in accordance with ASTM Standard No. 4318. The results of the tests are summarized in Figures C-6 through C-9.

The expansion index test (EI) provides an indication of swelling potential of a compacted soil. Such tests are performed in accordance with ASTM D 4829. Expansion Index testing was performed by Leighton and Associates (References 27 through 30) during grading of the adjacent site. Test results from this work are shown in Appendix G, Figures G-6 to G-8. The classification of potential expansion of soils using EI is described in the following table.

Expansion Index (EI)	Expansion Potential
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
130 or higher	Very High

D. Particle Size Analyses

Particle size analyses were performed on samples in accordance with ASTM D422. The results of the tests are presented in Figures C-2 through C-5.

E. Corrosivity Tests

Corrosivity tests were performed by HDR to assess for potential corrosion of common construction elements in contact with the site soils. The results of this testing is provided in Figures C-15 and C-16.

F. Compression Testing

Representative samples of engineered fill soil encountered onsite were tested to determine compressibility characteristic. Samples were soaked part way through the testing to assess performance under loading. Results of our testing are included in Figures C-17 through C-20.

STONEY-MILLER CONSULTANTS, INC.

MOISTURE, DENSITY AND SATURATION

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel

Borehole	Depth (ft)	Sample Length (in)	Sample Type	Soil Unit	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Expansion Index
LB-1	4.00	12	RING		Silty Clay	16.0	111.8	85	
LB-1	8.00	12	RING		Silty Clay	20.2	109.7	100	
LB-2	6.00	12	RING		Silty Clay	11.2	104.8	50	
LB-2	12.00	12	RING		Silty Clay	15.5	105.7	70	
LB-2	13.00					19.6			
LB-3	10.00	12	RING		Silty Clay	16.9	116.0	100	
LB-3	19.00	12	RING		Silty Clay	23.7	100.5	94	
LB-4	5.00	12	RING		Silty Clay	30.3	94.0	100	
LB-4	10.00	12	RING		Silty Clay	29.3	91.7	94	
LB-4	15.00	12	RING		Silty Clay	23.9	105.6	100	
LB-4	15.00					23.4			
LB-4	15.10	12	SB						
LB-4	20.00	12	RING		Silty Clay	24.3	100.1	96	
LB-4	25.00	12	RING		Silty Clay	26.9	95.2	94	
LB-4	30.00	12	RING		Silty Clay	27.0	94.7	93	
LB-4	30.10	12	SB						
LB-4	35.00	12	RING		Silty Clay	26.1	92.8	86	
LB-4	40.00	12	RING		Silty Clay	25.7	97.0	94	
LB-4	45.00	12	RING		Silty Clay	25.4	99.3	98	
LB-4	50.00	12	RING		Silty Clay	25.8	100.2	100	
LB-4	55.00	12	RING		Silty Clay	25.6	94.0	87	
LB-4	60.00	12	RING		Silty Clay	23.4	102.3	98	
LB-5	5.00	12	RING		Silty Clay	18.6	95.2	65	
LB-5	5.00					21.0			
LB-5	5.10	12	SB						
LB-5	10.00	12	RING		Silty Clay	12.3	119.4	81	
LB-5	15.00	12	RING		Silty Clay	17.2	110.3	88	
LB-5	20.00	12	RING		Silty Clay	17.5	115.5	100	
LB-5	25.00	12	RING		Silty Clay	18.5	106.7	86	
LB-5	25.00					22.1			
LB-5	25.10	12	SB						
LB-5	35.00	12	RING		Silty Clay	19.5	106.9	91	
LB-5	45.00	12	RING		Silty Clay	23.2	101.9	96	
LB-5	45.00					22.5			
LB-5	45.10	12	SB						
LB-5	55.00	12	RING		Silty Clay	32.2	95.1	100	
LB-5	65.00	12	RING		Silty Clay	29.7	93.8	100	
LB-5	75.00	12	RING		Silty Clay	28.1	95.3	99	
LB-5	85.00	12	RING		Silty Clay	25.4	102.8	100	

Figure No. C-1

STONEY-MILLER CONSULTANTS, INC.

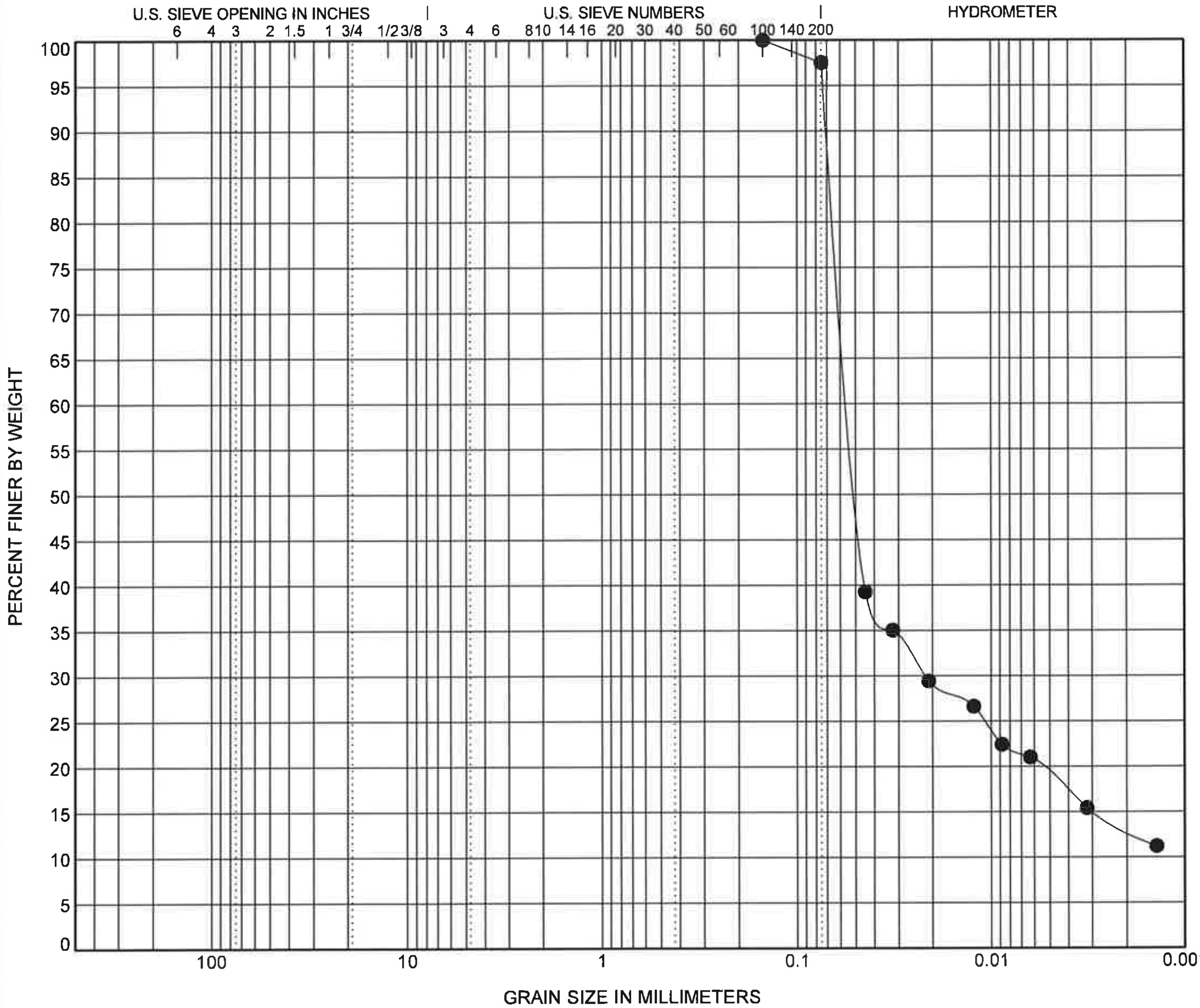
GRAIN SIZE DISTRIBUTION

Client: Griffin Living, LLC

Project Number: 14283-00L

Project Name: Griffin Living

Address: 24600 La Plata Drive;Laguna Niguel



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● LB-4	**45.0**	**Silty Clay**					

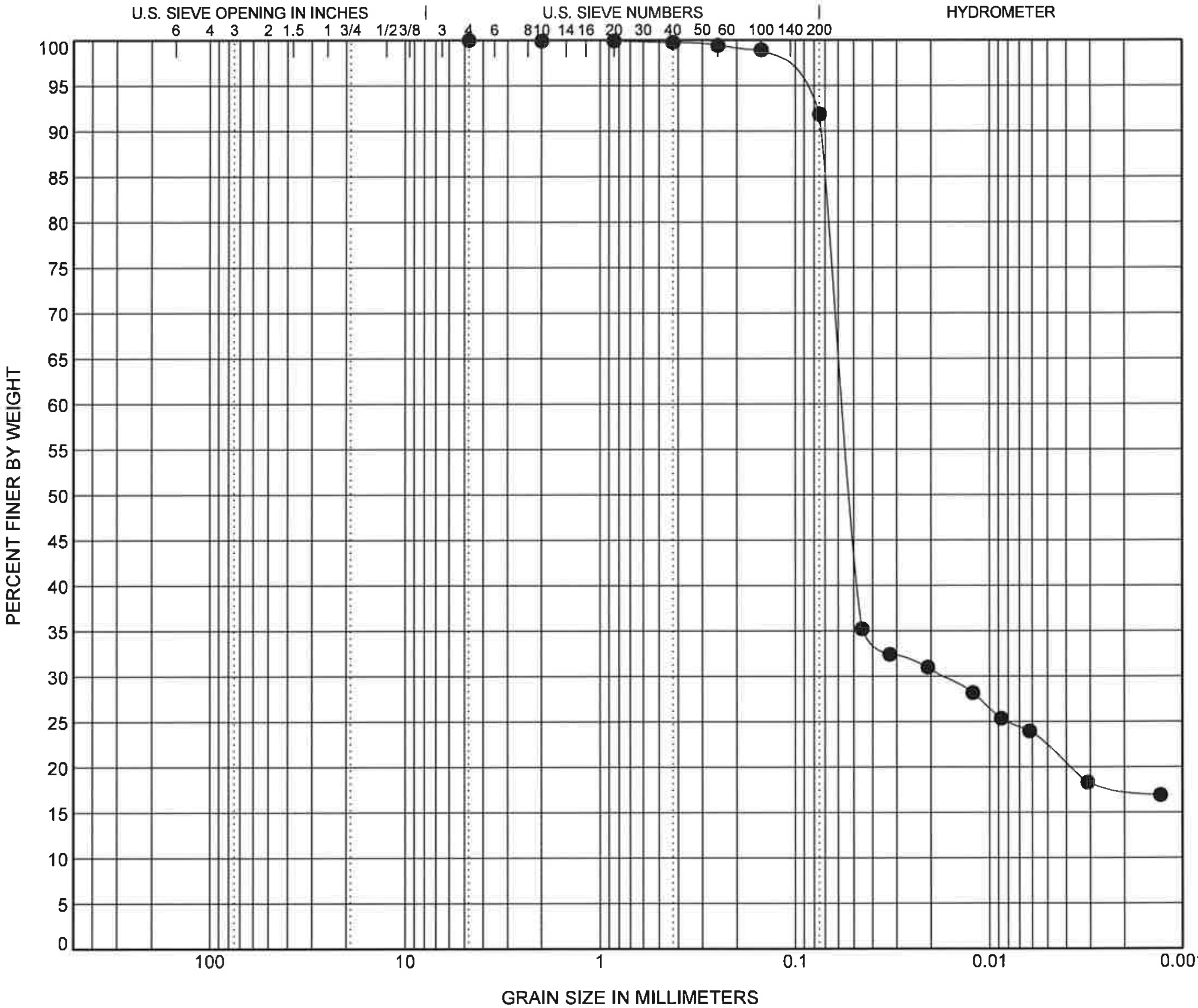
BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● LB-4	**45.0**	**0.15**	**0.054**	**0.022**		**0.0**	**2.5**	**78.4**	**19.1**

STONEY-MILLER CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**LB-5**	**5.0**	**Silty Clay**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**LB-5**	**5.0**	**4.75**	**0.057**	**0.017**		**0.0**	**8.1**	**69.7**	**22.2**

Figure No. C-3

GRAIN SIZE DISTRIBUTION

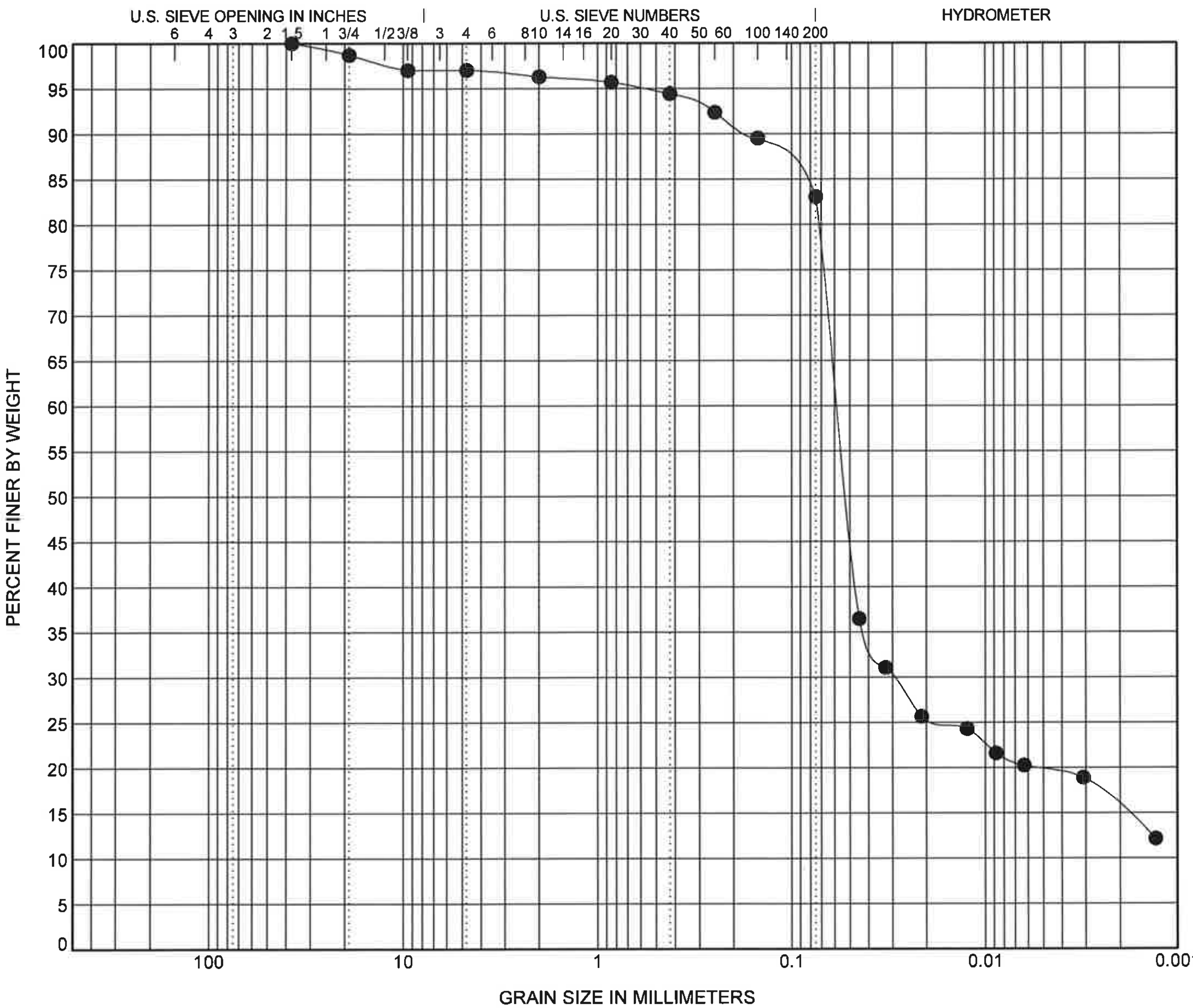
STONEY-MILLER CONSULTANTS, INC.

Client: Griffin Living, LLC

Project Number: 14283-00L

Project Name: Griffin Living

Address: 24600 La Plata Drive;Laguna Niguel



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	LB-5	5.0						

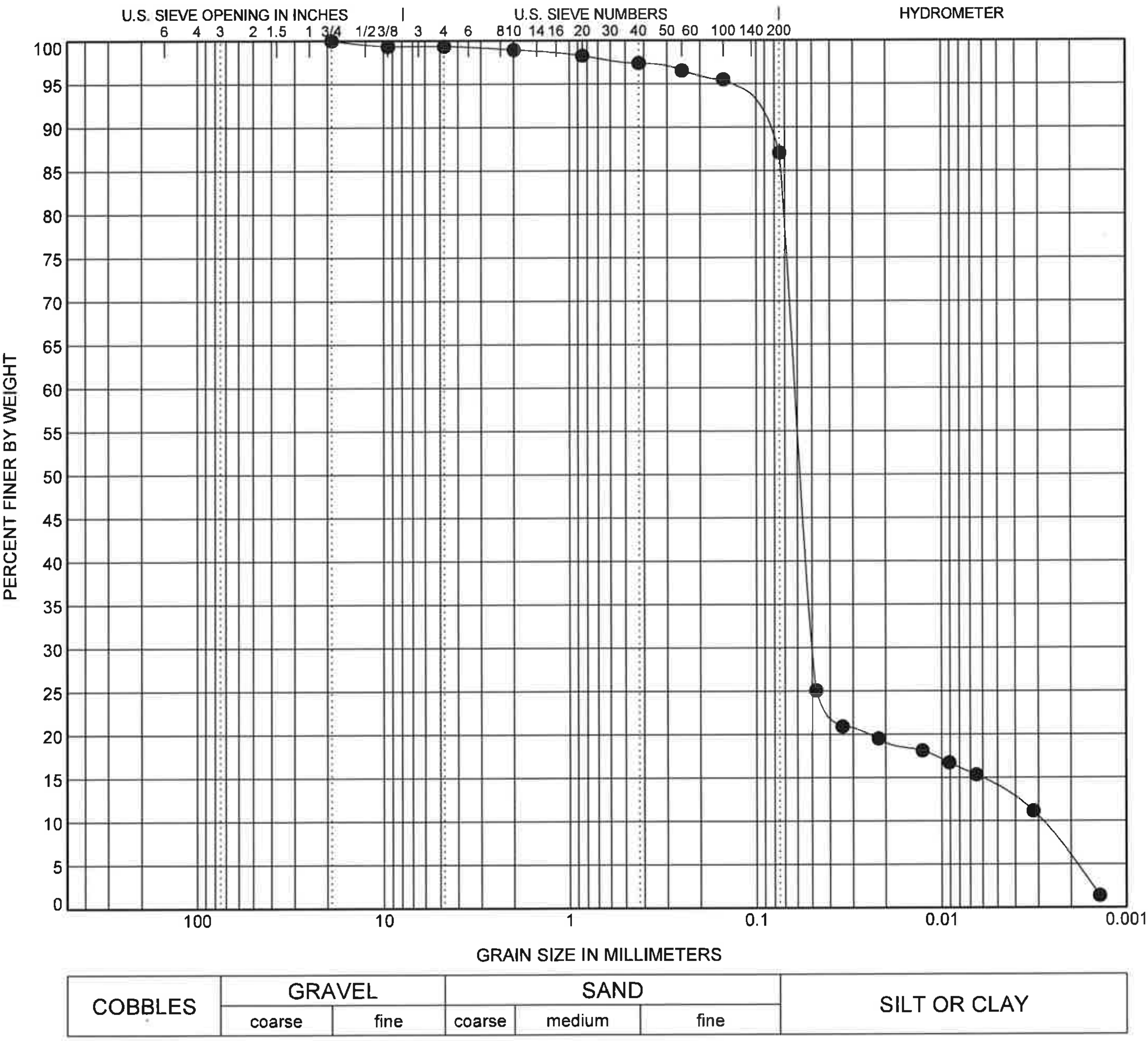
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	LB-5	5.0	37.5	0.058	0.03		3.0	14.0	63.2	19.8

STONEY-MILLER CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **LB-5**	**45.0**	**Silty Clay**	**50**	**28**	**22**	**13.64**	**21.19**

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **LB-5**	**45.0**	**19**	**0.061**	**0.049**	**0.003**	**0.7**	**12.3**	**73.3**	**13.8**

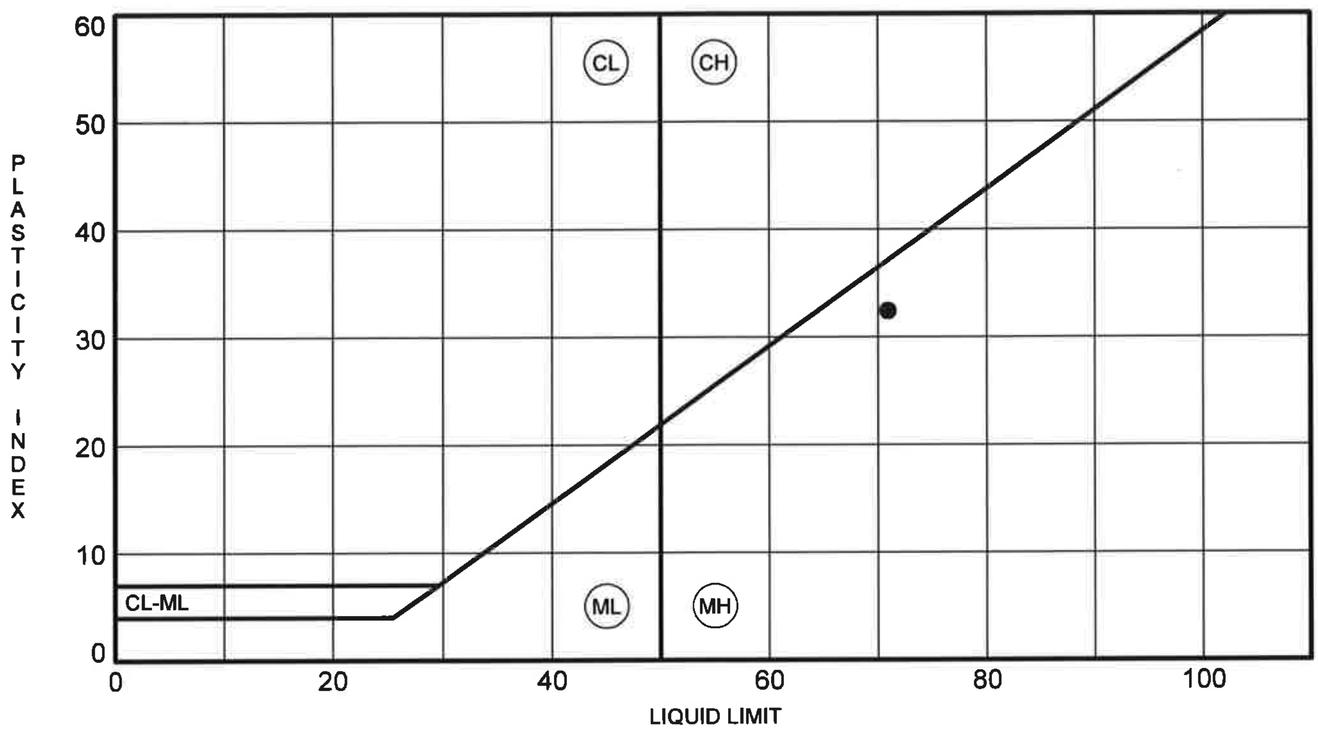
Figure No. C-5

STONEY-MILLER CONSULTANTS, INC.

ATTERBERG LIMITS' RESULTS

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**LB-4**	**35.00**	**71**	**38**	**33**		**Silty Clay**

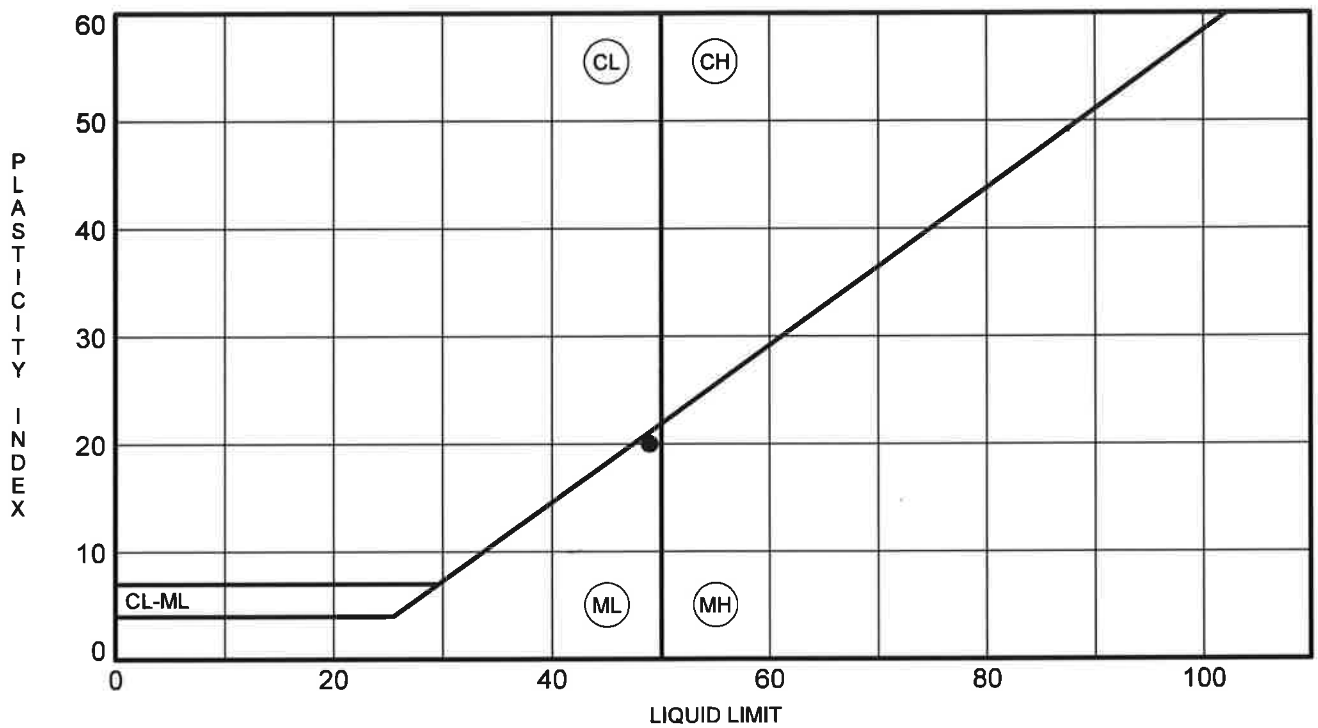
Figure No. C-6

STONEY-MILLER CONSULTANTS, INC.

ATTERBERG LIMITS' RESULTS

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**LB-5**	**5.00**	**49**	**29**	**20**	**92**	**Silty Clay**

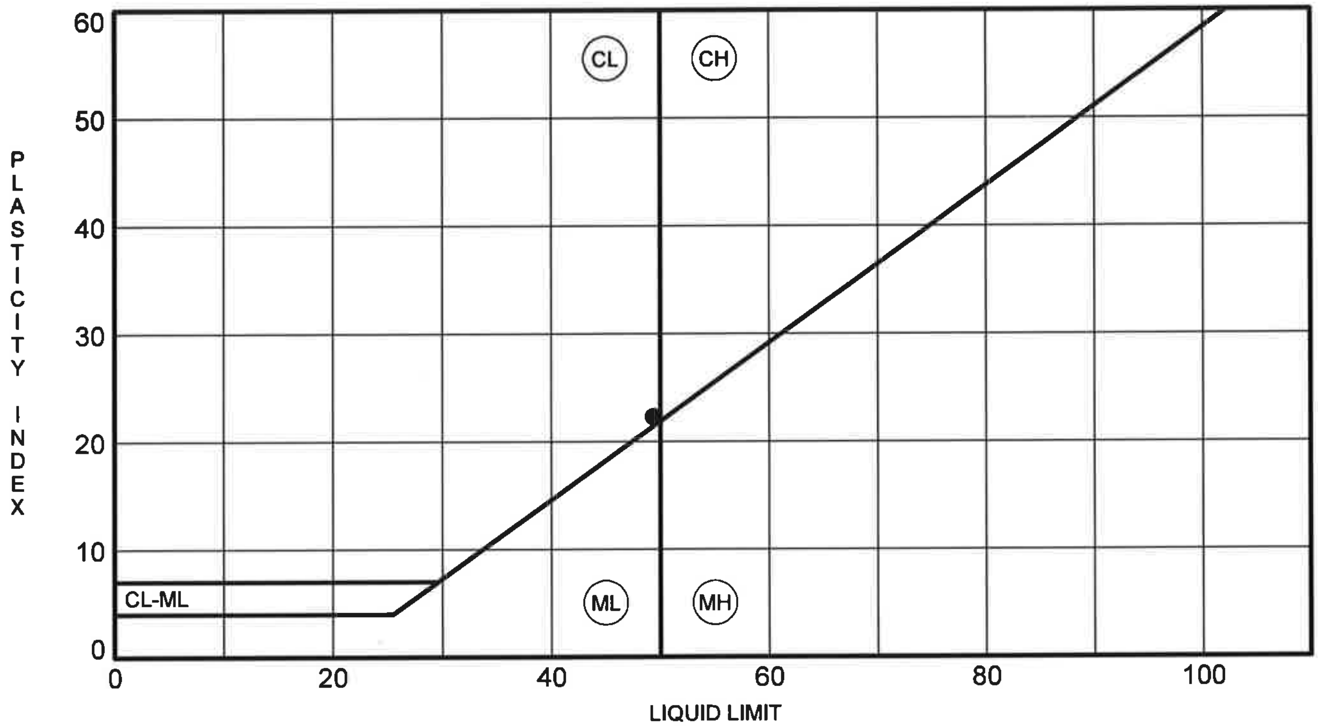
Figure No. C-7

STONEY-MILLER CONSULTANTS, INC.

ATTERBERG LIMITS' RESULTS

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**LB-5**	**20.00**	**49**	**27**	**22**		**Silty Clay**

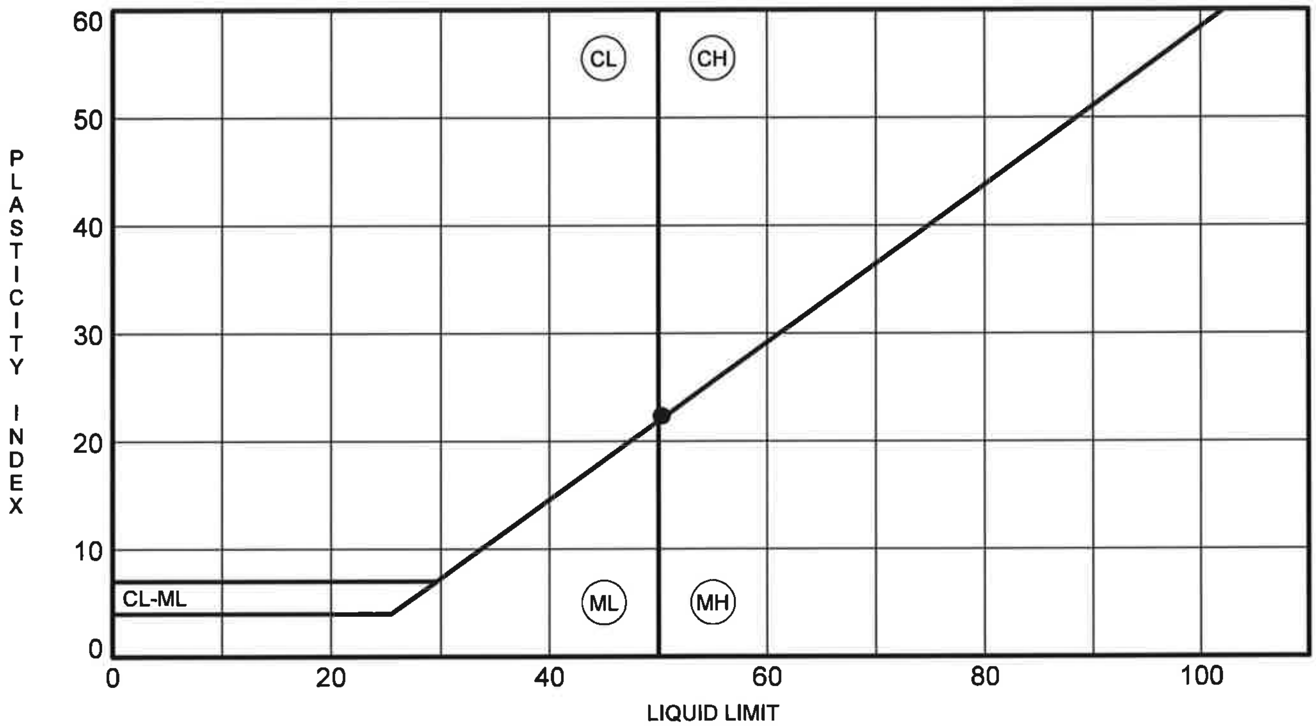
Figure No. C-8

STONEY-MILLER CONSULTANTS, INC.

ATTERBERG LIMITS' RESULTS

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**LB-5**	**45.00**	**50**	**28**	**22**		**Silty Clay**

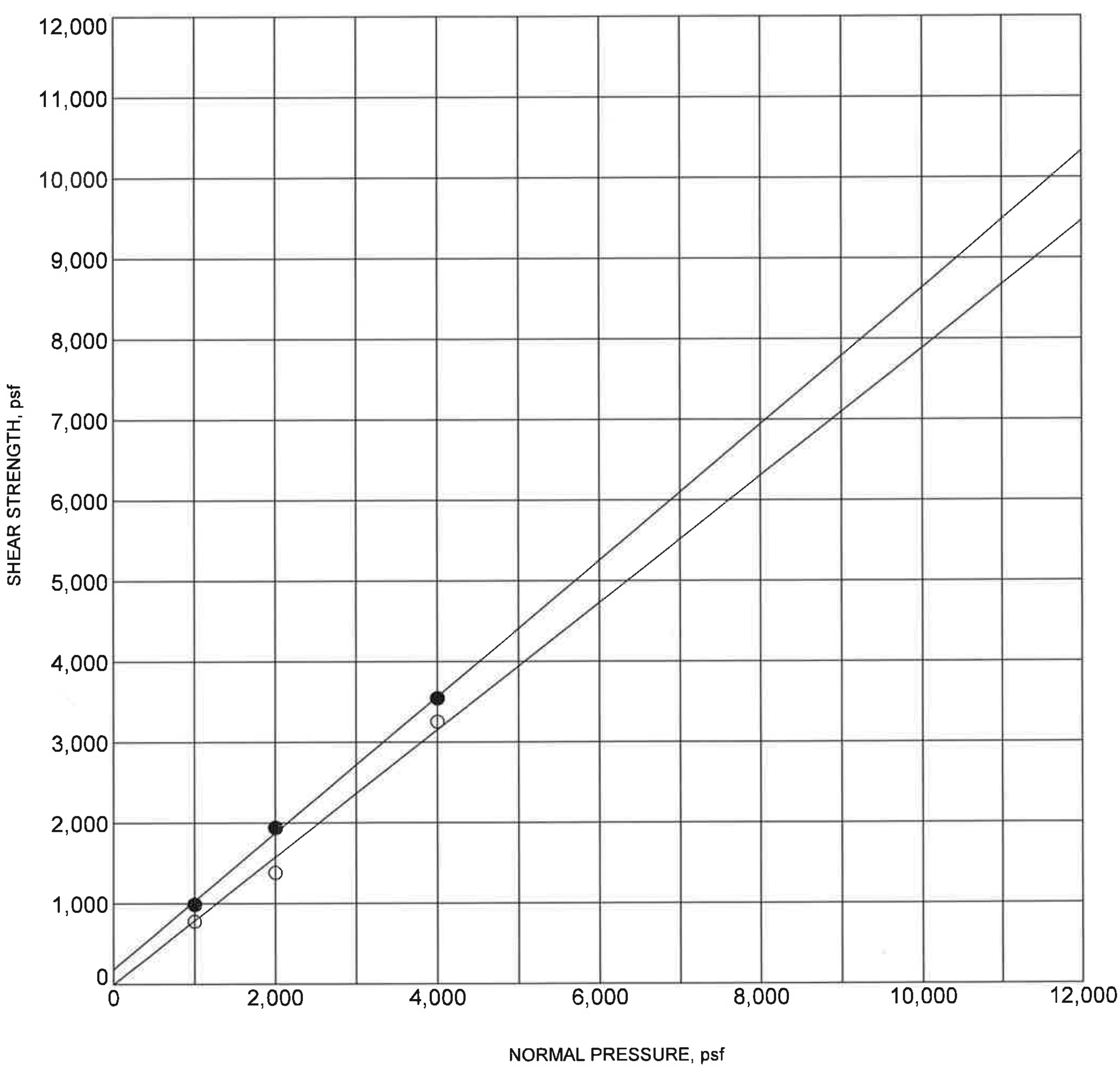
Figure No. C-9

STONEY-MILLER CONSULTANTS, INC.

DIRECT SHEAR TEST

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	Description	γ_d	MC%	c	ϕ
●	**LB-4**	**15.0**	**Peak Strength**	**95**	**30**	**186**	**40**
○	**LB-4**	**15.0**	**Ultimate Strength**			**0**	**38**

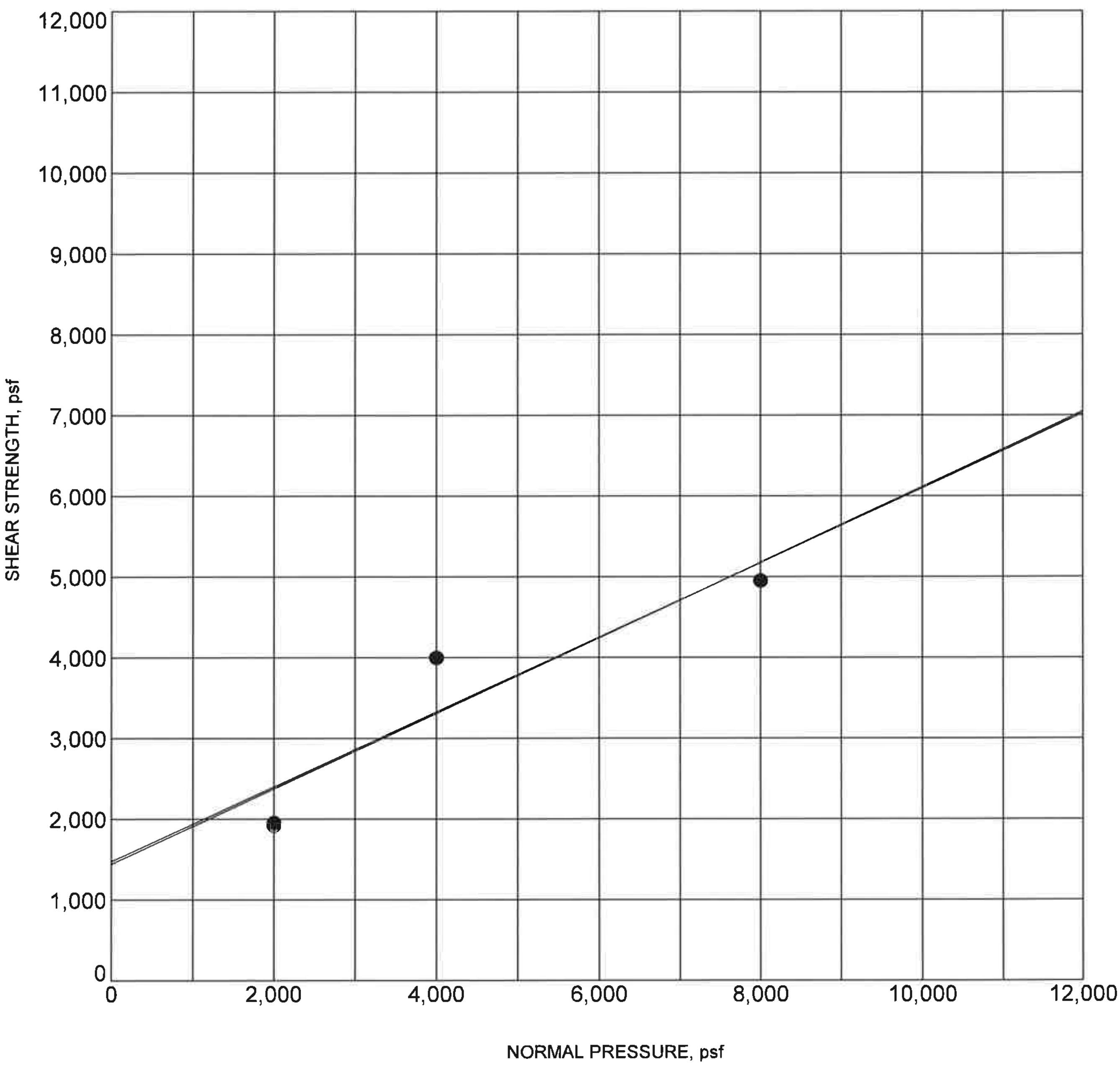
Figure No. C-10

STONEY-MILLER CONSULTANTS, INC.

DIRECT SHEAR TEST

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	Description	γ_d	MC%	c	ϕ
●	**LB-4**	**40.0**	**Peak Strength**	**92**	**31**	**1477**	**25**
○	**LB-4**	**40.0**	**Ultimate Strength**			**1442**	**25**

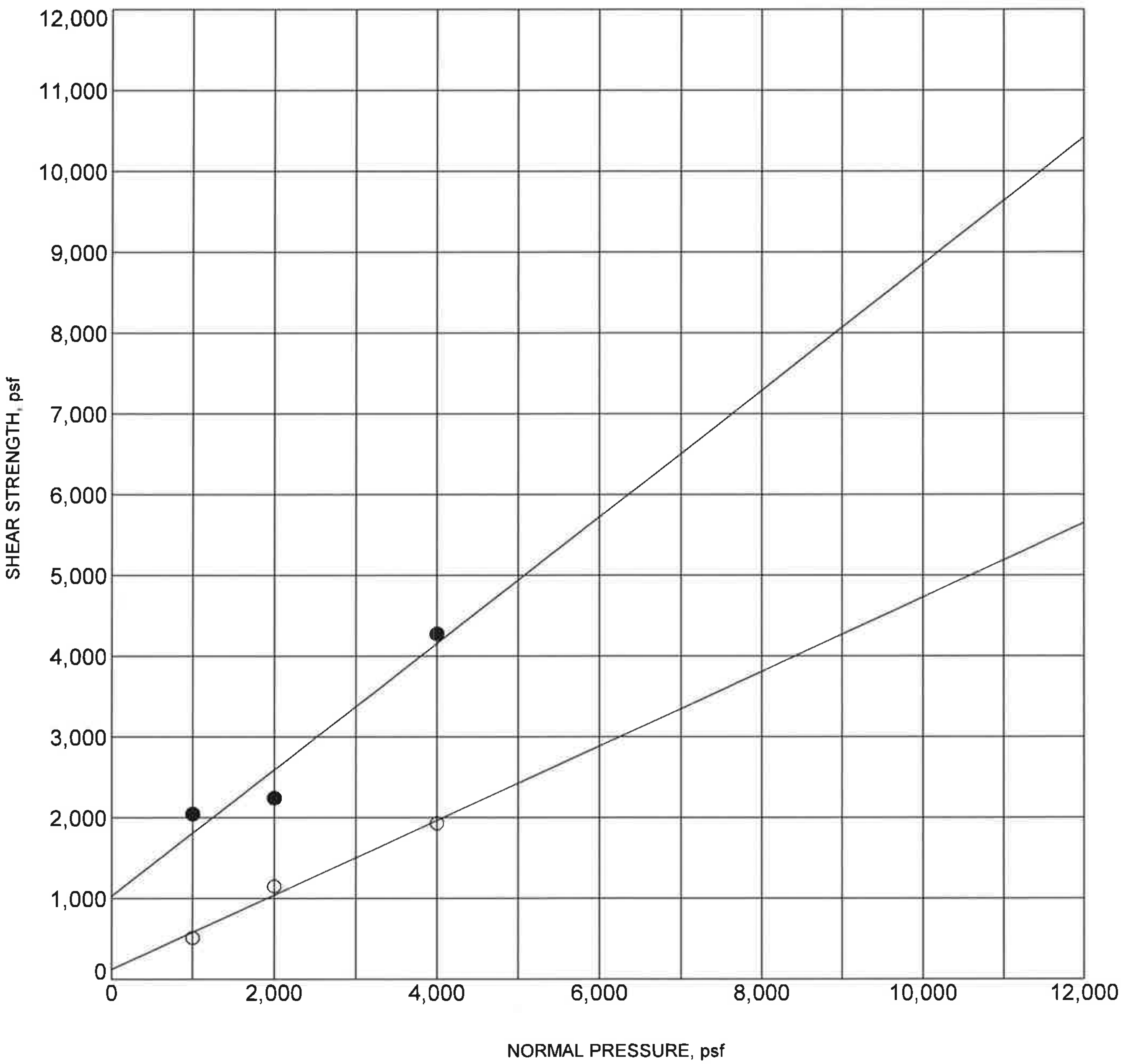
Figure No. C-11

STONEY-MILLER CONSULTANTS, INC.

DIRECT SHEAR TEST

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	Description	γ_d	MC%	c	ϕ
●	**LB-5**	**10.0**	**Peak Strength**	**107**	**22**	**1029**	**38**
○	**LB-5**	**10.0**	**Ultimate Strength**			**122**	**25**

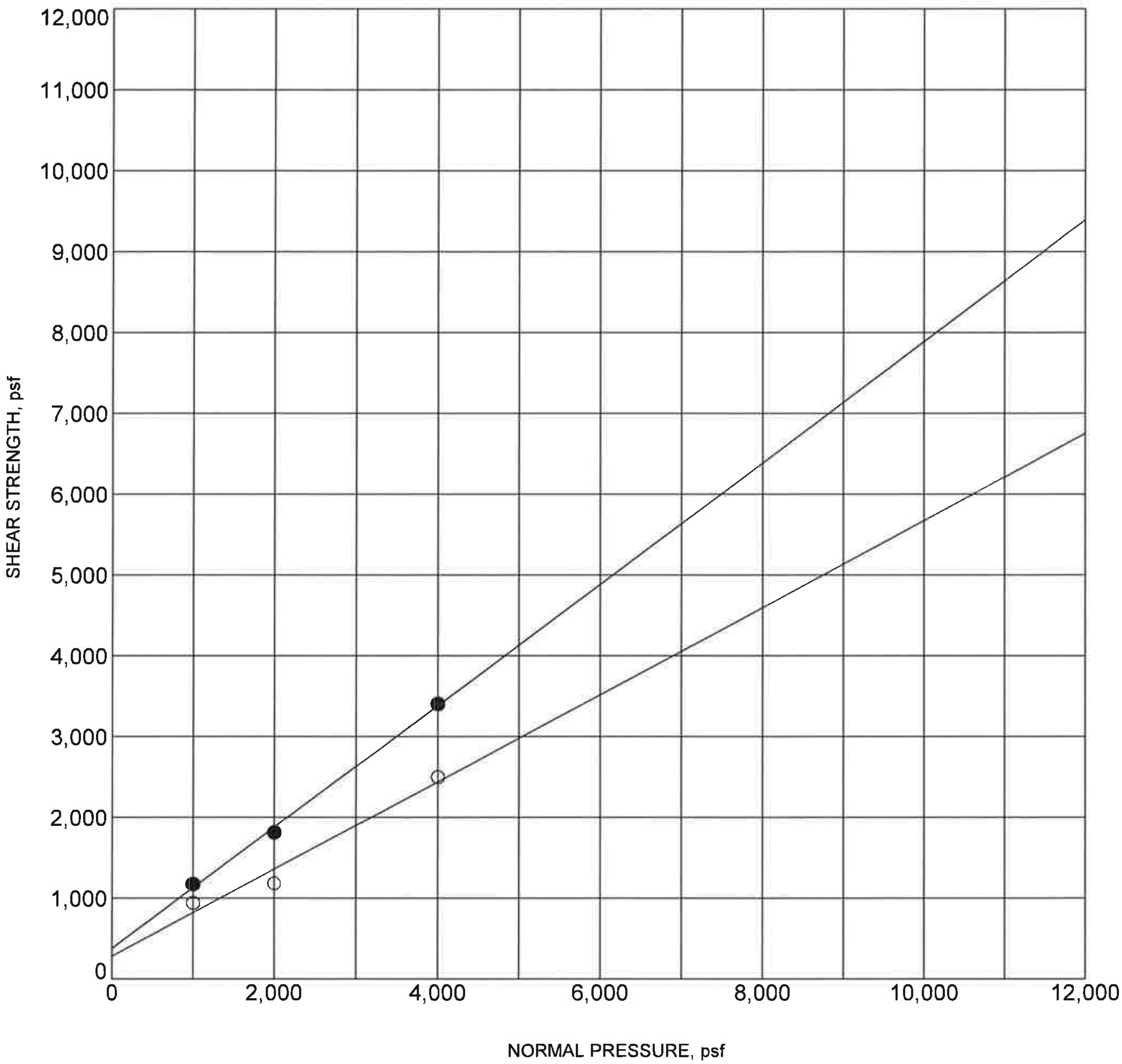
Figure No. C-12

STONEY-MILLER CONSULTANTS, INC.

DIRECT SHEAR TEST

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	Description	γ_d	MC%	c	ϕ
●	**LB-5**	**15.0**	**Peak Strength**	**97**	**26**	**378**	**37**
○	**LB-5**	**15.0**	**Ultimate Strength**			**284**	**28**

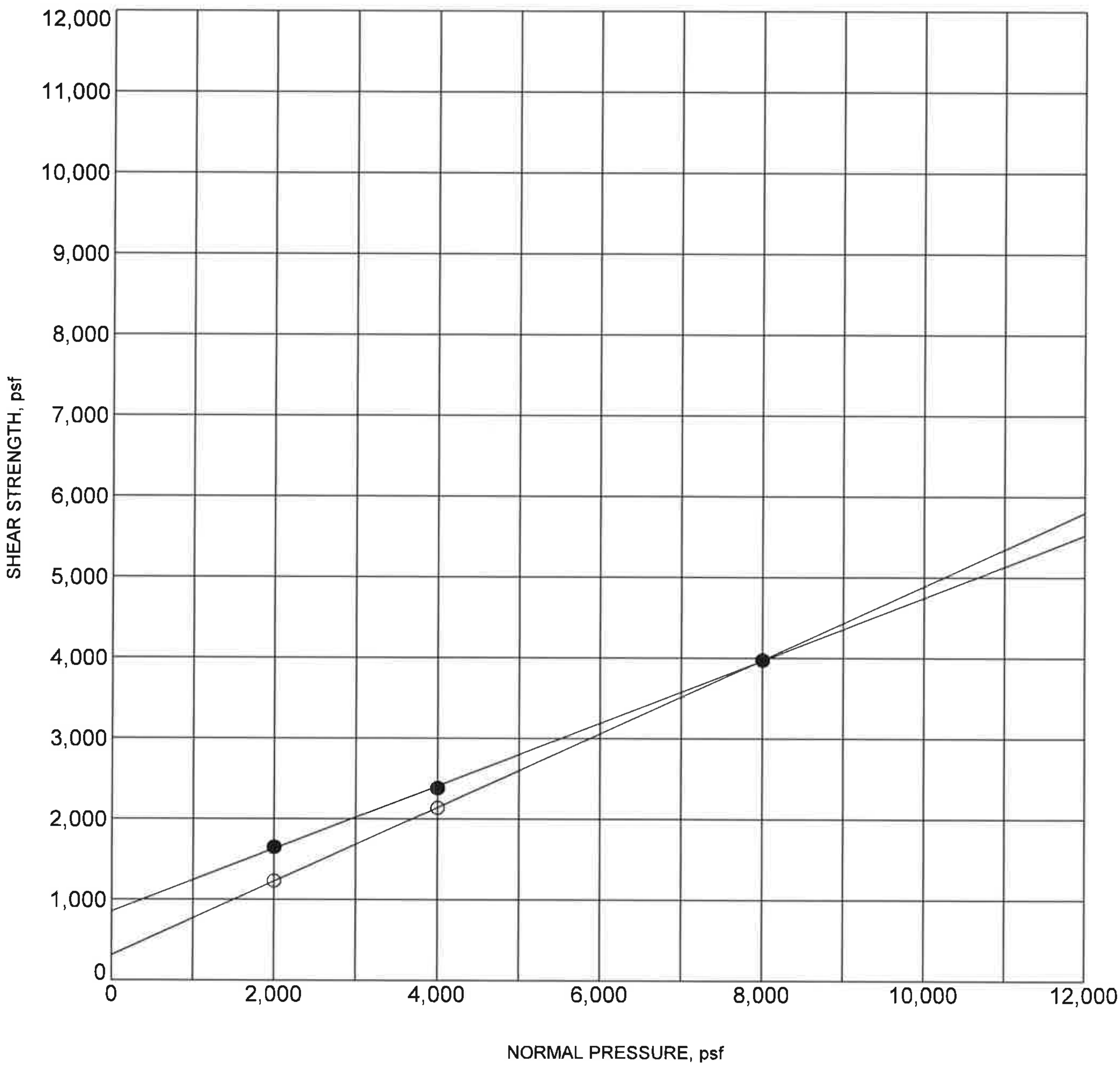
Figure No. C-13

STONEY-MILLER CONSULTANTS, INC.

DIRECT SHEAR TEST

Client: Griffin Living, LLC
Project Number: 14283-00L

Project Name: Griffin Living
Address: 24600 La Plata Drive;Laguna Niguel



	BOREHOLE	DEPTH	Description	γ_d	MC%	c	ϕ
●	**LB-5**	**65.0**	**Peak Strength**	**86**	**36**	**854**	**21**
○	**LB-5**	**65.0**	**Ultimate Strength**			**314**	**25**

Figure No. C-14

HDR

Table 1 - Laboratory Tests on Soil Samples

Stoney-Miller Consultants, Inc.
Griffin Living LLC
Your #14283-00, HDR Lab #21-0071LAB
26-Jan-21

Sample ID			
			LB-4 @ 25
Resistivity		**Units**	
as-received		ohm-cm	2,560
minimum		ohm-cm	368
pH			7.8
Electrical Conductivity		mS/cm	1.98
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	345
magnesium	Mg^{2+}	mg/kg	207
sodium	Na^{1+}	mg/kg	1,380
potassium	K^{1+}	mg/kg	169
ammonium	NH_4^{1+}	mg/kg	ND
Anions			
carbonate	CO_3^{2-}	mg/kg	ND
bicarbonate	HCO_3^{1-}	mg/kg	994
fluoride	F^{1-}	mg/kg	54
chloride	Cl^{1-}	mg/kg	276
sulfate	SO_4^{2-}	mg/kg	3,950
nitrate	NO_3^{1-}	mg/kg	3.4
phosphate	PO_4^{3-}	mg/kg	ND
Other Tests			
sulfide	S^{2-}	qual	na
Redox		mV	na

Minimum resistivity and pH per CTM 643, Chloride per CTM 422, Sulfate per CTM 417

Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.

mg/kg = milligrams per kilogram (parts per million) of dry soil.

Redox = oxidation-reduction potential in millivolts

ND = not detected

na = not analyzed

HDR

Table 1 - Laboratory Tests on Soil Samples

Stoney-Miller Consultants, Inc.
Griffin Living LLC
Your #14283-00, HDR Lab #21-0066LAB
26-Jan-21

Sample ID			LB-5 @ 0
Resistivity		**Units**	
as-received		ohm-cm	3,920
minimum		ohm-cm	480
pH			7.0
Electrical Conductivity		mS/cm	2.84
Chemical Analyses			
Cations			
calcium	Ca^{2+}	mg/kg	2,850
magnesium	Mg^{2+}	mg/kg	677
sodium	Na^{1+}	mg/kg	966
potassium	K^{1+}	mg/kg	104
ammonium	NH_4^{1+}	mg/kg	ND
Anions			
carbonate	CO_3^{2-}	mg/kg	ND
bicarbonate	HCO_3^{1-}	mg/kg	229
fluoride	F^{1-}	mg/kg	14
chloride	Cl^{1-}	mg/kg	298
sulfate	SO_4^{2-}	mg/kg	12,300
nitrate	NO_3^{1-}	mg/kg	81
phosphate	PO_4^{3-}	mg/kg	ND
Other Tests			
sulfide	S^{2-}	qual	na
Redox		mV	na

Minimum resistivity and pH per CTM 643, Chloride per CTM 422, Sulfate per CTM 417

Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.

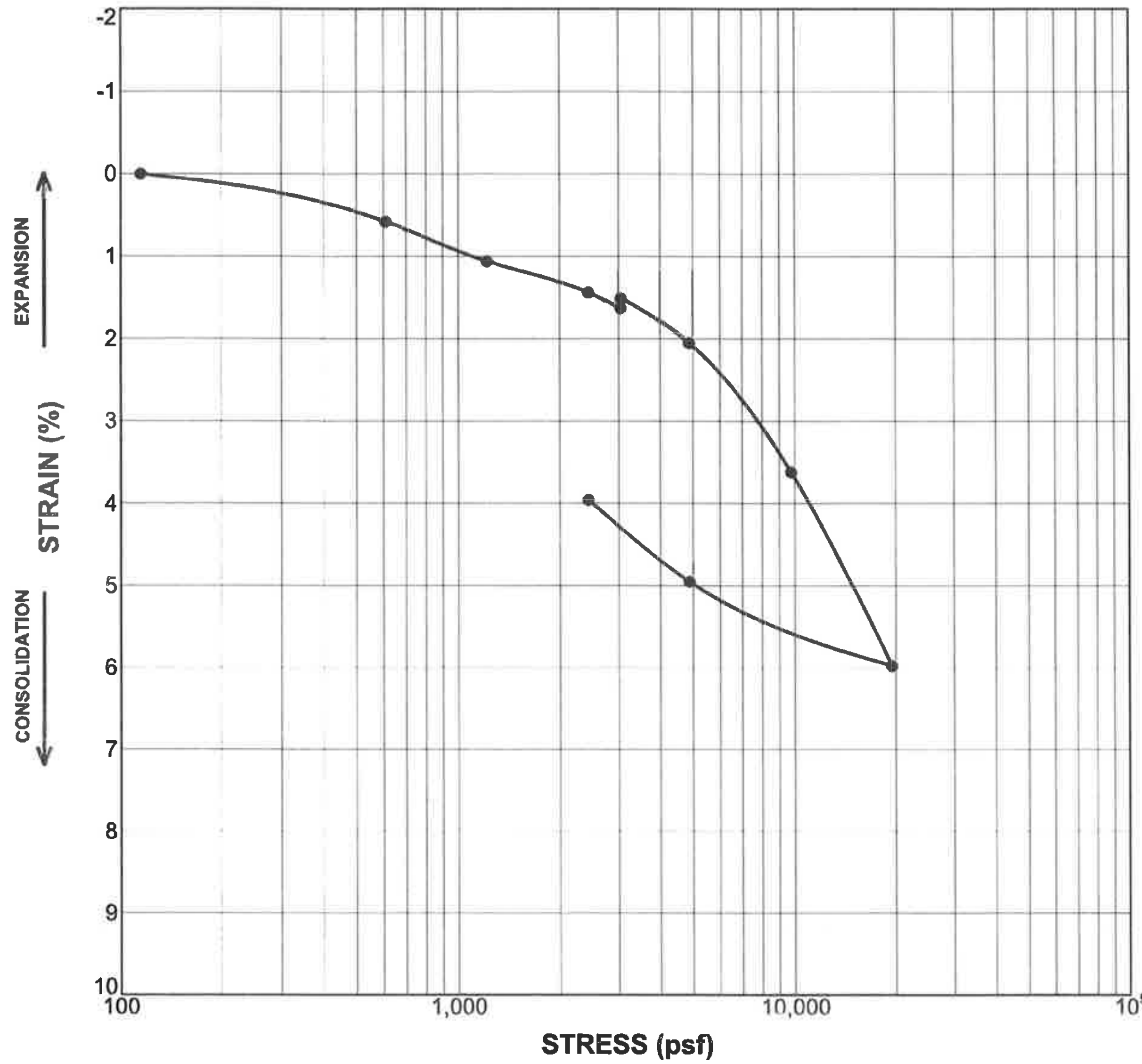
mg/kg = milligrams per kilogram (parts per million) of dry soil.

Redox = oxidation-reduction potential in millivolts

ND = not detected

na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316



SYMBOL	LOCATION	DEPTH	e_o	CLASS.	VOLUME CHANGE,%	FINES,% (<.075mm)	LOAD WATER ADDED (psf)
●	LB-5	25.0	0.6984		-0.12		3050

Relatively undisturbed sample tested

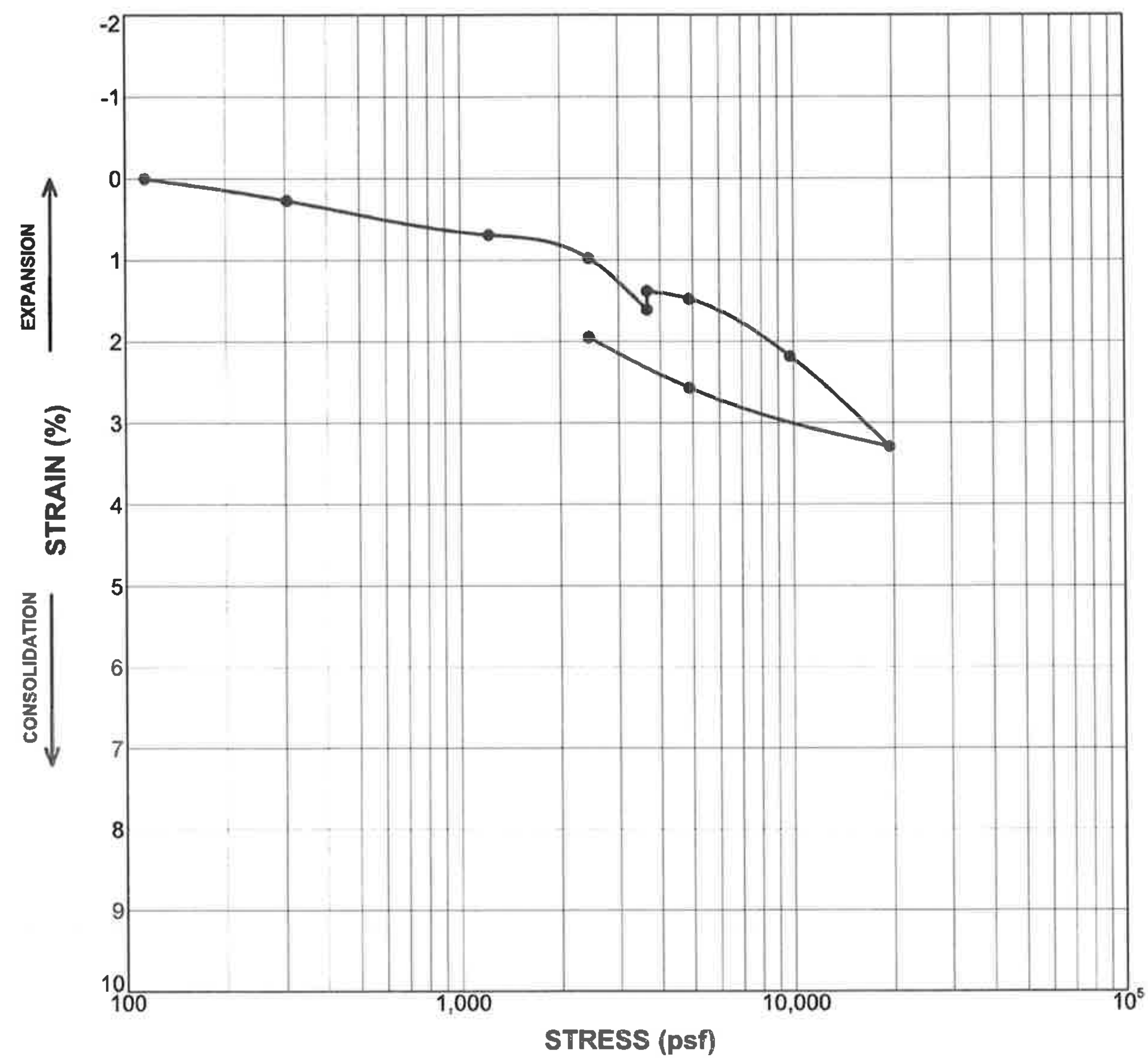
ASTM Method D2435

CONSOLIDATION TEST 21.002.00.GPJ DHLA.GDT 2/8/21

DHLA
DAVID H. LEE & ASSOCIATES
23011 Moulton Parkway #D-12
LAGUNA HILLS, CA 92653
Telephone: 949-461-5690
Fax: 949-461-7901

CONSOLIDATION TEST RESULTS

CLIENT: STONEY-MILLER CONSULTANTS, INC.	PROJECT: 21.002.00	DATE: February, 2021	PLATE A-1.1



SYMBOL	LOCATION	DEPTH	e_o	CLASS.	VOLUME CHANGE,%	FINES,% (<.075mm)	LOAD WATER ADDED (psf)
●	LB-5	35.0	0.5424		-0.23		3660

Relatively undisturbed sample tested

ASTM Method D2435

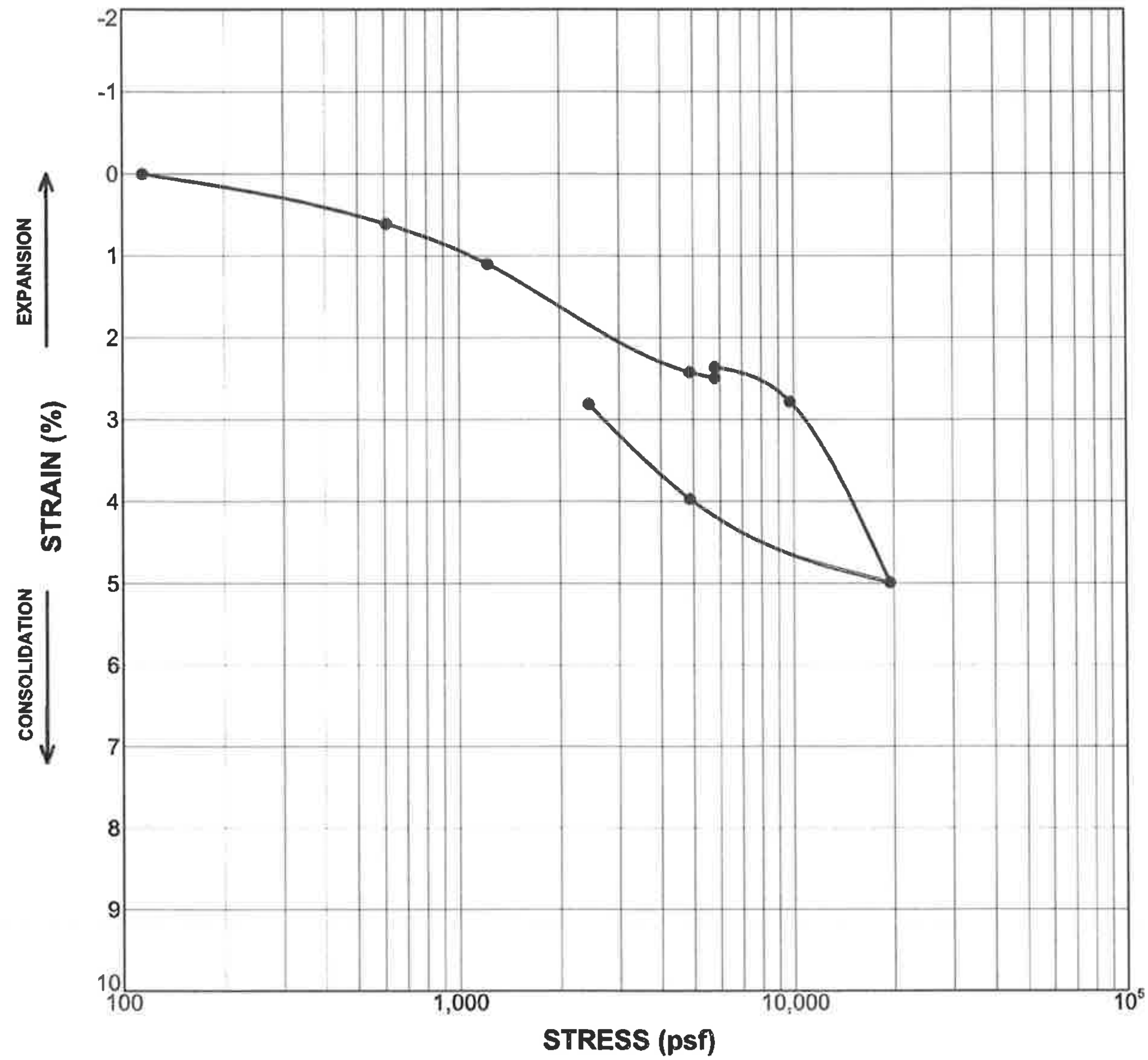
CONSOLIDATION TEST 21.002.00.GPJ DHLA.GDT 2/8/21

DHLA

DAVID H. LEE & ASSOCIATES
23011 Moulton Parkway #D-12
LAGUNA HILLS, CA 92653
Telephone: 949-461-5690
Fax: 949-461-7901

CONSOLIDATION TEST RESULTS

CLIENT: STONEY-MILLER CONSULTANTS, INC.	PROJECT: 21.002.00	DATE: February, 2021	PLATE A-1.2



SYMBOL	LOCATION	DEPTH	e_o	CLASS.	VOLUME CHANGE,%	FINES,% (<.075mm)	LOAD WATER ADDED (psf)
●	LB-5	45.0	0.7077		-0.13		5800

Relatively undisturbed sample tested

ASTM Method D2435

DHLA

DAVID H. LEE & ASSOCIATES
23011 Moulton Parkway #D-12
LAGUNA HILLS, CA 92653
Telephone: 949-461-5690
Fax: 949-461-7901

CONSOLIDATION TEST RESULTS

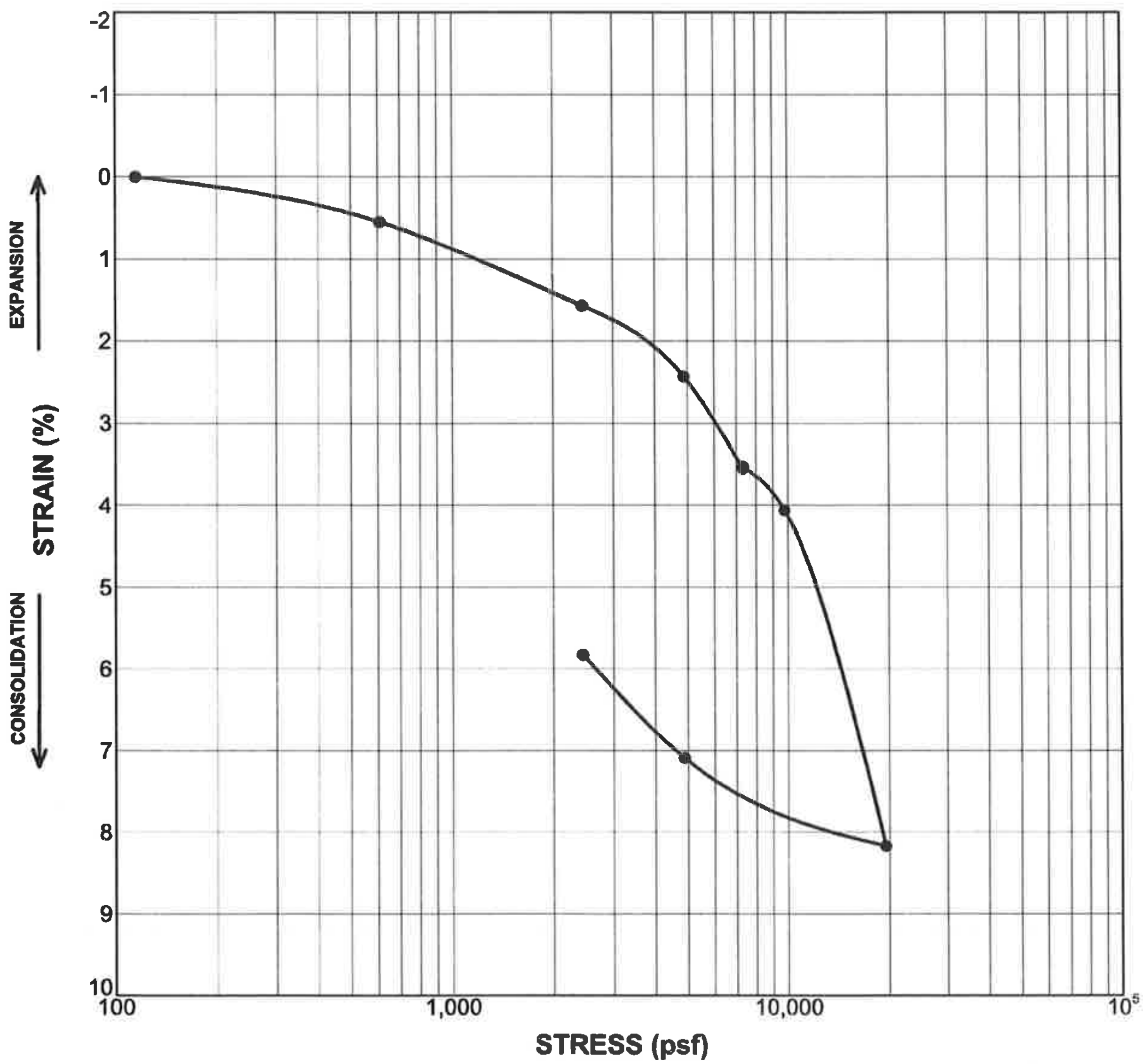
CLIENT: STONEY-MILLER CONSULTANTS, INC.

PROJECT: 21.002.00

DATE: February, 2021

PLATE A-1.3

CONSOLIDATION TEST 21.002.00.GPJ DHLA.GDT 2/8/21



SYMBOL	LOCATION	DEPTH	e_o	CLASS.	VOLUME CHANGE,%	FINES,% (<.075mm)	LOAD WATER ADDED (psf)
●	LB-5	55.0	0.8299		-0.02		7325

Relatively undisturbed sample tested

ASTM Method D2435

CONSOLIDATION TEST 21.002.00.GPJ DHLA.GDT 2/8/21

DHLA

DAVID H. LEE & ASSOCIATES
23011 Moulton Parkway #D-12
LAGUNA HILLS, CA 92653
Telephone: 949-461-5690
Fax: 949-461-7901

CONSOLIDATION TEST RESULTS

CLIENT: STONEY-MILLER CONSULTANTS, INC.	PROJECT: 21.002.00	DATE: February, 2021	PLATE A-1.4

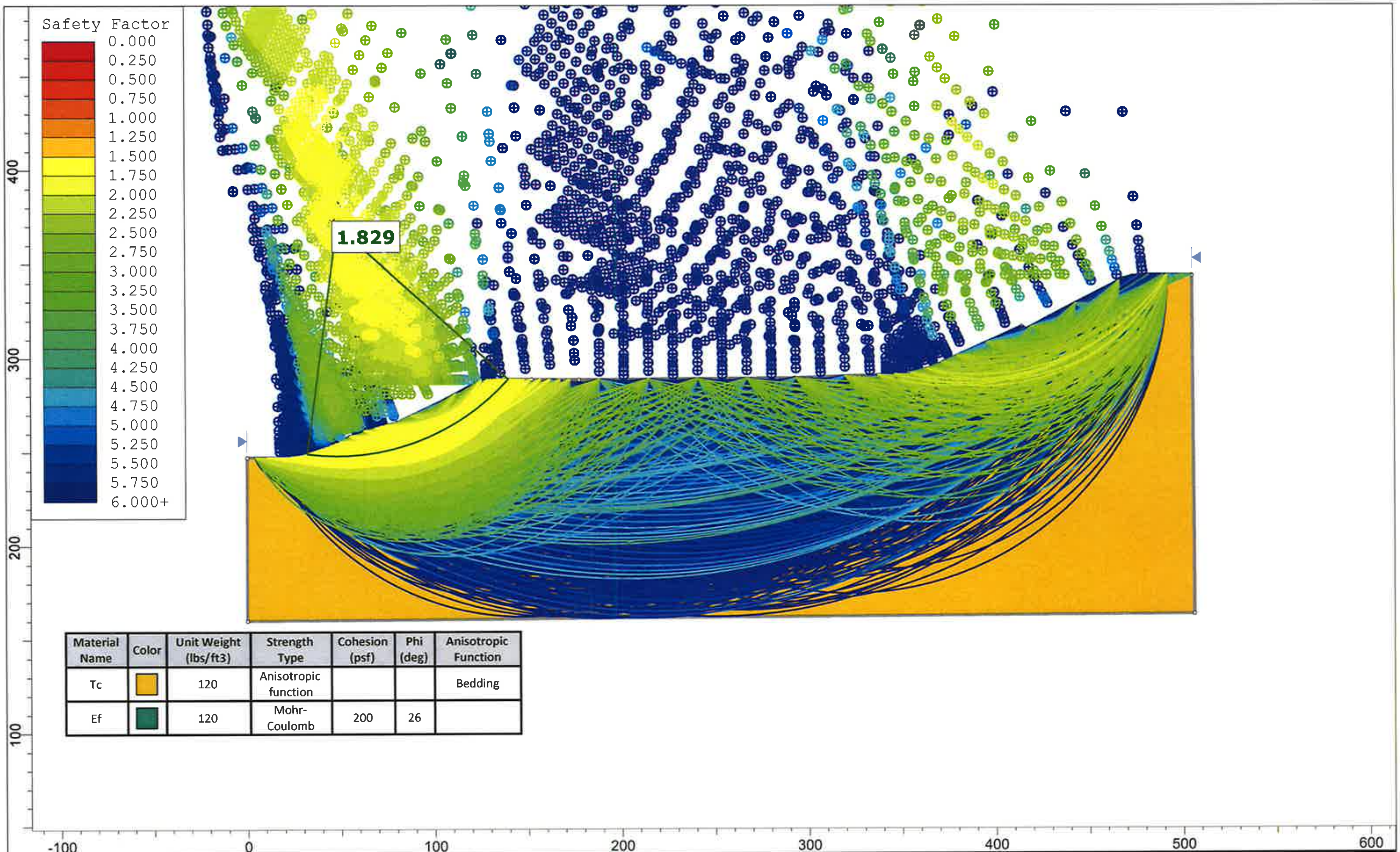
C-20

APPENDIX D

ENGINEERING STABILITY ANALYSES

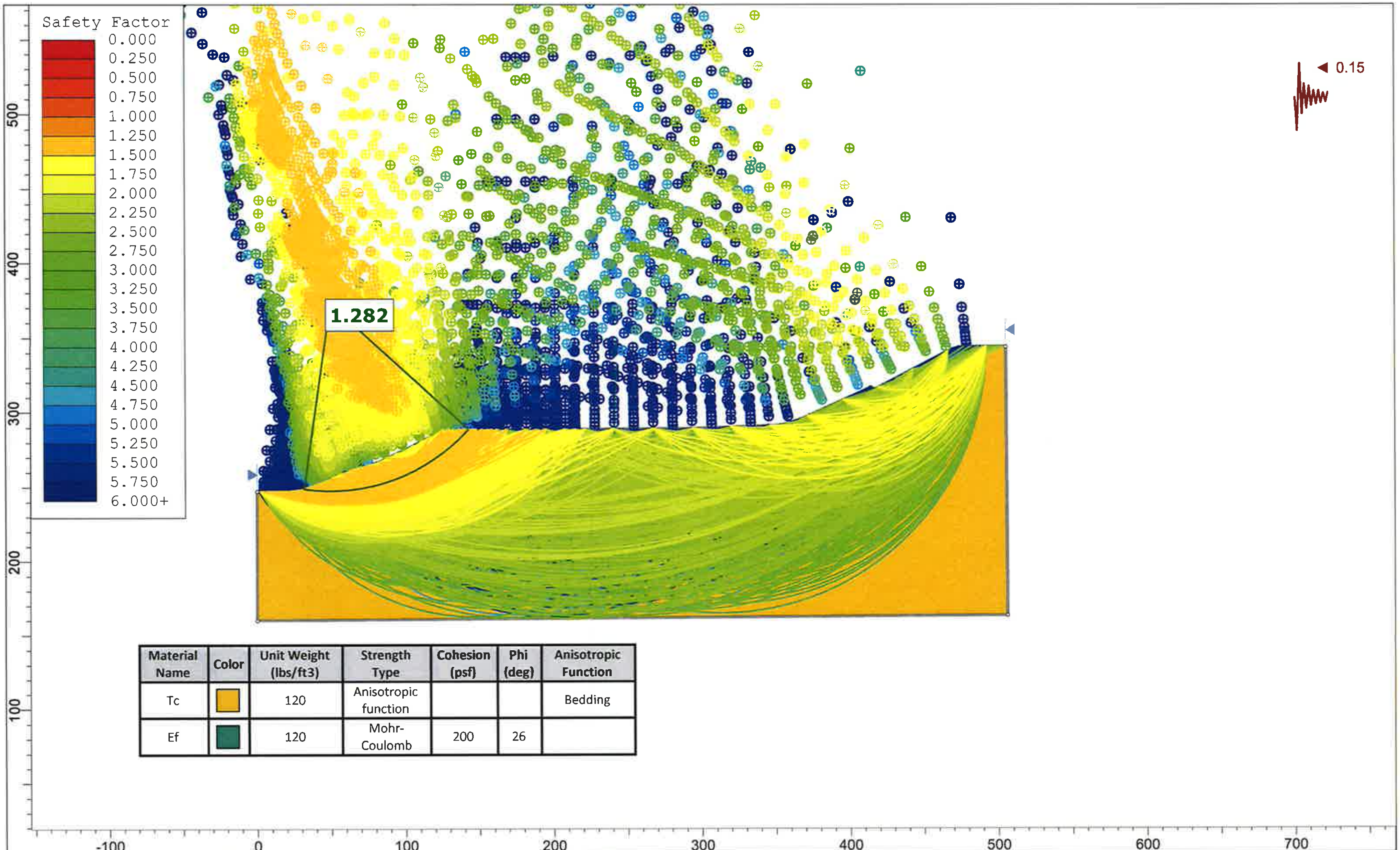
TABLE D-1
SUMMARY OF STRENGTH PARAMETERS

Material Type	Bulk Density γm (pcf)	Bulk Density γs (pcf)	Static Condition		Pseudostatic Condition (0.15g)	
			Cohesion C (psf)	Friction Angle ϕ (deg)	Cohesion C (psf)	Friction Angle ϕ (deg)
Capistrano Bedrock (Tc) – Across Bedding	120	125	700	26	770	28
Capistrano Bedrock (Tc) – Along Bedding	120	125	200	18	220	20
Engineered Fill (Ef)	120	125	200	26	220	28
Assumed Lateral Force (Seismic) – 0.15g						



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function
Tc		120	Anisotropic function			Bedding
Ef		120	Mohr-Coulomb	200	26	

STONEY MILLER CONSULTANTS, INC. GEOFIRM	*Project* 14283- 4600 La Plata Drive, Laguna Niguel, CA 92677 - Static
	Analysis Description Cross-Section A
	Drawn By Rachel Seidner — *Company* Stoney-Miller
SLIDEINTERPRET 9.012	*Date* 2/8/2021, 1:59:50 PM — *File Name* 14283_Griffin_SSA.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Anisotropic Function
Tc		120	Anisotropic function			Bedding
Ef		120	Mohr-Coulomb	200	26	

STONEY MILLER CONSULTANTS, INC. | GEOFIRM

Project	14283- 4600 La Plata Drive, Laguna Niguel, CA 92677 - Seismic
Analysis Description	Cross-Section A
Drawn By	Rachel Seidner
Company	Stoney-Miller
Date	2/8/2021, 1:59:50 PM
File Name	14283_Griffin_SSA.slmd

SLIDEINTERPRET 9.012

APPENDIX E

STANDARD GRADING GUIDELINES

APPENDIX E

STANDARD GRADING GUIDELINES

GENERAL

These specifications present the usual and minimum requirements for grading operations observed by **SMC** or its designated representative. No deviation from these specifications will be allowed, except where specifically superseded in the geotechnical report signed by a registered geotechnical engineer.

The placement, spreading, mixing, watering, and compaction of the fills in strict accordance with these guidelines shall be the sole responsibility of the contractor. The construction, excavation, and placement of fill shall be under the direct observation of the soils engineer signing the soils report. If unsatisfactory soil-related conditions exist, the soils engineer shall have the authority to reject the compacted fill ground and, if necessary, excavation equipment will be shut down to permit completion of compaction. Conformance with these specifications will be discussed in the final report issued by the soils engineer.

SITE PREPARATION

All brush, vegetation and other deleterious material such as rubbish shall be collected, piled and removed from the site prior to placing fill, leaving the site clear and free from objectionable material.

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

The surface shall then be plowed or scarified to a minimum depth of 6 inches until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment used. After the area to receive fill has been cleared and scarified, it shall be diced or bladed by the contractor until it is uniform and free from large clods, brought to the proper moisture content and compacted to minimum requirements. If the scarified zone is greater than 12 inches in depth, the excess shall be removed and placed in lifts restricted to 6 inches.

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

MATERIALS

Materials for compacted fill shall consist of materials approved by the soils engineer. These materials may be excavated from the cut area or imported from other approved sources, and soils from one or more sources may be blended. Fill soils shall be free from organic vegetable matter and other unsuitable substances. Normally, the material shall contain no rocks or hard lumps greater than 6 inches in size and shall contain at least 50 percent of material smaller than 1/4-inch in size. Materials greater than 4 inches in size shall be placed so that they are completely surrounded by compacted fines; no nesting of rocks shall be permitted. No material of a perishable, spongy, or otherwise of an unsuitable nature shall be used in the fill soils.

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

PLACING, SPREADING, AND COMPACTING FILL MATERIAL

The material used in the compacting process shall be evenly spread, watered, processed, and compacted in thin lifts not to exceed 6 inches in thickness to obtain a uniformly dense layer.

When the moisture content of the fill material is below that specified by the soils engineer, water shall be added by the contractor until the moisture content is near optimum as specified.

When the moisture content of the fill material is above that specified by the geotechnical engineer, the fill material shall be aerated by the contractor by blading, mixing, or other satisfactory methods until the moisture content is near optimum as specified.

After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted to 90 percent of the maximum laboratory density in compliance with ASTM D: 1557-02 (five layers). Compaction shall be accomplished by sheepsfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compacting equipment. Equipment shall be of such design that it will be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes to obtain the desired density uniformly.

A minimum relative compaction of 90 percent out to the finished slope face of all fill slopes will be required. Compacting of the slopes shall be accomplished by backrolling the slopes in increments of 2 to 5 feet in elevation gain or by overbuilding and cutting back to the compacted inner core, or by any other procedure which produces the required compaction.

GRADING OBSERVATIONS

The soils engineer shall observe the placement of fill during the grading process and will file a written report upon completion of grading stating his observations as to compliance with these specifications.

One density test shall be required for each 2 vertical feet of fill placed, or one for each 1,000 cubic yards of fill, whichever requires the greater number of tests. Any cleanouts and processed ground to receive fill must be observed by the soils engineer and/or engineering geologist prior to any fill placement. The contractor shall notify the geotechnical engineer when these areas are ready for observation.

PROTECTION OF WORK

During the grading process and prior to the complete construction of permanent drainage controls, it shall be the responsibility of the contractor to provide good drainage and prevent ponding of water and damage to adjoining properties or to finished work on the site.

After the geotechnical engineer has terminated his observations of the completed grading, no further excavations and/or filling shall be performed without the approval of the soils engineer, if it is to be subject to the recommendations of this report.

APPENDIX F

UTILITY TRENCH BACKFILL GUIDELINES

APPENDIX F

UTILITY TRENCH BACKFILL GUIDELINES

The following guidelines pertinent to utility trench backfills are commonly employed on projects throughout southern California and are recommended for use on this project.

1. Each utility subcontractor (gas, electric, water, sewer, telephone, cable TV, irrigation, drainage, etc.) shall submit to the developer for dissemination to his consultants (civil engineer, geotechnical engineer, and utility contractor) a plot plan of all utility lines installed under his purview which identifies line type, material, size, depth, and approximate location.

2. The developer or his agent shall provide a composite plot plan of all utilities or a copy of all individual utility plot plans to his geotechnical engineer for use in evaluating whether all utility trench backfills are suitable for the intended use.

3. The geotechnical engineer shall provide a report, which includes a plot plan showing the location of all utility, trenches which:

   A. Are located within the load influence zone of a structure (1:1 projection);
   B. Are located beneath any hardscape;
   C. Are parallel and in close proximity to the top or toe of a slope and may adversely impact slope stability if improperly backfilled;
   D. Are located on the face of a slope in a trench 18-inches or more in depth.

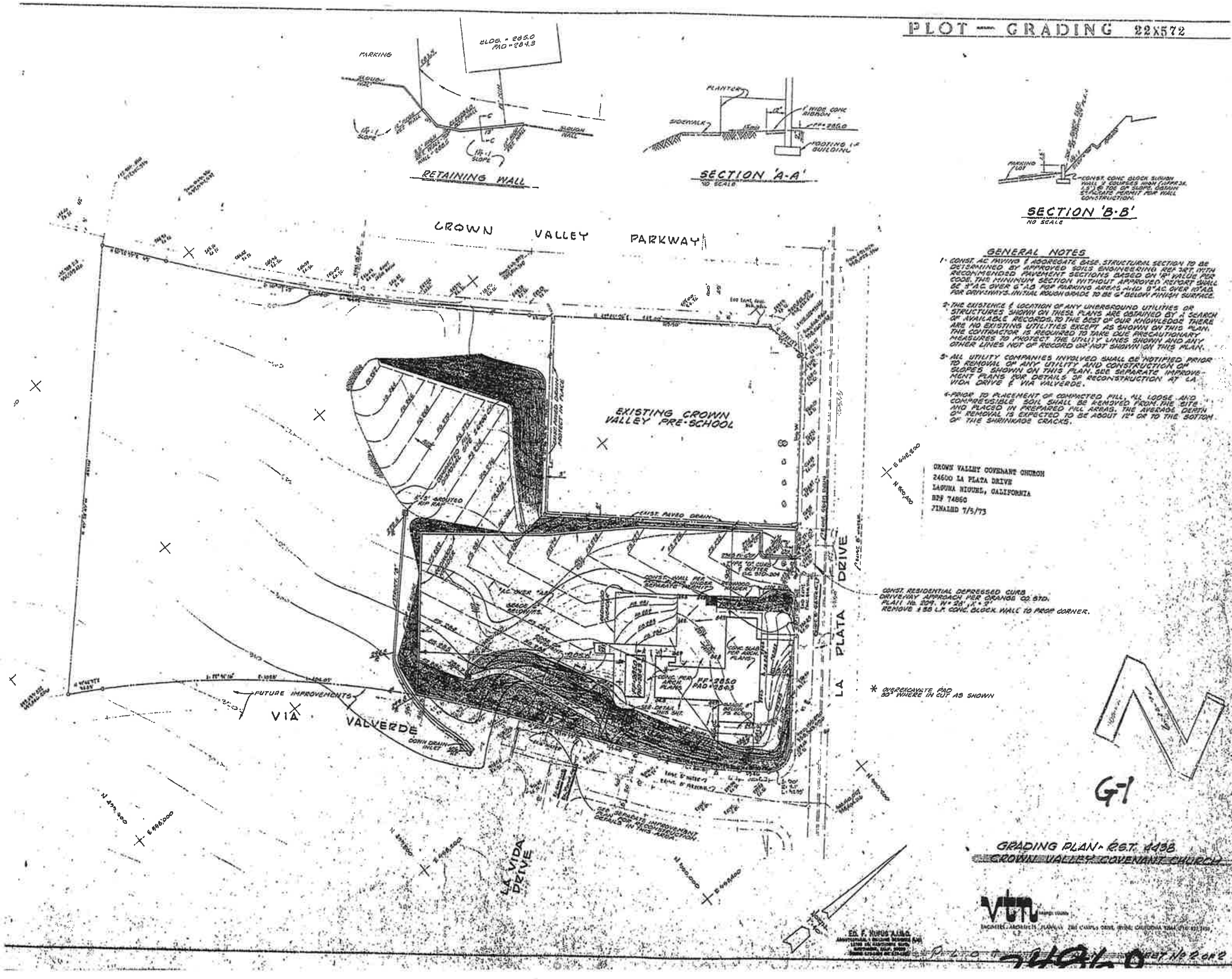
   Typically, trenches that are less than 18-inches in depth will not be within the load influence zone if located next to a structure, and will not have a significant effect on slope stability if constructed near the top or toe of a slope and need not be shown on the plot plan unless determined to be significant by the geotechnical engineer. This plot plan may be prepared by someone other than the geotechnical engineer, but must meet his approval.

4. Backfill compaction test locations must be shown on the plot plan described in No. 3 above, and a table of test data provided in the geotechnical report.

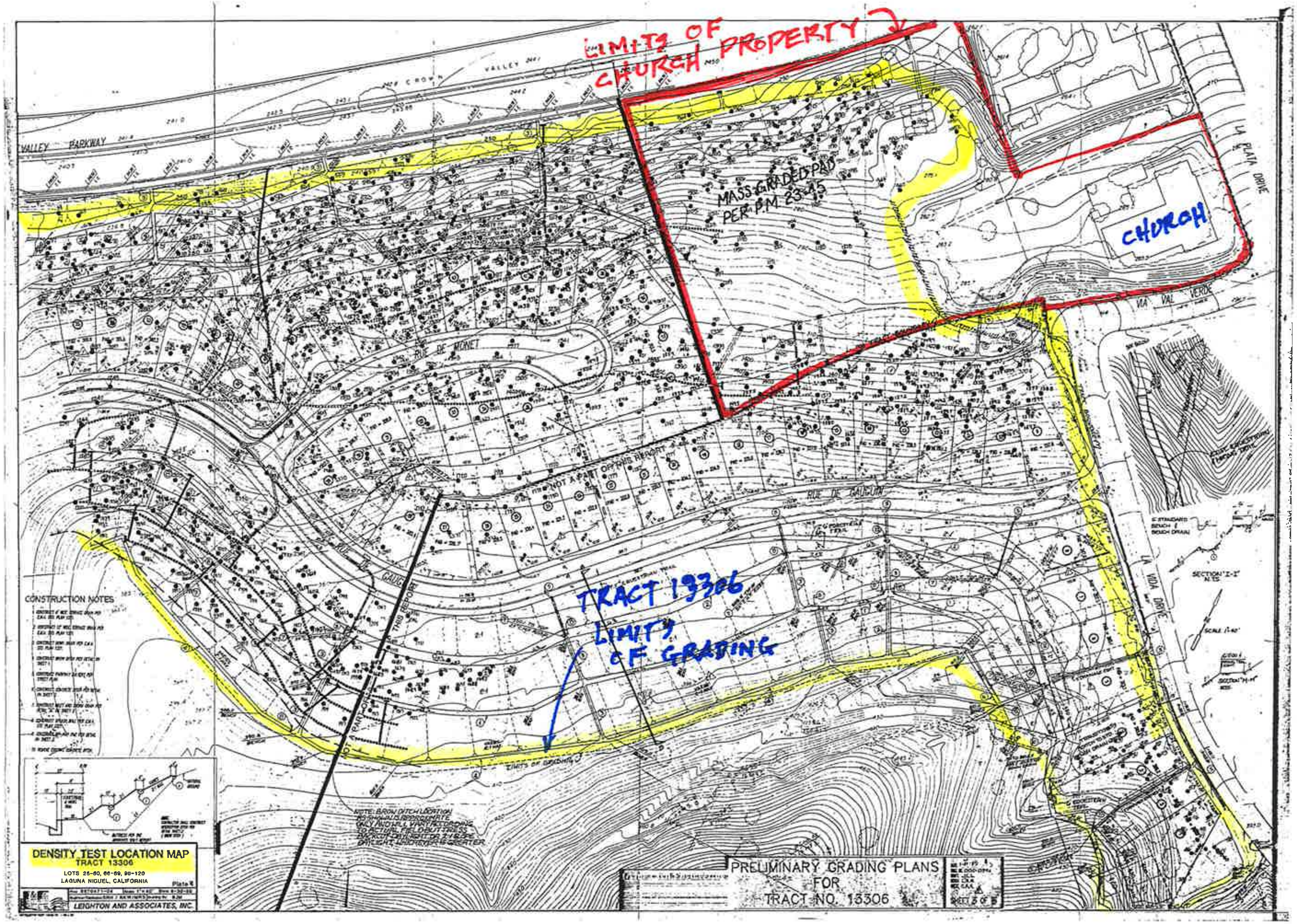
5. The geotechnical report (utility trench backfill) must state that all utility trenches within the subject lots have been backfilled in a manner suitable for the intended use. This includes the backfill of all trenches shown on the plot plan described in No. 3 and the backfill of those trenches, which did not need to be plotted on this plan.

APPENDIX G

HISTORICAL DOCUMENTS

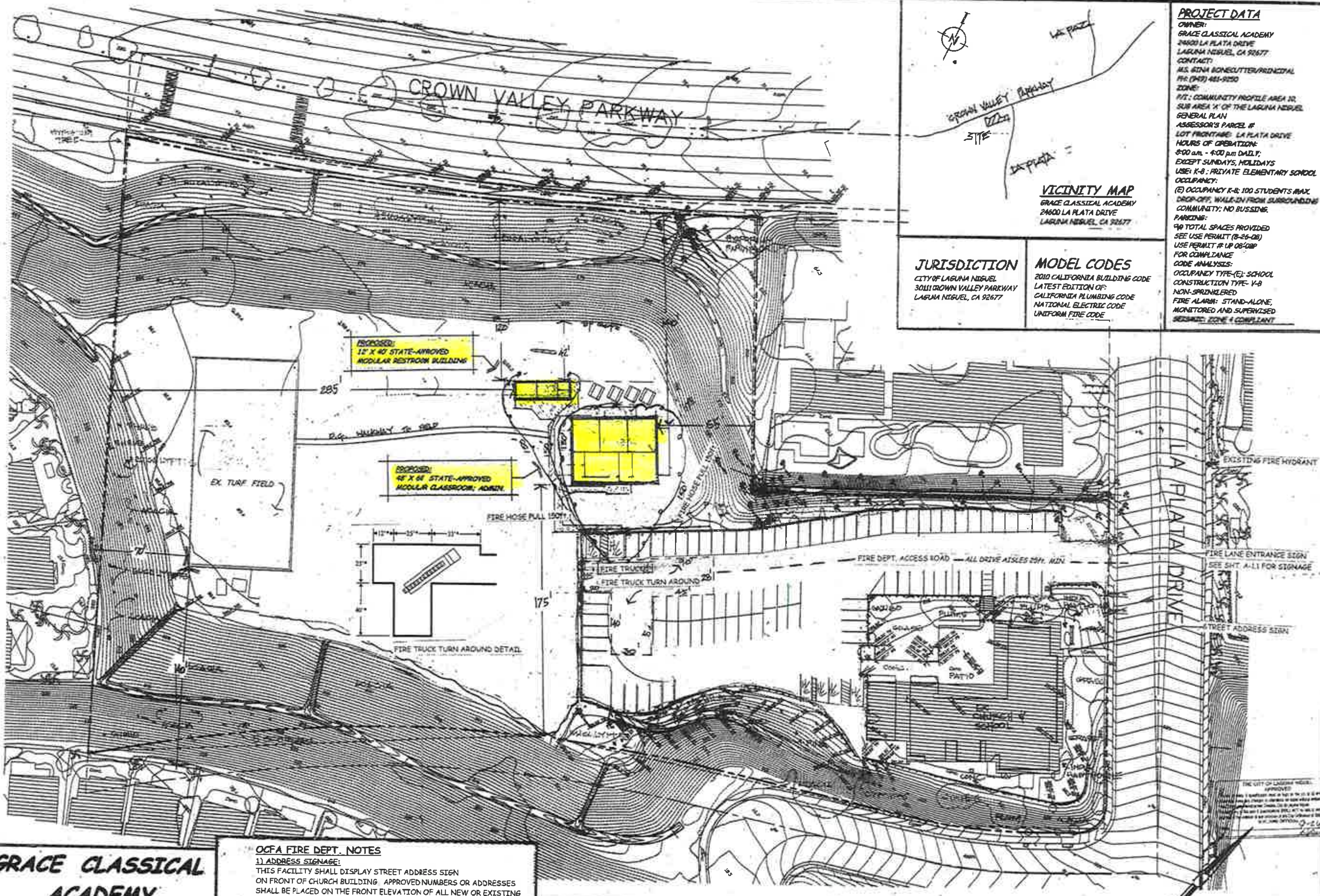


PLOT — GRADING 22X572
BLDG. = 285.0
PAD = 284.3
PARKING
RETAINING WALL
PLANTER
SIDEWALK
FOOTING OF BUILDING
SECTION 'A-A'
NO SCALE
PARKING LOT
CONST. CONC. BLOCK SLOUGH WALL 2 COURSES HIGH (APPROX. 15") @ TOE OF SLOPE. OBTAIN SEPARATE PERMIT FOR WALL CONSTRUCTION.
SECTION 'B-B'
NO SCALE
GENERAL NOTES
1- CONST. AC PAVING & AGGREGATE BASE. STRUCTURAL SECTION TO BE DETERMINED BY APPROVED SOILS ENGINEERING REPORT WITH RECOMMENDED PAVEMENT SECTIONS BASED ON 'R' VALUE PER CODE. THE MINIMUM SECTION WITHOUT APPROVED REPORT SHALL BE 3" AC OVER 6" AB FOR PARKING AREAS AND 3" AC OVER 10" AB FOR DRIVEWAYS. INITIAL ROUGH GRADE TO BE 6" BELOW FINISH SURFACE.
2- THE EXISTENCE & LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS PLAN. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS PLAN.
3- ALL UTILITY COMPANIES INVOLVED SHALL BE NOTIFIED PRIOR TO REMOVAL OF ANY UTILITY AND CONSTRUCTION OF SLOPES SHOWN ON THIS PLAN. SEE SEPARATE IMPROVEMENT PLANS FOR DETAILS OF RECONSTRUCTION AT LA VIDA DRIVE & VIA VALVERDE.
4- PRIOR TO PLACEMENT OF COMPACTED FILL, ALL LOOSE AND COMPRESSIBLE SOIL SHALL BE REMOVED FROM THE SITE AND PLACED IN PREPARED FILL AREAS. THE AVERAGE DEPTH OF REMOVAL IS EXPECTED TO BE ABOUT 12" OR TO THE BOTTOM OF THE SHRINKAGE CRACKS.
CROWN VALLEY PARKWAY
EXISTING CROWN VALLEY PRE-SCHOOL
EXIST. PAVED DRAIN
LA PLATA DRIVE
VIA VALVERDE
FUTURE IMPROVEMENTS
LA VIDA DRIVE
CONST. RESIDENTIAL DEPRESSED CURB DRIVEWAY APPROACH PER ORANGE CO. STD. PLAN No. 209. W = 28', X = 9'
REMOVE ±58 L.F. CONC. BLOCK WALL TO PROP CORNER.
* OVEREXCAVATE PAD 30" WHERE IN CUT AS SHOWN
CROWN VALLEY COVENANT CHURCH
24600 LA PLATA DRIVE
LAGUNA NIGUEL, CALIFORNIA
BP# 74860
FINALED 7/5/73
G-1
GRADING PLAN - R.S.T. 4438
CROWN VALLEY COVENANT CHURCH
VTN
ED. F. KUFUS A.I.B.D.
SHEET No 2 OF 2



LIMITS OF CHURCH PROPERTY
MASS GRADED PAD PER P.M. 23-45
CHURCH
LA PLATA DRIVE
VIA VAL VERDE
VALLEY PARKWAY
RUE DE MONET
RUE DE GAUGUIN
LA VIDA DRIVE
NOT A PART OF THIS REPORT
TRACT 13306 LIMITS OF GRADING
CONSTRUCTION NOTES
DENSITY TEST LOCATION MAP
TRACT 13306
LOTS 25-60, 66-69, 90-120
LAGUNA NIGUEL, CALIFORNIA
LEIGHTON AND ASSOCIATES, INC.
PRELIMINARY GRADING PLANS FOR TRACT NO. 13306

G-2



VICINITY MAP
GRACE CLASSICAL ACADEMY
24600 LA PLATA DRIVE
LAGUNA NIGUEL, CA 92677

PROJECT DATA
OWNER:
GRACE CLASSICAL ACADEMY
24600 LA PLATA DRIVE
LAGUNA NIGUEL, CA 92677
CONTACT:
MS. GINA BONECUTTER/PRINCIPAL
PH: (949) 481-9250
ZONE:
P/I.: COMMUNITY PROFILE AREA 10,
SUB AREA 'A' OF THE LAGUNA NIGUEL
GENERAL PLAN
ASSESSOR'S PARCEL #
LOT FRONTAGE: LA PLATA DRIVE
HOURS OF OPERATION:
8:00 a.m. - 4:00 p.m DAILY;
EXCEPT SUNDAYS, HOLIDAYS
USE: K-8 : PRIVATE ELEMENTARY SCHOOL
OCCUPANCY:
(E) OCCUPANCY K-8; 100 STUDENTS MAX.
DROP-OFF, WALK-IN FROM SURROUNDING
COMMUNITY; NO BUSSING.
PARKING:
99 TOTAL SPACES PROVIDED
SEE USE PERMIT (8-26-08)
USE PERMIT # UP 08-08P
FOR COMPLIANCE
CODE ANALYSIS:
OCCUPANCY TYPE-(E): SCHOOL
CONSTRUCTION TYPE- V-B
NON-SPRINKLERED
FIRE ALARM: STAND-ALONE,
MONITORED AND SUPERVISED
SEISMIC: ZONE 4 COMPLIANT

JURISDICTION
CITY OF LAGUNA NIGUEL
30111 CROWN VALLEY PARKWAY
LAGUNA NIGUEL, CA 92677

MODEL CODES
2010 CALIFORNIA BUILDING CODE
LATEST EDITION OF:
CALIFORNIA PLUMBING CODE
NATIONAL ELECTRIC CODE
UNIFORM FIRE CODE

JT PLANS
1335 HEDIONDA AVE.
VISTA, CA 92081
CALL: (760) 275-3894 FAX: (760) 599-1235
E-MAIL: vstaylor@aol.com

SITE PLAN-FIRE ACCESS ROADWAYS/
SIGNAGE / HOSE PULLS / NOTES

GRACE CLASSICAL ACADEMY
24600 LA PLATA DRIVE
LAGUNA NIGUEL, CA 92677
"SERVING CHILDREN IN THE COMMUNITY"

GRACE CLASSICAL ACADEMY

24600 LA PLATA DRIVE
LAGUNA NIGUEL, CA 92677
"SERVING CHILDREN IN THE COMMUNITY"

OCFA FIRE DEPT. NOTES

1) ADDRESS SIGNAGE:
THIS FACILITY SHALL DISPLAY STREET ADDRESS SIGN ON FRONT OF CHURCH BUILDING. APPROVED NUMBERS OR ADDRESSES SHALL BE PLACED ON THE FRONT ELEVATION OF ALL NEW OR EXISTING BUILDINGS IN SUCH A POSITION THAT IS PLAINLY VISIBLE AND LEGIBLE FROM THE STREET OR ROAD ON WHICH THE PROPERTY IS ADDRESSED. THE NUMBERS SHALL BE 6" MIN. HEIGHT. NUMBERS SHALL HAVE A MIN OF 1" STROKE, AND SHALL BE PLACED ON A CONTRASTING BACKGROUND.

2) SITE GRADIENTS:
ALL ACCESSIBLE CONCRETE WALKWAYS AND EXISTING FIRE ACCESS LANES SHALL BE <10% GRADE.

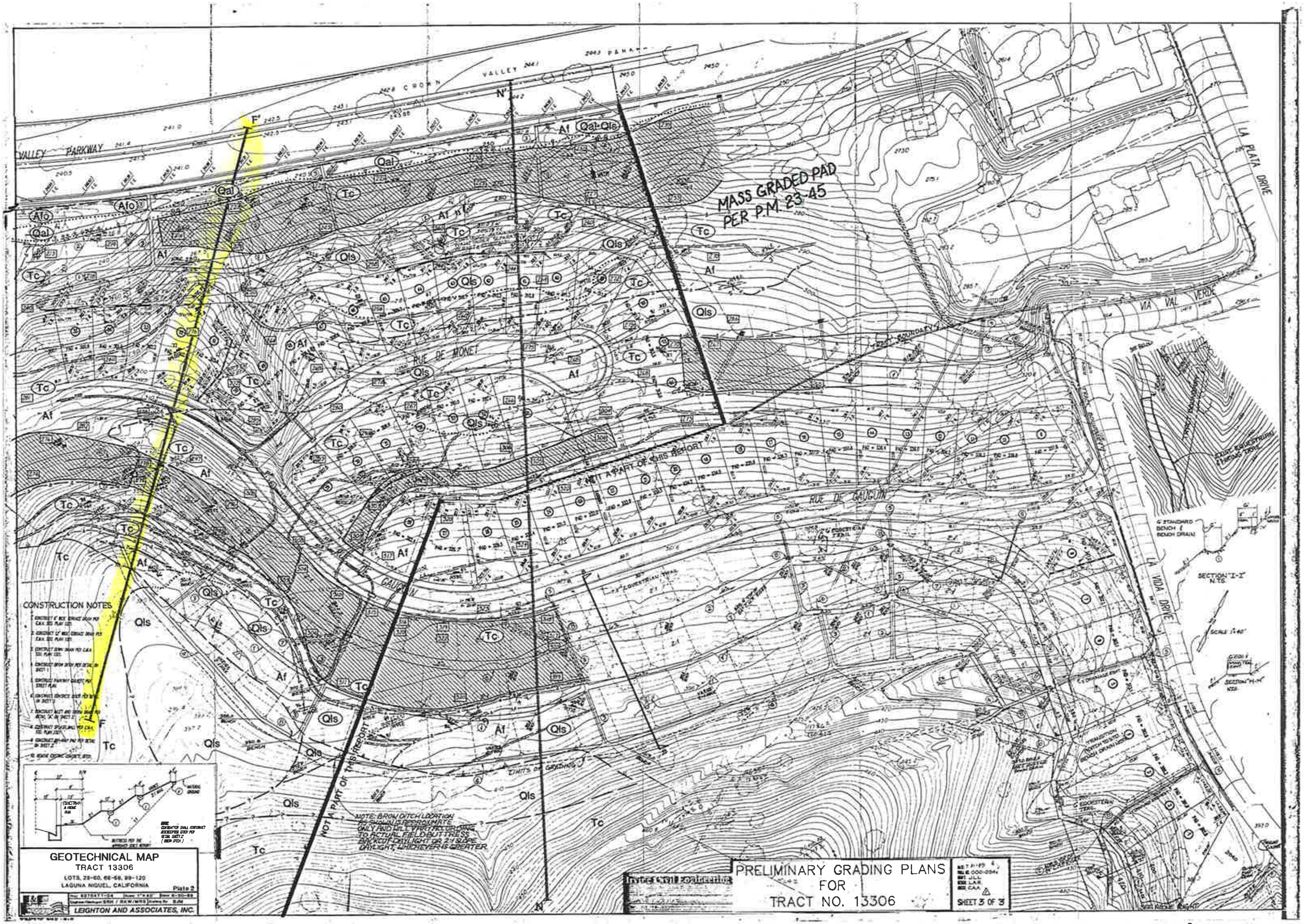
SITE PLAN 1" = 30ft.

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

AS SHOWN
JOHN TAYLOR

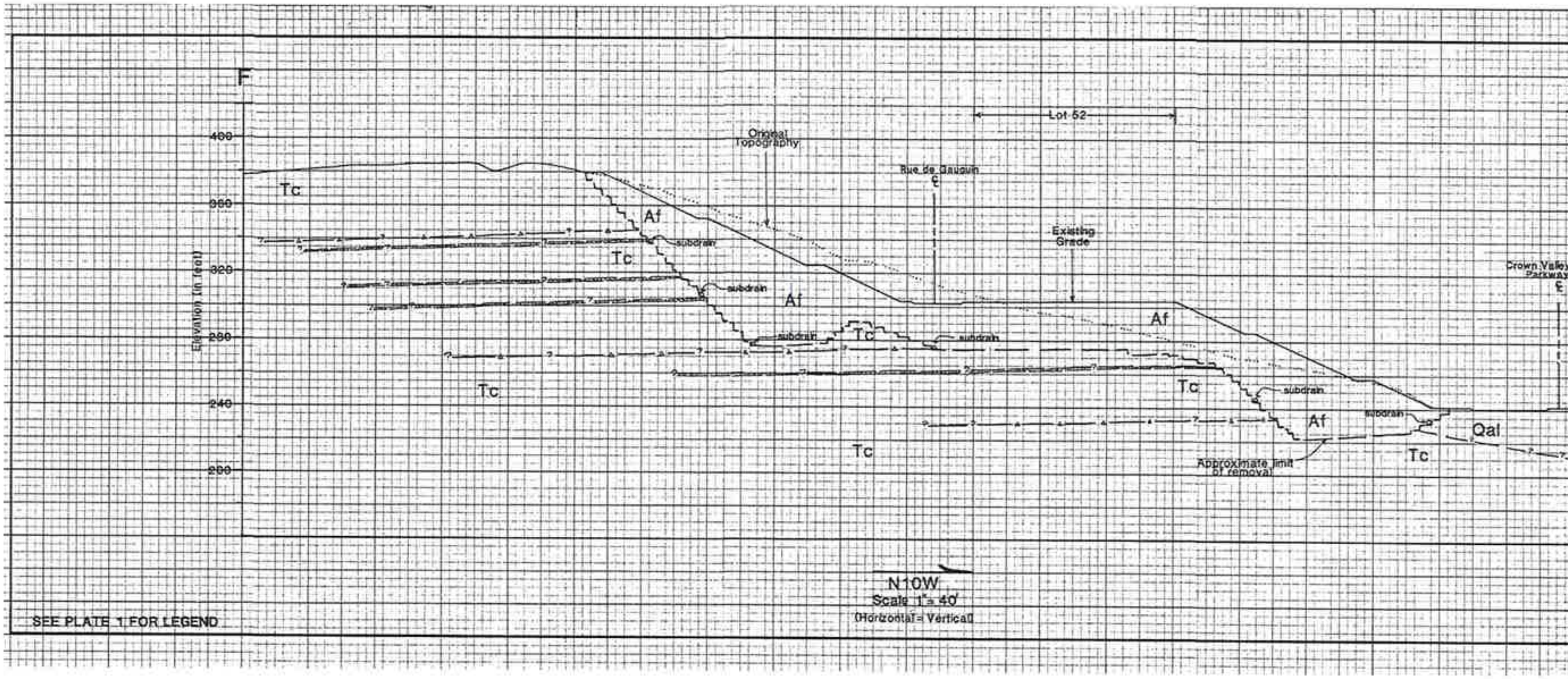
OCFA

G-3



CROWN VALLEY PARKWAY
MASS GRADED PAD PER P.M. 23-45
LA PLATA DRIVE
VIA VAL VERDE
RUE DE MONET
RUE DE GAUGUIN
LA VIDA DRIVE
NOT A PART OF THIS REPORT
LIMITS OF GRADING
F'
F
N'
N
Qal
Afo
Af
Tc
Qls
CONSTRUCTION NOTES
SECTION "I-I"
NOTE: BROW DITCH LOCATION IS SHOWN APPROXIMATE ONLY AND WILL VARY ACCORDING TO ACTUAL FIELD BUTTRESS BACKCUT DAYLIGHT OR 2:1 SLOPE DAYLIGHT, WHICHEVER IS GREATER.
GEOTECHNICAL MAP
TRACT 13306
LOTS 23-60, 66-69, 99-120
LAGUNA NIGUEL, CALIFORNIA
Plate 2
LEIGHTON AND ASSOCIATES, INC.
PRELIMINARY GRADING PLANS FOR TRACT NO. 13306
SHEET 3 OF 3

G-4



Project No: 8870471-04

LEIGHTON AND ASSOCIATES

AS-GRADED GEOTECHNICAL CROSS-SECTION F-F'

CONCORDE / PACIFIC CREST

Plate 5

G-5

APPENDIX H

CEQA GUIDELINES – GEOLOGY AND SOILS

CONCLUSIONS: CEQA Guidelines – Appendix H Environmental Checklist

VII. GEOLOGY AND SOILS. Would the project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☒	☐	☐
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☒	☐	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

DISCUSSION:

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: *Less Than Significant with Mitigation Incorporated*

SIGNIFICANCE ANALYSIS:

Site has no seismic risk (not Alquist-Priolo Zone faulting, liquefaction or landsliding) other than normal ground shaking which will be mitigated by design per the 2019 California Building Code (CBC). Excavations in excess of 20 feet are planned to grade site and construct building which will be mitigated by use of shoring and layback of slopes to stable configurations.

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. *Less Than Significant with Mitigation Incorporated*

SIGNIFICANCE ANALYSIS:

Site has no Alquist-Priolo Zone faulting nor other known fault closer than three miles. Impacts of ground shaking during earthquakes will be mitigated with design per 2019 CBC. ***Less Than Significant with Mitigation Incorporated***

ii) Strong seismic ground shaking? *Less Than Significant with Mitigation Incorporated*

SIGNIFICANCE ANALYSIS:

Earthquake up to M7.5 estimated for site from faults located 3 to 5 miles away. Impacts of ground shaking during earthquakes will be mitigated with design per 2019 CBC. Peak Ground Acceleration estimated at 0.6g for project site for 2% probability in 100 years. ***Less Than Significant with Mitigation Incorporated***

iii) Seismic-related ground failure, including liquefaction? *Less Than Significant with Mitigation Incorporated*

SIGNIFICANCE ANALYSIS:

Site stability exceeds 1.1 Factor of Safety under seismic loading. Retaining walls to be designed for seismic stability under seismic loading in accordance with 2019 CBC. ***Less Than Significant with Mitigation Incorporated***

iv) Landslides? *No Impact*

SIGNIFICANCE ANALYSIS:

No landslides were identified onsite during prior grading or during our recent subsurface investigation. Therefore, ***No Impact***.

b) Result in substantial soil erosion or the loss of topsoil? *Less Than Significant with Mitigation Incorporated*

SIGNIFICANCE ANALYSIS:

All slopes are or will be constructed at 2 to 1 (horizontal to vertical) or flatter. Such slopes are surficially stable with normal grading practices. Planned pad areas will be designed to channel flow to approved drainage structures. ***Less Than Significant with Mitigation Incorporated***

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse? *Less Than Significant Impact*

SIGNIFICANCE ANALYSIS:

No landslides were identified onsite during prior grading or during our recent subsurface investigation. The onsite earth materials are almost soley comprised of engineered fill soils (silts and clays) and sedimentary bedrock (siltstones and claystones) which have consistencies ranging from firm to hard. As a result, these soils have very little to no chance of landsliding, lateral spreading, subsidence, liquefaction or collapse. ***Less Than Significant Impact***

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? *Less Than Significant with Mitigation Incorporated*

SIGNIFICANCE ANALYSIS:

The onsite soils have been tested to have a medium to high Expansion Potential. Site grading will include compaction of soil materials at an above optimum moisture content and flatwork, pavements, floor slabs, and retaining walls will be engineered to mitigate effects of expansive soil. ***Less Than Significant with Mitigation Incorporated***

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater? *No Impact*

SIGNIFICANCE ANALYSIS:

The Site has onsite silt and clay soils that are unsuitable for filtration. However, the site is served by a new sewer main that will connect to the existing 12" VCP sewer main located in Crown Valley Parkway. All onsite wastewater will be disposed directly to the existing sewer system and not to a septic system nor use of any leach fields onsite. Therefore, the onsite silt and clay soils are not relevant thus there is ***No Impact***.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? *Less Than Significant with Mitigation Incorporated*

SIGNIFICANCE ANALYSIS:

No known paleontological resources were found during the recent nor historical geotechnical field investigations. However, onsite monitoring should be conducted during grading operations by a qualified paleontologist. Grading operations will consist of mostly over excavation of previously graded areas to a depth of 5 feet. Therefore, ***Less Than Significant With Mitigation Incorporated.***