



APPENDIX K

Supplemental Geotechnical Investigation



**Sladden
Engineering**

SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
PROPOSED RANCH AT MADISON
EAST OF MONROE STREET BETWEEN AVENUE 52 & AVENUE 54
TENTATIVE TRACT MAP NO. 39179
LA QUINTA AREA
RIVERSIDE COUNTY, CALIFORNIA

-Prepared By-

Sladden Engineering

45090 Golf Center Parkway, Suite F
Indio, California 92201
(760) 863-0713



Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, California 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863
www.sladdenengineering.com

December 3, 2025

Project No. 544-22319
25-11-545

Discovery MM Club, LLC
Attention: Mr. John Gamlin
14605 North 73rd Street
Scottsdale, Arizona 85260

Subject: Supplemental Geotechnical Investigation

Project: Proposed Ranch at Madison
East of Monroe Street Between Avenue 52 & Avenue 54
Tentative Tract Map No. 39179
La Quinta Area
Riverside County, California

Sladden Engineering is pleased to present the results of the supplemental geotechnical investigation performed for the Ranch at Madison development proposed for the property located east of Monroe Street between Avenue 52 and Avenue 54 in the La Quinta area of Riverside County, California. Our services were completed in accordance with our proposal for geotechnical engineering services dated September 17, 2025, and your authorization to proceed with the work. The purpose of our investigation was to explore the subsurface conditions at the site to provide recommendations for foundation design and the design of the various site improvements. Evaluation of environmental issues and hazardous waste was not included within the scope of services provided.

The opinions, recommendations and design criteria presented in this report are based on our field exploration program, laboratory testing and engineering analyses. Based on the results of our investigation, it is our professional opinion that the proposed project should be feasible from a geotechnical perspective provided that the recommendations presented in this report are implemented in design and carried out through construction.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this report, please contact the undersigned.

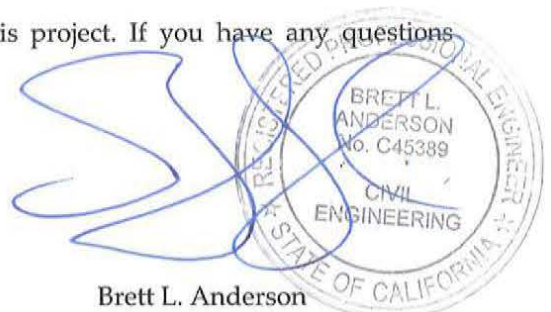
Respectfully submitted,

SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist



SER/mc
Copies: PDF/Addressee



Brett L. Anderson
Principal Engineer

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INTRODUCTION	1
PROJECT DESCRIPTION	2
SCOPE OF SERVICES	2
SITE CONDITIONS.....	3
GEOLOGIC SETTING.....	3
SUBSURFACE CONDITIONS	4
GROUNDWATER CONDITIONS	5
SEISMICITY AND FAULTING	6
SITE-SPECIFIC GROUND MOTION PARAMETERS.....	7
GEOLOGIC HAZARDS.....	7
CONCLUSIONS	9
EARTHWORK AND GRADING.....	10
Site Clearing	10
Preparation of Building Areas	10
Compaction	11
Shrinkage and Subsidence.....	11
CONVENTIONAL SHALLOW SPREAD FOOTINGS.....	12
SLABS-ON-GRADE.....	12
RETAINING WALLS	13
ON-SITE PAVEMENT DESIGN	14
CORROSION SERIES.....	15
UTILITY TRENCH BACKFILL.....	16
EXTERIOR CONCRETE FLATWORK.....	16
DRAINAGE	16
LIMITATIONS	16
ADDITIONAL SERVICES	17
REFERENCES.....	18

PLATES	Site Location Map
	Regional Geologic Map
	Exploration Location Plan
APPENDIX A	Field Exploration
APPENDIX B	Laboratory Testing
APPENDIX C	Seismic Design Map and Report
	Site-Specific Ground Motion Parameters
APPENDIX D	Liquefaction Analysis
APPENDIX E	Grading Plan - Tentative Tract Map No. 39179
APPENDIX F	Conceptual Master Plan
APPENDIX G	Sladden (2022)
APPENDIX H	Landmark (2022)

INTRODUCTION

This report presents the results of the supplemental geotechnical investigation conducted by Sladden Engineering for APN 780-010-013 within Tentative Tract Map (TTM) No. 39179. This report also summarizes prior TTM related reports, including Sladden (2022) for APNs 780-020-001, 002, 003, and 780-010-012, and Landmark (2022) for APN 780-010-014. In the event of any conflicting recommendations, the requirements and recommendations contained in this report shall supersede those of prior reports.

The overall project will consist of constructing an 85-lot residential development located on the east side of Monroe Street and between Avenue 52 and Avenue 54 in the La Quinta area of Riverside County, California. The central portion of the site is located at approximately 33.6638 degrees north latitude and 116.2292 degrees west longitude. The approximate location of the site is indicated on the Site Location Map (Figure 1).



Figure 1 (USGS, 2021)

Our investigation was conducted to evaluate the engineering properties of the subsurface materials, to evaluate their *in-situ* characteristics, and to provide engineering recommendations and design criteria for site preparation, foundation design and the design of various site improvements. This study also includes a review of published and unpublished geotechnical and geological literature regarding seismicity at and near the subject site.

PROJECT DESCRIPTION

Based on the provided Grading Plan (RTM, 2025) and the provided Conceptual Master Plan (Vita, 2025), the Ranch at Madison development will consist of constructing 31 estate lots, 34 golf cottages, and 20 village units along with a 9-hole golf course. The development is expected to include associated water features, open space, underground utilities, paved roadways and parking areas, concrete flatwork, landscaped areas, and various related site amenities and improvements. For the purposes of our analysis, we anticipate that the structures will consist of relatively lightweight wood-frame or light gauge steel-frame structures, supported on conventional shallow spread footings and concrete slabs-on-grade.

Based on the relatively level nature of the site, Sladden expects that grading will be limited to minor cuts and fills to accomplish the desired elevations and provide adequate gradients for site drainage. This does not include the removal and re-compaction of the loose surface soil and primary foundation-bearing soil within the proposed building and foundation areas. Upon completion of precise grading plans, Sladden should be retained to verify that the recommendations presented within this report are properly incorporated into the design of the proposed project.

Structural foundation loads were not available at the time of this report. However, based on our experience with similar lightweight construction, we anticipate that foundation loads for the proposed residential structures will consist of isolated column loads of less than 30 kips and continuous wall loads of less than approximately 3.0 kips per linear foot.

If the actual structural loading conditions differ significantly from these assumed values, we should be contacted to assess whether the geotechnical recommendations provided herein remain applicable or require modification.

SCOPE OF SERVICES

The purpose of our investigation was to determine specific engineering characteristics of the surface and near-surface soil to develop foundation design criteria and recommendations for site preparation. Specifically, our site characterization consisted of the following tasks:

- Site reconnaissance to assess the existing surface conditions on and adjacent to the site.
- Drilling six (6) exploratory boreholes to depths between approximately 21 and 51 feet bgs to characterize the subsurface soil conditions. Representative samples of the soil were classified in the field and retained for laboratory testing and engineering analyses.
- Performing laboratory testing on selected samples to evaluate their engineering characteristics.
- Reviewing previous geotechnical reports, geologic literature and discussing geologic hazards.
- Performing site-specific ground motion analyses for the subject property.
- Performing engineering analyses to develop recommendations for foundation design and site preparation.
- The preparation of this report summarizing our work at the site.

SITE CONDITIONS

The overall project site consists of APNs 780-010-012, 013, 014, 780-020-001, 002, 003. The site occupies approximately 174 acres of land. With the exception of a few isolated abandoned site structures, the site is mostly undeveloped and appears to have been predominately utilized for agricultural purposes. The site is transected by Avenue 53 near the central portion of the property.

The current investigation was conducted for APN 780-010-013. The parcel consists of approximately 19.4 acres and is located on the east side of Madison Street and north of Avenue 53 in the La Quinta area of Riverside County, California. The parcel consists of mostly abandoned Date Palm groves and a few associated site structures.

The project site is bounded by scattered residential and agricultural properties to the north, east and south and Monroe Street to the immediate west. Based on our review of the Indio 7.5-Minute Quadrangle Map (USGS, 2021), site elevations range from approximate elevation of 10 to 40 feet below mean sea level (MSL).

No natural ponding of water or surface seeps were observed at or near the site during our investigations. Site drainage appears to be controlled via sheet flow and surface infiltration. Regional drainage is provided by the Whitewater River which is located approximately 3.5-miles northeast of the site.

GEOLOGIC SETTING

The project site is located within the Colorado Desert Physiographic Province (also referred to as the Salton Trough) which is characterized as a northwest-southeast trending structural depression extending from the Gulf of California to the Banning Pass. The Salton Trough is dominated by several northwest-trending faults, most notably the San Andreas Fault system. The Salton Trough is bounded by the Santa Rosa-San Jacinto Mountains on the southwest, the San Bernardino Mountains on the north, the Little San Bernardino - Chocolate - Orocopia Mountains on the east and extends through the Imperial Valley into the Gulf of California on the south.

A relatively thick sequence (20,000 feet) of sediment has been deposited in the Coachella Valley portion of the Salton Trough from Miocene to present times. These sediments are predominately terrestrial in nature with some lacustrine (lake) and minor marine deposits. The major contributor of these sediments has been the Colorado River. The mountains surrounding the Coachella Valley are composed primarily of Precambrian metamorphic and Mesozoic "granitic" rock.

The Salton Trough is an internally draining area with no readily available outlet to Gulf of California and with portions well below sea level (-253' msl). The region is intermittently blocked from the Gulf of California by the damming effects of the Colorado River delta (current elevation +30' msl). Between about 300AD and 1600 AD (to 1700) the Salton Trough has been inundated by the River's water, forming ancient Lake Cahuilla (max. elevation +58' msl). Since that time the floor of the Trough has been repeatedly flooded with other "fresh" water lakes (1849, 1861, and 1891), the most recent and historically long-lived being the current Salton Sea (1905). The sole outlet for these waters is evaporation, leaving behind vast amounts of terrestrial sediment materials and evaporite minerals.

The site has been mapped by Rogers (1965) to be immediately underlain by undifferentiated Quaternary-age lake deposits and alluvium (Ql-Qal). The regional geologic setting for the site vicinity is presented on the Regional Geologic Map (Figure 2).



Figure 2 (Rogers, 1965)

SUBSURFACE CONDITIONS

Prior investigations associated with the currently proposed development include Sladden (2022) and Landmark (2022). The Sladden (2022) investigation consisted of advancing ten (10) exploratory bores to depths between approximately 5 and 51 feet bgs within APNs 780-020-001, 002, 003, and 780-010-012. The bores were advanced with a Mobile B-61 drill-rig equipped with 8-inch outside diameter augers. The bores encountered approximately three (3) feet of disturbed/fill soil that was immediately underlain by interbedded lacustrine deposits and alluvium. A copy of the Sladden (2022) report is attached for reference.

The Landmark (2022) investigation was conducted for APN 780-010-014 and consisted of advancing five (5) exploratory bores to depths between approximately 21 and 51 feet bgs. The bores were advanced using a Mobile B-61 drill-rig equipped with 8-inch diameter augers. The earth materials were generally similar to those observed during the Sladden investigations and are described as interbedded silty sand (SM), sand (SP-SM) and silt (ML). The Landmark (2022) report is attached for reference.

The subsurface conditions for the current investigation (APN 780-010-013) were evaluated through six (6) exploratory boreholes advanced to depths between approximately 21 and 51 feet bgs. The approximate locations of the boreholes are illustrated on the Exploration Location Plan (Plate 3). The boreholes were advanced using a truck-mounted Mobile B-61 drill-rig equipped with 8-inch outside diameter hollow stem augers. A geologist employed by Sladden was on-site to log the materials encountered and retrieve samples for laboratory testing and engineering analysis.

During the current field investigation, a mantle of disturbed/fill soil extended to depths between approximately two (2) three (3) feet below existing grade. This fill material appeared to be associated with past agricultural activity.

The native soil throughout the site consists primarily of interbedded fine-grained silty sand (SM), sand (SP), sandy silt (ML) and sandy clay (CL). Generally, granular soil was found to be dry to slightly moist, loose to dense and grayish brown in in-situ color. Cohesive layers were found to be dry to moist, medium stiff to very stiff, light gray to grayish brown in in-situ color and exhibited low plasticity characteristics.

The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and tests of the field samples. The final logs are included in Appendix A of this report. The stratification lines represent the approximate boundaries between soil types although the transitions may be gradual and variable across the site.

GROUNDWATER CONDITIONS

Groundwater was not encountered during the field investigations. Based on the depth to groundwater in the project vicinity (CDWR, 2025), it is our opinion that groundwater should not be a factor in the design or construction of the proposed project. The following table provides a summary of the recorded high groundwater depths in the project vicinity.

TABLE 1 GROUNDWATER DEPTHS				
STATE WELL (LOCAL NAME)	LAT/LONG	DISTANCE (KM)	DATE	DEPTH (FT)
(Empire Polo 2)	33.6784/-116.2359	1.6	05/31/2024	90.1
06S07E13M002S	33.6485/-116.2161	2.2	03/16/2017	25.2
06S07E02D002S	33.6848/-116.2328	2.2	11/06/1985	66
06S07E16A002S	33.6536/-116.2525	2.6	11/19/1987	74.1
06S07E04H001S	33.6806/-116.2533	2.8	02/27/2017	111.9
06S07E13J004S	33.6482/-116.2007	3.2	04/28/2004	12.08
06S07E16D002S	33.6531/-116.266	3.8	02/19/2021	99.8
06S08E19R001S	33.6281/-116.1851	5.8	03/21/2017	20.1

SEISMICITY AND FAULTING

The southwestern United States is a tectonically active and structurally complex region, dominated by northwest-trending dextral faults. The faults of the region are often part of complex fault systems, composed of numerous subparallel faults that splay or step from main fault traces. Strong seismic shaking could be produced by any of these faults during the design life of the proposed project.

We consider the most significant geologic hazard to the project to be the potential for moderate to strong seismic shaking that is likely to occur during the design life of the project. The proposed project is located in the highly seismic Southern California region within the influence of several fault systems. A Holocene-active active fault is defined by the State of California as a fault that has exhibited surface displacement within the Holocene time (about the last 11,700 years). A pre-Holocene fault is defined by the State as a fault whose recency of past movement is older than 11,700 years.

As previously stated, the site has been subjected to strong seismic shaking related to active faults that traverse through the region. Some of the more significant seismic events near the subject site within recent times include: M6.0 North Palm Springs (1986), M6.1 Joshua Tree (1992), M7.3 Landers (1992), M6.2 Big Bear (1992), M7.1 Hector Mine (1999), and M7.1 Ridgecrest (2019).

Table 2 lists the closest known potentially active faults that was generated in part using fault parameters from The Revised 2002 California Probabilistic Seismic Hazard Maps (Cao et al, 2003), 2008 National Seismic Hazard Maps – Source Parameters (USGS, 2008) and the Fault and Fold Database of the United States (USGS, 2025a). This table does not identify the probability of reactivation or the on-site effects from earthquakes occurring on any faults in the region.

TABLE 2 CLOSEST KNOWN ACTIVE FAULTS		
Fault Name	Distance (Km)	Maximum Event
San Andreas	8.2	7.5
San Jacinto	31.3	7.2
Burnt Mountain	33.4	6.5
Eureka Peak	34.4	6.4
Pinto Mountain	53.3	6.8
So Emerson-Copper Mnt	54.8	7.0
Pisgah-Bullion Mnt Mesquite Lake	56.2	7.3
Calico-Hidalgo	56.7	7.3
Landers	58.5	7.3

SITE-SPECIFIC GROUND MOTION PARAMETERS

Sladden has reviewed the 2022 California Building Code (CBC) and ASCE7-16 and developed site-specific ground motion parameters for the subject site. The project Seismic Design Maps and site-specific ground motion parameters are summarized in the following table and included within Appendix C. The project Structural Engineer should verify that all design parameters provided are applicable for the subject project.

TABLE 3 GROUND MOTION PARAMETERS	
Latitude / Longitude	33.6657/-116.2283
Risk Category	II
Site Class	D (Measured)
Code Reference Documents	ASCE 7-16; Chapter 11 & 21

Description	Type	Map Based	Site-Specific
MCE _R Ground Motion (0.2 second period)	S _S	1.622	---
MCE _R Ground Motion (1.0 second period)	S _I	0.668	---
Site-Modified Spectral Acceleration Value	S _{MS}	1.622	1.826
Site-Modified Spectral Acceleration Value	S _{MI}	Null	1.599
Numeric Seismic Design Value at 0.2 second SA	S _{DS}	1.082	1.217
Numeric Seismic Design Value at 1.0 second SA	S _{DI}	Null	1.066
Site Amplification Factor at 0.2 second	F _a	1.0	1.0
Site Amplification Factor at 1.0 second	F _v	Null	2.5
Site Peak Ground Acceleration	PGA _M	0.78	0.739

GEOLOGIC HAZARDS

The subject site is located in an active seismic zone and will likely experience strong seismic shaking during the design life of the proposed project. In general, the intensity of ground shaking will depend on several factors including; the distance to the earthquake focus, the earthquake magnitude, the response characteristics of the underlying materials, and the quality and type of construction. Geologic hazards and their relationship to the site are discussed below.

- I. Surface Rupture. Surface rupture is expected to occur along preexisting, known active fault traces. However, surface rupture could potentially splay or step from known active faults or rupture along unidentified traces. Based on our review of Rogers (1965), Dibblee (2008), Jennings (1994), and CDOC (2025) known active faults are not mapped on the site. In addition, no signs of active surface faulting were observed during our review of non-stereo digitized photographs of the site and site vicinity (Google Earth, 2025). Finally, no signs of active surface fault rupture or secondary seismic effects (lateral spreading, lurching etc.) were identified during our field investigation. Therefore, it is our opinion that risks associated with primary surface ground rupture should be considered "low".

- II. Ground Shaking. The site has been subjected to past ground shaking by faults that traverse through the region. Strong seismic shaking from nearby active faults is expected to produce strong seismic shaking during the design life of the proposed project. Based on site-specific ground motion parameters developed for the property (Appendix C), the site-modified peak ground acceleration (PGAm) is estimated to be 0.739g.
- III. Liquefaction. Liquefaction is the process in which loose, saturated granular soil loses strength as a result of cyclic loading. The strength loss is a result of a decrease in granular sand volume and a positive increase in pore pressures. Generally, liquefaction can occur if all of the following conditions apply; liquefaction-susceptible soil, groundwater within a depth of 50 feet or less, and strong seismic shaking.
- We have performed seismic settlement calculations utilizing a magnitude of 7.5 and the site-specific peak ground acceleration developed for the project (PGAm=0.739). Historic high and anticipated high groundwater depths were determined to be approximately 25 feet bgs (CDWR, 2025). Calculations indicate potential total seismic settlements of 1.17 inches and 2.80 inches for BH-1 and BH-5, respectively. The potential seismically related differential settlements are expected to be less than 1.5 inches. Based upon the general uniformity of the soil, we expect the maximum differential settlement to occur over a horizontal distance of approximately 200 feet. Accordingly, risks associated with seismic settlement should not control design but should be considered in the design of the proposed structures. The seismic settlement calculations are included within Appendix D.
- IV. Tsunamis and Seiches. Because the site is situated at an inland location and is not immediately adjacent to any impounded bodies of water, risks associated with tsunamis and seiches are considered “negligible”.
- V. Slope Failure, Landsliding, Rock Falls. Slope instability in the form of landslides and rock falls were not observed at or near the subject site. The site is situated on relatively flat ground and is not located immediately adjacent to any slopes. As such, risks associated with slope instability (landslides, mass wasting, and rock falls) are considered “negligible”.
- VI. Expansive Soil. Generally, the near-surface soil consists of silty sand (SM) and sandy silt (ML). Based on the results of our laboratory testing (EI= 1 & 46), the materials underlying the site fall within the “very low” to “low” expansion potential. The recommended remedial grading will result in substantial mixing and blending of the surface soil. The expansion potential of the subsurface soil should be reevaluated after grading.
- VII. Hydro-consolidation. Because the site lies within the former extent of ancient Lake Cahuilla, the native soils would have been fully saturated for an extended period in the geologic past. Any collapse-prone behavior (hydro-consolidation) would have already occurred under those saturated conditions and subsequent natural consolidation. Our subsurface exploration did not identify loose or metastable soils indicative of modern collapse potential. Accordingly, the risk of hydro-consolidation at the site is considered low.

- VIII. Static Settlement. Static settlement resulting from the anticipated foundation loads should be tolerable provided that the recommendations included in this report are considered in foundation design and construction. The ultimate static settlement is expected to be less than 1 inch when using the recommended allowable bearing pressures. As a practical matter, differential static settlement between footings can be assumed as one-half of the total static settlement.
- IX. Subsidence. Land subsidence can occur in valleys where aquifer systems have been subjected to extensive groundwater pumping, such that groundwater pumping exceeds groundwater recharge. Generally, pore water reduction can result in a rearrangement of skeletal grains and could result in elastic (recoverable) or inelastic (unrecoverable) deformation of an aquifer system. Locally, no fissures or other surficial evidence of subsidence were observed at or near the subject site.
- X. Debris Flows. Debris flows are viscous flows consisting of poorly sorted mixtures of sediment and water and are generally initiated on slopes steeper than approximately six horizontal to one vertical (6H:1V) (Boggs, 2001). Based on the flat nature of the site and the composition of the surface soil, we judge that risks associated with debris flows should be considered “negligible”.
- XI. Flooding and Erosion. No signs of flooding or erosion were observed during our field investigation. Risks associated with flooding and erosion should be evaluated and mitigated by the project design Civil Engineer.

CONCLUSIONS

Based on the results of our investigation, it is our professional opinion that the project should be feasible from a geotechnical perspective provided that the recommendations included in this report are incorporated into design and carried out through construction. The main geotechnical concerns are the presence of loose and potentially compressible near-surface native soil throughout the project site, the existing date groves within portions of the site, and potential seismic settlements.

Proper removal of organic material and soft/saturated soils associated with the former agricultural activity is essential to establish a stable subgrade. These measures will reduce the potential for post-construction settlement, differential movement, and structural distress in planned improvements. All clearing, excavation, and compaction activities should be performed in accordance with the recommendations of this report and verified through appropriate field inspection and testing.

We recommend that remedial work within the proposed new building areas include over-excavation and re-compaction of the artificial fill soil, loose native surface soil, and the primary foundation-bearing soil to provide uniform foundation support and to help mitigate potential differential settlements. Specific recommendations for foundation area preparation are presented in the Earthwork and Grading section of this report.

Caving did occur to varying degrees within each of our exploratory bores and the surface soil may be susceptible to caving within deeper excavations. All excavations should be constructed in accordance with the normal CalOSHA excavation criteria. Based on our observations of the materials encountered, we anticipate that the subsoil will conform to that described by CalOSHA as Type C. Soil conditions should be verified in the field by a "Competent person" employed by the Contractor.

The following recommendations present more detailed design criteria that have been developed based on our field and laboratory investigation.

EARTHWORK AND GRADING

All earthwork including excavation, backfill, and preparation of the primary foundation and/or slab bearing soil should be performed in accordance with the geotechnical recommendations presented in this report and portions of the local regulatory requirements, as applicable. All earthwork should be performed under the observation and testing of a qualified soil engineer. The following geotechnical engineering recommendations for the proposed project are based on observations from the field investigation program, laboratory testing, and geotechnical engineering analyses.

- a. Site Clearing: Areas to be graded should be cleared of vegetation, date trees and associated root systems, underground utilities, and debris. All areas scheduled to receive fill should be cleared of old fills and any irreducible matter. The unsuitable materials should be removed off-site. Voids left by obstructions should be properly backfilled in accordance with the compaction recommendations of this report.

Agricultural operations such as planting, irrigation, and soil tilling typically result in the presence of organic-rich soil, root matter, and localized zones of soft or saturated conditions, all of which may compromise the long-term stability and performance of structural improvements if not properly mitigated

Complete removal of all vegetation, including stumps, root systems, and surface organic material, should be performed across the former grove areas. Organic matter is highly compressible and subject to decomposition, which can lead to future settlement and ground instability. Removal efforts should extend both laterally and vertically to facilitate the removal of biologically active material from the proposed building and paving areas.

- b. Preparation of the Building Areas. To provide firm and uniform foundation bearing conditions, we recommend over-excavation and re-compaction throughout the proposed building areas. All artificial fill soil and native low density near surface native soil should be removed to a depth of at least 5 feet below existing grade or 4 feet below the bottom of the footings, whichever is deeper. Remedial grading should extend laterally, a minimum of five feet beyond the building limits. The native soil exposed by over-excavation should be scarified, moisture conditioned to near optimum moisture content and compacted to at least 90 percent relative compaction prior to fill placement. The previously removed soil may then be replaced as compacted engineered soil in accordance with the recommendations below.

- c. **Compaction:** Soil to be used as engineered fill should be free of organic material, debris, and other deleterious substances. All fill material should be placed in thin lifts, not exceeding six inches in a loose condition. If import fill is required, the material should be of a low to non-expansive nature and should meet the following criteria:

Plastic Index	Less than 12
Liquid Limit	Less than 35
Percent Soil Passing #200 Sieve	Between 15% and 35%
Maximum Aggregate Size	3 inches

The subgrade and all fill should be compacted with acceptable compaction equipment, to at least 90 percent relative compaction. The bottom of the exposed subgrade should be observed by a representative of Sladden Engineering prior to fill placement. Compaction testing should be performed on all lifts to ensure proper placement of the fill materials. Table 4 provides a summary of the excavation and compaction recommendations.

TABLE 4 SUMMARY OF RECOMMENDATIONS	
*Remedial Grading	Over-excavation and re-compaction within the building envelope and extending laterally for 5 feet beyond the building limits and to a minimum of 5 feet below existing grade or 4 feet below the bottom of the footings, whichever is deeper.
Native / Import Engineered Fill	Place in thin lifts not exceeding 6 inches in a loose condition, at near optimum moisture content and compact to a minimum of 90 percent relative compaction.
Asphalt Concrete Sections	Compact the top 12 inches to at least 95 percent compaction at near optimum moisture content.

*Actual depth may vary and should be determined by a representative of Sladden Engineering in the field during construction.

- d. **Shrinkage and Subsidence:** Volumetric shrinkage of the material that is excavated and replaced as controlled compacted fill should be anticipated. We estimate that this shrinkage should be between 10 and 20 percent. Subsidence of the surfaces that are scarified and compacted should be between 1 tenth and 3 tenths of a foot. This will vary depending upon the type of equipment used, the moisture content of the soil at the time of grading and the actual degree of compaction attained.

CONVENTIONAL SHALLOW SPREAD FOOTINGS

Conventional shallow spread footings are expected to provide adequate support for the proposed residential structures. All footings should be founded upon properly compacted engineered fill soil and should have a minimum embedment depth of 12 inches measured from the lowest adjacent finished grade. Continuous and isolated footings should have minimum widths of 12 inches and 24 inches, respectively. Continuous and isolated footings supported upon properly compacted engineered fill soil may be designed using allowable (net) bearing pressures of 1800 and 2000 pounds per square foot (psf), respectively. Allowable increases of 200 psf for each additional 1 foot of width and 250 psf for each additional 6 inches of depth may be used if desired. The maximum allowable bearing pressure should be 3000 psf. The allowable bearing pressures apply to combined dead and sustained live loads. The allowable bearing pressures may be increased by one-third when considering transient live loads, including seismic and wind forces.

Based on the recommended allowable bearing pressures, the total static settlement of the shallow footings is anticipated to be less than one-inch provided foundation preparations conform to the recommendations described in this report. Static differential settlement is anticipated to be approximately one-half of the total settlement for similarly loaded footings spaced up to approximately 40 feet apart.

Lateral load resistance for the spread footings will be developed by passive pressure against the sides of the footings below grade and by friction acting at the base of the footings. An allowable passive pressure of 250 psf per foot of depth may be used for design purposes. An allowable coefficient of friction 0.45 may be used for dead and sustained live loads to compute the frictional resistance of the footing placed directly on compacted fill. Under seismic and wind loading conditions, the passive pressure and frictional resistance may be increased by one-third.

All footing excavations should be observed by a representative of the project geotechnical consultant to verify adequate embedment depths prior to placement of forms, steel reinforcement or concrete. The excavations should be trimmed neat, level and square. All loose, disturbed, sloughed or moisture-softened soils and/or any construction debris should be removed prior to concrete placement. All footings should be reinforced in accordance with the project Structural Engineer's recommendations

SLABS-ON-GRADE

To provide uniform and adequate support, concrete slabs-on-grade must be placed on properly compacted engineered fill soil as outlined in the previous sections of this report. The slab subgrade should remain near optimum moisture content and should not be permitted to dry prior to concrete placement. Slab subgrade should be firm and unyielding. Disturbed soil should be removed and replaced with engineered fill soil compacted to a minimum of 90 percent relative compaction.

Slab thickness and reinforcement should be determined by the structural engineer. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed accordingly with respect to minimum concrete cover requirements. We recommend a minimum slab thickness of 4 inches along with minimum reinforcement of #3 bars at 24 inches on center in both directions.

Slabs with moisture-sensitive surfaces should be underlain with a moisture vapor retarder consisting of a polyvinyl chloride membrane such as 10-mil visqueen, or equivalent, with joints lapped not less than 6-inches. All laps within the membrane should be sealed and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface can not be achieved by grading, consideration should be given to placing a thin leveling course of sand across the pad surface prior to placement of the membrane.

RETAINING WALLS

Retaining walls may be necessary to accomplish the proposed construction. Cantilever retaining walls may be designed using “active” pressures. Active pressures may be estimated using an equivalent fluid weight of 35 pcf for level native backfill soil acting in a triangular pressure distribution with drained backfill conditions. “At Rest” pressures should be utilized for restrained walls. At rest pressures may be estimated using an equivalent fluid weight of 55 pcf for native backfill soil with level drained backfill conditions.

According to the 2022 California Building Code CBC, seismic loads should be considered in the design of walls retaining in excess of six (6) feet of earth material. The potential seismic pressures for cantilever retaining walls with drained, level backfill conditions may be estimated using a uniform pressure distribution of $15H$ psf (where H is in feet). The potential seismic pressures for restrained walls with drained, level backfill conditions may be estimated using a uniform pressure distribution of $20H$ psf (where H is in feet). The seismic pressures should be applied as a point load acting at a height of approximately $0.6H$ feet from the bottom of the wall. Alternately, the seismic loading may be determined using a seismic coefficient of $K_h = 0.246$ (equivalent to $1/2 \times 2/3 \times PGAM$) in accordance with City of Los Angeles design criteria.

We recommend that a back drain system be provided behind all retaining walls or that the walls be designed for full hydrostatic pressures. The back drains should consist of a heavy walled, four-inch diameter, perforated pipe sloped to drain to outlets by gravity, and of clean, free-draining, three-quarter to one-and-a-half-inch crushed rock or gravel. The crushed rock or gravel should extend to within one foot of the surface. The upper one foot should be backfilled with compacted, fine-grained soil to exclude surface water. A Mirafi 140N (or equivalent) filter cloth should be placed between the on-site native material and the drain rock.

We recommend that the ground surface behind retaining walls be sloped to drain. Under no circumstances should the surface water be diverted into back drains. Appropriate waterproofing systems should be incorporated into retaining wall design and construction.

ON-SITE PAVEMENT DESIGN

Asphalt concrete pavements should be designed in accordance with the Caltrans Highway Design Manual based on the R-Value and Traffic Index. The R-value of the near-surface soil was determined to be 62 and 19 at equilibrium for BH-1 and BH-6, respectively. Because site grading will result in the significant blending of the near-surface soil, the R-value should be determined based on post-grading test results of the actual subgrade soil. For preliminary pavement design, a design R-Value of 40 and Traffic Indices (TI) of 5.0 and 6.5 were used for the light-duty and heavy-duty pavements, respectively. We assumed Asphalt Concrete (AC) over Class II Aggregate Base (AB). The preliminary flexible pavement layer thickness is as follows:

TABLE 5 RECOMMENDED ASPHALT PAVEMENT SECTION LAYER THICKNESS		
Pavement Material	Recommended Thickness	
	TI = 5.0	TI = 6.5
Asphalt Concrete Surface Course	3.0 inches	4.0 inches
Class II Aggregate Base Course	4.5 inches	6.0 inches
Compacted Subgrade Soil	12.0 inches	12.0 inches

The final pavement section shall be governed by the more conservative of the structural sections determined through Caltrans-based R-Value and TI analysis, or the minimum section required by the agency having jurisdiction. The final pavement section shall conform to the applicable agency's requirements or exceed them as dictated by geotechnical design considerations presented above.

Asphalt concrete and the aggregate base material should conform to the latest edition of the Standard Specifications for Public Works Construction ("Greenbook") or CalTrans Standard Specifications. The subgrade soil and the aggregate base course should be compacted to at least 90 percent and 95 percent of the maximum dry density as determined by ASTM Method D 1557, respectively.

The pavement section thicknesses presented in this report should be considered **preliminary engineering recommendations**. The pavement thicknesses assume typical material properties and construction practices consistent with Caltrans Standard Specifications, including compaction requirements, aggregate quality, and asphalt concrete placement standards.

It is important to note that the recommended asphalt concrete thickness does not account for potential asphalt shrinkage, temperature-related contraction, long-term oxidation, or variability in field compaction that can occur during construction. These factors may reduce the effective thickness or alter the performance of the asphalt layer over time. Similarly, the recommendations do not incorporate contractor-specific production tolerances, mix design variability, or construction sequencing that may affect final pavement behavior.

CORROSION SERIES

Corrosion-series testing was performed on bulk soil samples obtained from the bores to provide an initial assessment of the potential for corrosive conditions that may impact buried metal utilities, concrete structures, and other subsurface improvements. The testing provides screening level indicators through evaluation of soil pH, minimum resistivity, soluble sulfate content, and soluble chloride content.

The soluble sulfate concentrations of the surface soil were determined to be 40 and 260 parts per million (ppm) for BH-1 and BH-6, respectively. The soil falls within the "S0" sulfate exposure category. The use of Type V cement and special sulfate-resistant concrete mixes may not be necessary. The soluble sulfate content of the surface soil should be reevaluated after grading and appropriate concrete mix designs should be established based upon post-grading test results.

The pH level of the surface soil was determined to be 7.8 and 8.4 for BH-1 and BH-6, respectively. Based on soluble chloride concentration testing (110 ppm & 170 ppm) the soil falls within the "C1" chloride exposure category per ACI 318-19 Table 19.3.1.1. The minimum resistivity of the surface soil was found to be 3,500 and 1,700 ohm-cm.

Based on the Corrosion-series test results, the majority of the site soil appears to exhibit "low" corrosion potential. While these findings are useful for early design considerations, they should be viewed strictly as screening level indicators. The interpretation of corrosion potential is highly sensitive to soil variability, localized moisture conditions, and sample disturbance, and the limited sampling during initial exploration cannot capture all subsurface variations.

The corrosion-series testing is not intended to serve as the sole basis for final corrosion-related design decisions. Soil conditions may change after site grading, utility trenching, or excavation, and additional soil horizons may become exposed that were not accessible during the initial investigation.

Post Grading Recommendations:

- Conduct additional corrosion testing after site grading and utility trenching when fresh, representative soils are accessible.
- Retain a qualified corrosion engineer or corrosion-protection specialist to review both the preliminary and post-grading results and to provide project-specific recommendations for corrosion sensitive installations.
- The corrosion specialist may advise on material selection, protective coatings, increased cover or sacrificial thickness, soil treatment, isolation methods, or the potential need for cathodic protection depending on the final confirmed soil conditions.

UTILITY TRENCH BACKFILL

All utility trench backfill should be compacted to a minimum of 90 percent relative compaction. Trench backfill materials should be placed in lifts no greater than six inches in a loose condition, moisture conditioned (or air-dried) as necessary to achieve near optimum moisture content, and mechanically compacted to a minimum of 90 percent relative compaction. A representative of the project soil engineer should test the backfill to verify adequate compaction.

EXTERIOR CONCRETE FLATWORK

To provide uniform support and minimize settlement related cracking of concrete flatwork, the subgrade soil within concrete flatwork areas should be compacted to a minimum of 90 percent relative compaction. A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soil prior to concrete placement.

DRAINAGE

All final grades should be provided with positive gradients away from foundations to provide rapid removal of surface water runoff to an adequate discharge point. No water should be allowed to be pond on or immediately adjacent to foundation elements. To reduce water infiltration into the subgrade soil, surface water should be directed away from building foundations to an adequate discharge point. Subgrade drainage should be evaluated upon completion of the precise grading plans and in the field during grading.

LIMITATIONS

The findings and recommendations presented in this report are based upon an interpolation of the soil conditions between the exploratory locations and extrapolation of these conditions throughout the proposed building areas. Should conditions encountered during grading appear different than those indicated in this report, this office should be notified.

The use of this report by other parties or for other projects is not authorized. The recommendations of this report are contingent upon monitoring of the grading operation by a representative of Sladden Engineering. All recommendations are considered to be tentative pending our review of the grading operation and additional testing, if indicated. If others are employed to perform any soil testing, this office should be notified prior to such testing in order to coordinate any required site visits by our representative and to assure indemnification of Sladden Engineering.

We recommend that a pre-job conference be held on the site prior to the initiation of site grading. The purpose of this meeting will be to assure a complete understanding of the recommendations presented in this report as they apply to the actual grading performed.

ADDITIONAL SERVICES

Once completed, final project plans and specifications should be reviewed by use prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. Following review of plans and specifications, observation should be performed by the Soil Engineer during construction to document that foundation elements are founded on/or extend into the properly compacted soil, and that suitable backfill soil is placed upon competent materials and properly compacted at the recommended moisture content.

Tests and observations should be performed during grading by the Soil Engineer or his representative in order to verify that the grading is being performed in accordance with the project specifications. Field density testing shall be performed in accordance with acceptable ASTM test methods. The minimum acceptable degree of compaction should be 90 percent for engineered fill soil and 95 percent for Class II aggregate base as obtained by ASTM Test Method D1557. Where testing indicates insufficient density, additional compactive effort shall be applied until retesting indicates satisfactory compaction.

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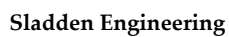
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PLATES

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
EXPLORATION LOCATION PLAN



 Sladden Engineering	SITE LOCATION MAP		PLATE 1
	Project Number:	544-22319	
	Report Number:	25-11-545	
	Date:	December 3, 2025	



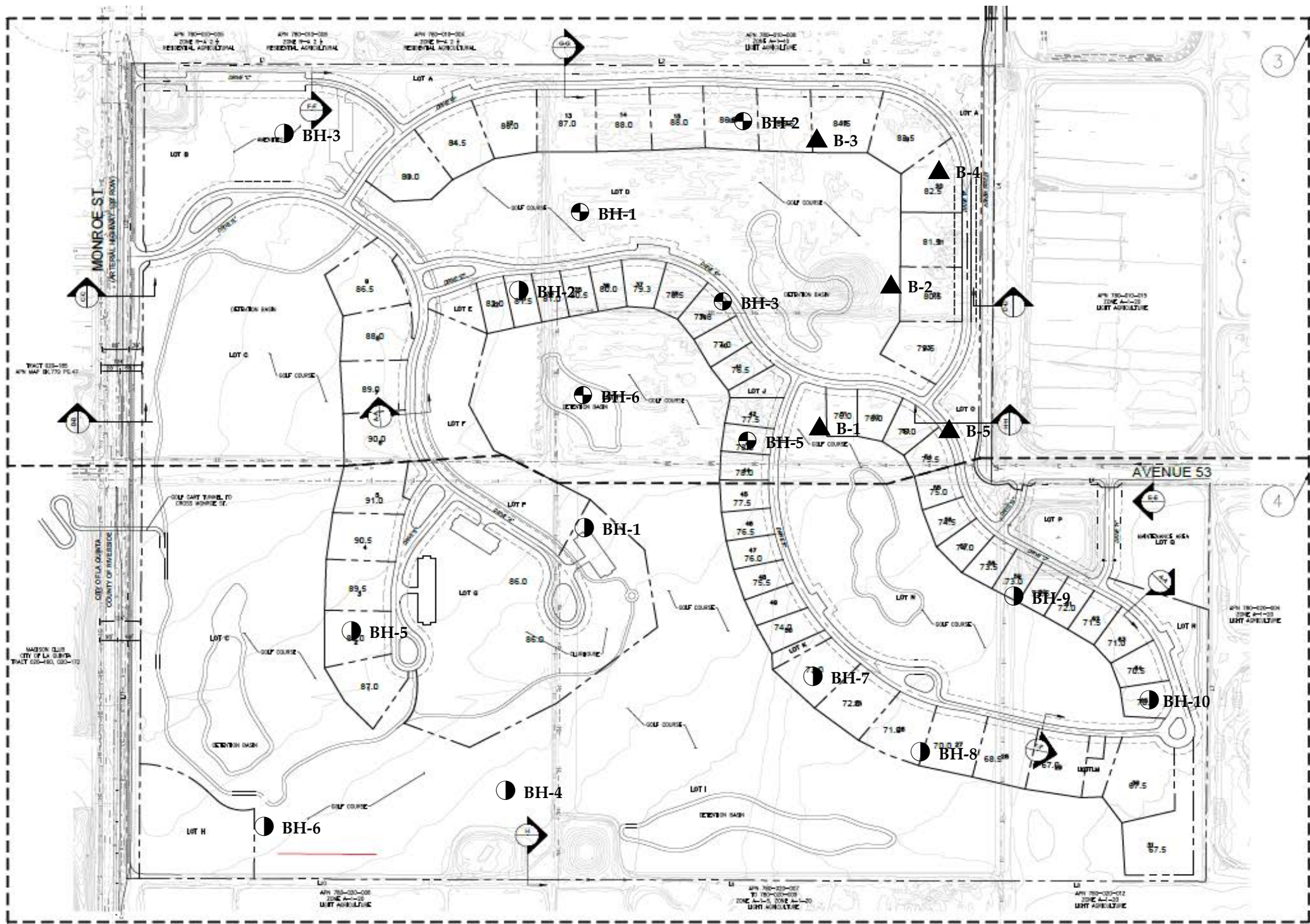
PLATE

544-22319

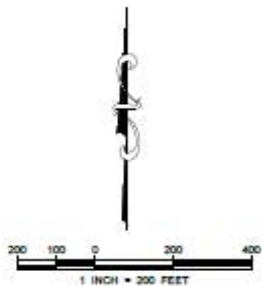
25-11-545

December 3, 2025

2



LINE TABLE		
NO.	BEARING	LENGTH
L1	N89°40'17"W	1295.57
L2	N89°40'45"W	862.987
L3	N89°40'45"W	862.987
L4	N89°38'54"E	1276.847
L5	N82°22'05"E	67.807
L7	N83°31'37"E	1273.407
L8	S58°45'30"E	281.407
L9	N89°40'45"W	1224.487
L10	N89°40'45"W	1293.957
L11	N89°41'17"E	1288.487
L12	S89°11'17"W	1271.817



LEGEND

- ▲ B-5 Borehole Location (Landmark, 2022)
- BH-10 Borehole Location (Sladden, 2022)
- BH-6 Borehole Location (Current Investigation)

Source: TTM No. 39179



Sladden Engineering

EXPLORATION LOCATION PLAN

Project Number:	544-22319
Report Number:	25-11-545
Date:	December 3, 2025

PLATE

3

APPENDIX A
FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

For our field investigation six (6) exploratory bores were excavated on the subject site. Continuous logs of the materials encountered were made by a representative of Sladden Engineering. Materials encountered in the bores were classified in accordance with the Unified Soil Classification System.

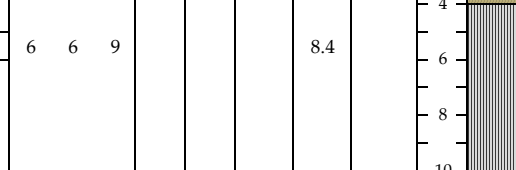
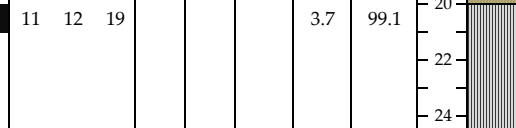
Representative undisturbed samples were obtained within our borings by driving a thin-walled steel penetration sampler (California split spoon sampler) or a Standard Penetration Test (SPT) sampler with a 140 pound automatic-trip hammer dropping approximately 30 inches (ASTM D1586). The number of blows required to drive the samplers 18 inches was recorded in 6-inch increments and blowcounts are indicated on the boring logs.

The California samplers are 3.0 inches in diameter, carrying brass sample rings having inner diameters of 2.5 inches. The standard penetration samplers are 2.0 inches in diameter with an inner diameter of 1.5 inches. Undisturbed samples were removed from the sampler and placed in moisture sealed containers in order to preserve the natural soil moisture content. Bulk samples were obtained from the excavation spoils and samples were then transported to our laboratory for further observations and testing.

 Sladden Engineering										BORE LOG			
										Equipment: MOBILE B-61		Date Drilled: 10/14/2025	
										Elevation: -15 Ft MSL		Boring No: BH-1	
Sample	Blow Counts			Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description		
	5	7	8	1	1	13.0	1.6	92.9	2		Silty Sand (SM); grayish brown, dry, loose, fine-grained (Disturbed/Fill).		
	6	12	19			32.8	3.0	93.5	4			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal)	
	4	6	7			22.2	2.0		6			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
	8	13	22			89.2	6.8	102.6	8			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
	6	7	10			86.1	12.6		10			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
	6	12	25			14.1	1.6	93.4	12			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
	5	7	9			20.0	3.7		14			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
	11	20	29			11.6	3.1	100.8	16			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
	6	9	10			28.2	6.3		18			Silty Sand (SM); grayish brown, dry to slightly moist, medium dense, fine-grained (Ql-Qal).	
	8	33	30			8.9	2.8	112.9	20			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
	9	13	15			10.7	3.7		22			Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).	
Completion Notes: Terminated at ~51.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.											THE RANCH AT MADISON APN 780-010-013		Page
Project No: 544-22319										Report No: 25-11-545			

 Sladden Engineering								BORE LOG				
								Equipment:	MOBILE B-61	Date Drilled:	10/14/2025	
								Elevation:	-15 Ft MSL	Boring No:	BH-2	
Sample	Blow Counts			Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description	
									2		Silty Sand (SM); grayish brown, dry, loose, fine-grained (Disturbed/Fill).	
									4		Silty Sand (SM); grayish brown, dry, loose, fine-grained (QI-Qal).	
	3	4	5				1.21		6			
									8			
	5	8	11				1.8	86.7	10			
									12		Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (QI-Qal).	
									14			
	4	5	7				2.4		16		Sandy Silt (ML); grayish brown, dry, stiff, low plasticity (QI-Qal).	
									18			
									20			
	8	10	12				4.3	93.3	22		Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (QI-Qal).	
									24			
									26			
	6	8	9				4.3		28		Sandy Silt (ML); grayish brown, dry, very stiff, low plasticity (QI-Qal).	
									30		Silt (ML); light grayish brown, dry, very stiff, low plasticity (QI-Qal).	
									32			
	8	14	19				3.7		34		Terminated at ~31.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.	
									36			
									38			
									40			
									42			
									44			
									46			
									48			
									50			
Completion Notes:										THE RANCH AT MADISON		
										APN 780-010-013		
										Project No:		544-22319
Report No:	25-11-545											

 Sladden Engineering								BORE LOG					
								Equipment: MOBILE B-61		Date Drilled: 10/14/2025			
								Elevation: -15 Ft MSL		Boring No: BH-3			
Sample	Blow Counts			Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description		
									2		Silty Sand (SM); grayish brown, dry, loose, fine-grained (Disturbed/Fill).		
									4				
	8	9	11				1.1	96.7	6		Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).		
									8				
	6	10	10				3.4		10		Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).		
									12				
	5	8	14				7.9	82.4	14				
									16		Sandy Silt (ML); light grayish brown, dry, stiff, low plasticity (Ql-Qal).		
									18				
	5	8	9				5.9		20		Sandy Silt (ML); light grayish brown, dry, very stiff, low plasticity (Ql-Qal).		
									22				
Completion Notes:										Terminated at ~21.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.			
										THE RANCH AT MADISON APN 780-010-013			
										Project No:	544-22319	Page	3
										Report No:	25-11-545		

 Sladden Engineering								BORE LOG						
								Equipment: MOBILE B-61		Date Drilled: 10/14/2025				
								Elevation: -15 Ft MSL		Boring No: BH-4				
Sample	Blow Counts			Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description			
									2		Silty Sand (SM); grayish brown, dry, loose, fine-grained with carbonized wood debris (Disturbed/Fill).			
	6	6	9				8.4		4		Sandy Silt (ML); grayish brown, dry, medium stiff, low plasticity (Ql-Qal).			
									6					
									8					
	7	9	14				1.2	96.5	10		Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).			
									12					
									14					
	8	9	11				1.6		16		Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).			
									18					
									20					
	11	12	19				3.7	99.1	22		Sandy Silt (ML); pale grayish brown, dry, very stiff, low plasticity (Ql-Qal).			
									24					
	5	7	8				5.1		26		Silty Sand (SM); grayish brown, dry, medium dense, fine-grained (Ql-Qal).			
									28					
									30					
	8	12	16				3.7	97.0	32		Silty Sand (SM); mottled grayish brown and yellowish brown, dry, medium dense, fine-grained (Ql-Qal).			
									34		Terminated at ~31.5 Feet bgs.			
									36		No Bedrock Encountered.			
									38		No Groundwater or Seepage Encountered.			
									40					
									42					
									44					
									46					
									48					
									50					
Completion Notes:											THE RANCH AT MADISON APN 780-010-013			
											Project No: 544-22319		Page	4
											Report No: 25-11-545			

 Sladden Engineering								BORE LOG			
								Equipment: MOBILE B-61		Date Drilled: 10/14/2025	
								Elevation: -15 Ft MSL		Boring No: BH-5	
Sample	Blow Counts			Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
									2		Silty Sand (SM); grayish brown, dry, loose, fine-grained (Disturbed/Fill).
	5	8	12			59.6	2.4		4		Sandy Silt (ML); grayish brown, dry, very stiff, low plasticity (QI-Qal).
									6		
	12	21	19			56.9	1.6	101.7	10		
									12		Sandy Silt (ML); grayish brown, dry, very stiff, low plasticity (QI-Qal).
									14		
	2	3	4			86.2	27.1		16		
									18		Clayey Silt (ML); dark grayish brown, moist, medium stiff, low plasticity (QI-Qal).
									20		
	10	12	13			15.3	22.1	90.3	22		
									24		Silty Sand (SM); grayish brown, moist, medium dense, fine-grained (QI-Qal).
									26		
	4	6	2			21.7	7.6		28		
									30		Silty Sand (SM); grayish brown, dry to slightly moist, medium dense, fine-grained (QI-Qal).
									32		
	11	15	17			24.0	6.2	96.1	34		
									36		Silty Sand (SM); grayish brown, dry to slightly moist, medium dense, fine-grained (QI-Qal).
									38		
	6	8	10			8.5	3.4		40		
									42		Sand (SP-SM); grayish brown, dry, medium dense, fine-grained (QI-Qal).
									44		
	11	15	18			73.3	19.2	92.9	46		
									48		Sandy Clay (CL); grayish brown, slightly moist, very stiff, low plasticity (QI-Qal).
									50		
	8	10	12			26.5	8.0				
											Silty Sand (SM); grayish brown, slightly moist, medium dense, fine-grained (QI-Qal).
	17	31	39			9.8	3.5	113.2			
											Sand (SP-SM); grayish brown, dry, dense, fine-grained (QI-Qal).

Completion Notes:
Terminated at ~51.5 Feet bgs.
No Bedrock Encountered.
No Groundwater or Seepage Encountered.

THE RANCH AT MADISON

APN 780-010-013

Project No: 544-22319

Report No: 25-11-545

Page

5



Equipment:	MOBILE B-61	Date Drilled:	10/14/2025
Elevation:	-15 Ft MSL	Boring No:	BH-6

Completion Notes:	THE RANCH AT MADISON APN 780-010-013		
	Project No: 544-22319	Page	6
	Report No: 25-11-545		

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			TYPICAL NAMES	
COARSE GRAINED SOILS MORE THAN HALF IS LARGER THAN No.200 SIEVE	GRAVELS	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
	MORE THAN HALF COARSE FRACTION IS LARGER THAN No.4 SIEVE SIZE	GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY-GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
	MORE THAN HALF COARSE FRACTION IS SMALLER THAN No.4 SIEVE SIZE	SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF IS SMALLER THAN No.200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, CLEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS: LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

EXPLANATION OF BORE LOG SYMBOLS

-  California Split-spoon Sample
-  Unrecovered Sample
-  Standard Penetration Test Sample
-  Groundwater depth

Note: The stratification lines on the borelogs represent the approximate boundaries between the soil types; the transitions may be gradual.

APPENDIX B

LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Representative samples were obtained in the field and returned to our laboratory for additional observations and testing. Laboratory testing was generally performed in two phases. The first phase consisted of testing in order to determine the compaction of the existing natural soil and the general engineering classifications of the soils underlying the site. This testing was performed in order to estimate the engineering characteristics of the soil and to serve as a basis for selecting samples for the second phase of testing. The second phase consisted of soil mechanics testing. This testing including consolidation, shear strength and expansion testing was performed in order to provide a means of developing specific design recommendations based on the mechanical properties of the soil.

CLASSIFICATION AND COMPACTION TESTING

Maximum Density-Optimum Moisture Determinations: Representative soil types were selected for maximum density determinations. This testing was performed in accordance with the ASTM Standard D1557, Test Method A. Graphic representations of the results of this testing are presented in this appendix. The maximum densities are compared to the field densities of the soil in order to determine the existing relative compaction to the soil.

Classification Testing: Soil samples were selected for classification testing. This testing consists of mechanical grain size analyses. This provides information for developing classifications for the soil in accordance with the Unified Soil Classification System which is presented in the preceding appendix. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing is very useful in detecting variations in the soil and in selecting samples for further testing.

SOIL MECHANIC'S TESTING

Expansion Testing: Two (2) bulk samples were selected for Expansion testing. Expansion testing was performed in accordance with the UBC Standard 18-2. This testing consists of remolding 4-inch diameter by 1-inch thick test specimens to a moisture content and dry density corresponding to approximately 50 percent saturation. The samples are subjected to a surcharge of 144 pounds per square foot and allowed to reach equilibrium. At that point the specimens are inundated with distilled water. The linear expansion is then measured until complete.

Direct Shear Testing: Two (2) bulk samples were selected for Direct Shear testing. This test measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation design and lateral design. Tests were performed using a recompacted test specimen that was saturated prior to tests. Tests were performed using a strain controlled test apparatus with normal pressures ranging from 800 to 2300 pounds per square foot.

Corrosion Series Testing: The soluble sulfate concentrations of the surface soil were determined in accordance with California Test Method Number (CA) 417. The pH and Minimum Resistivity were determined in accordance with CA 643. The soluble chloride concentrations were determined in accordance with CA 422.



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Maximum Density/Optimum Moisture

ASTM D698/D1557

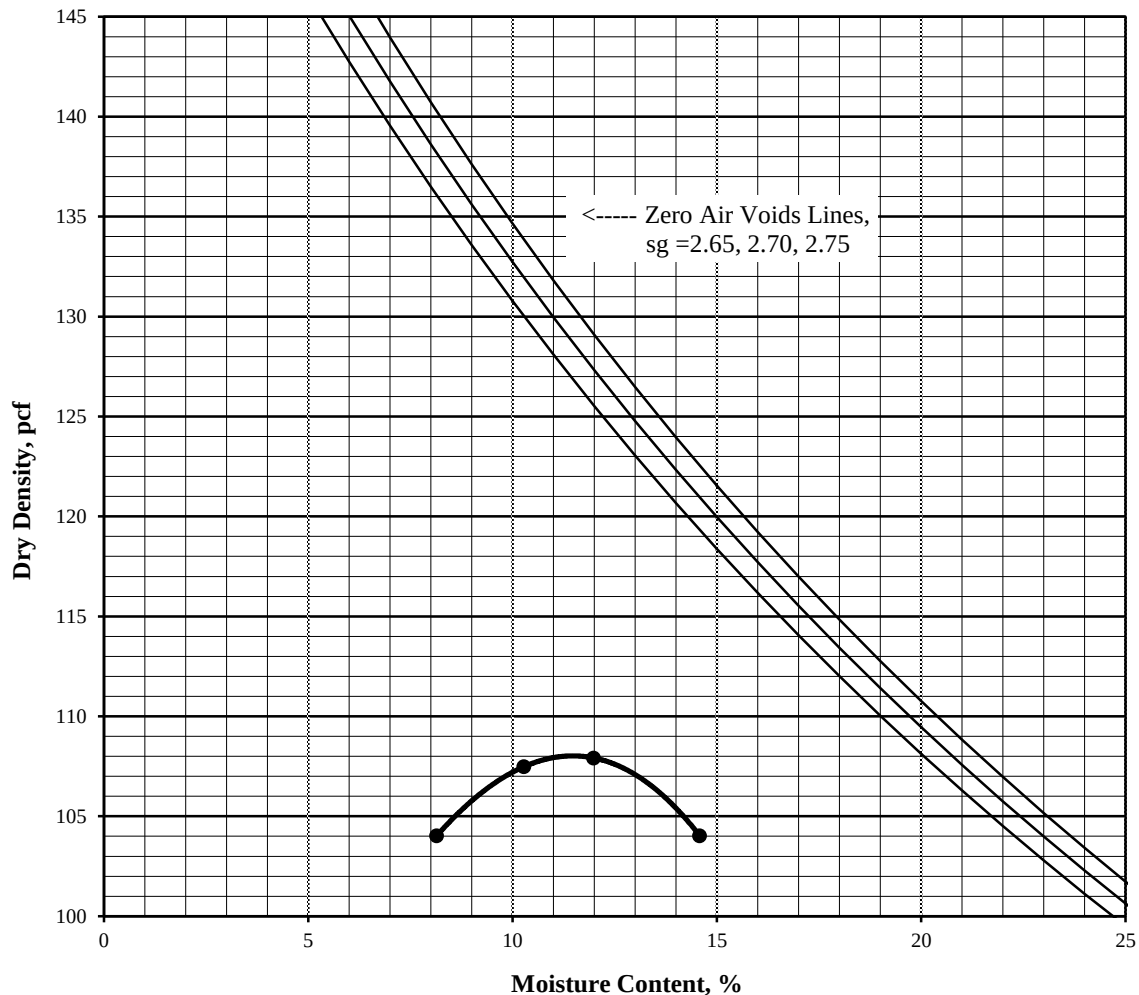
Project Number: 544-22319
Project Name: Ranch @ Madison
Lab ID Number: LN6-25412
Sample Location: BH-1 Bulk 1 @ 0-5'
Description: Olive Brown Silty Sand (SM)

November 6, 2025

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 108.5 pcf
Optimum Moisture: 11.5%

Sieve Size	% Retained
3/4"	
3/8"	
#4	0.0





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Maximum Density/Optimum Moisture

ASTM D698/D1557

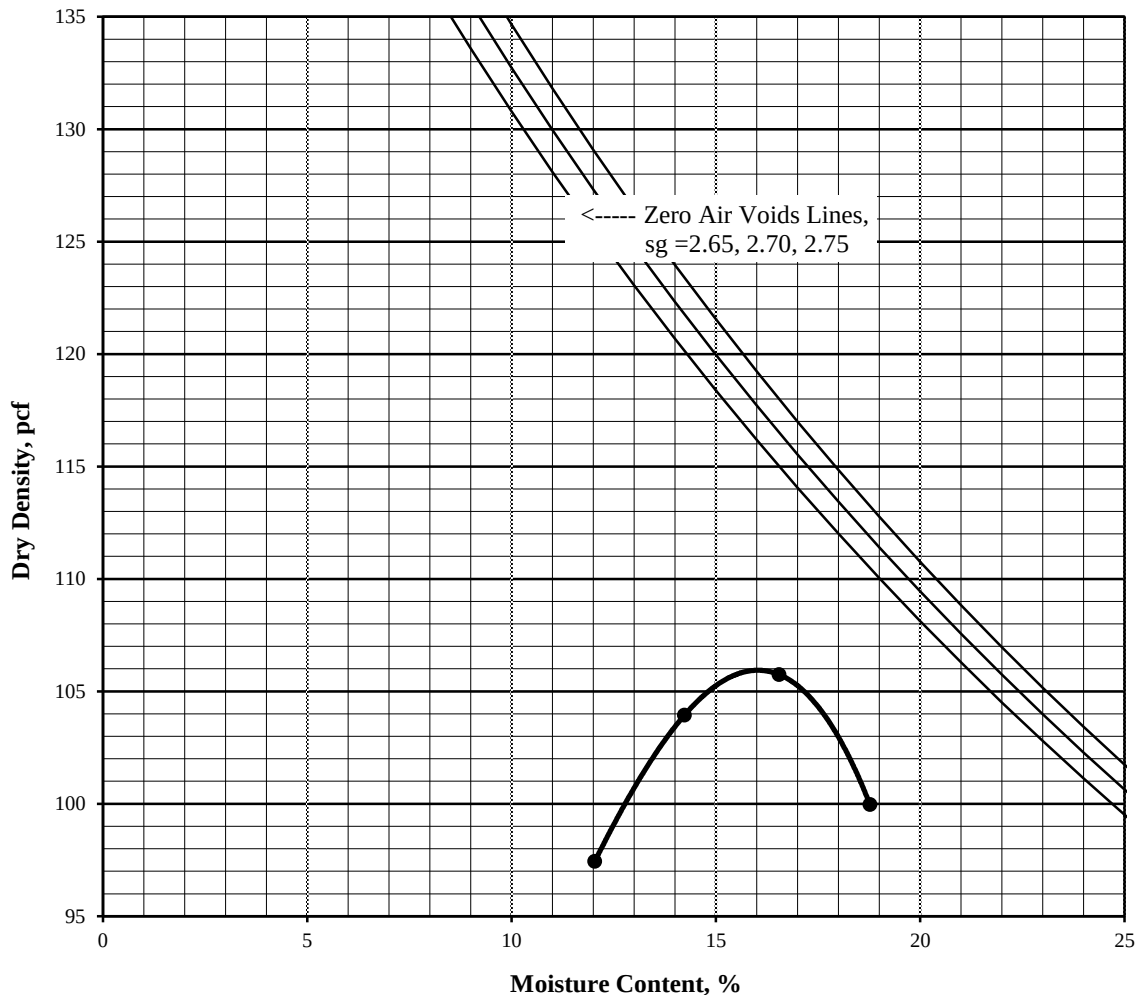
Project Number: 544-22319
Project Name: Ranch @ Madison
Lab ID Number: LN6-25412
Sample Location: BH-6 Bulk 2 @ 0-5'
Description: Light Brown Sandy Silt (ML)

November 6, 2025

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 107.5 pcf
Optimum Moisture: 15.5%

Sieve Size	% Retained
3/4"	
3/8"	
#4	0.0





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Expansion Index

ASTM D 4829

Job Number: 544-22319

Job Name: Ranch @ Madison

Lab ID Number: LN6-25412

Sample ID: BH-1 Bulk 1 @ 0-5'

Soil Description: Olive Brown Silty Sand (SM)

November 6, 2025

Wt of Soil + Ring:	549.0
Weight of Ring:	194.6
Wt of Wet Soil:	354.4
Percent Moisture:	12.4%
Sample Height, in	0.95
Wet Density, pcf:	113.4
Dry Denstiy, pcf:	100.9

% Saturation:	50.0
---------------	------

Expansion	Rack # 2	
Date/Time	10/28/2025	2:30 PM
Initial Reading	0.0000	
Final Reading	0.0010	

Expansion Index	1
-----------------	---

(Final - Initial) x 1000



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Expansion Index

ASTM D 4829

Job Number: 544-22319

Job Name: Ranch @ Madison

Lab ID Number: LN6-25412

Sample ID: BH-6 Bulk 2 @ 0-5'

Soil Description: Light Brown Sandy Silt (ML)

November 6, 2025

Wt of Soil + Ring:	543.8
Weight of Ring:	191.8
Wt of Wet Soil:	352.0
Percent Moisture:	12.7%
Sample Height, in	0.95
Wet Density, pcf:	112.6
Dry Denstiy, pcf:	99.9

% Saturation:	50.0
---------------	------

Expansion	Rack # 2	
Date/Time	10/29/2025	2:30 PM
Initial Reading	0.0000	
Final Reading	0.0460	

Expansion Index	46
-----------------	----

(Final - Initial) x 1000



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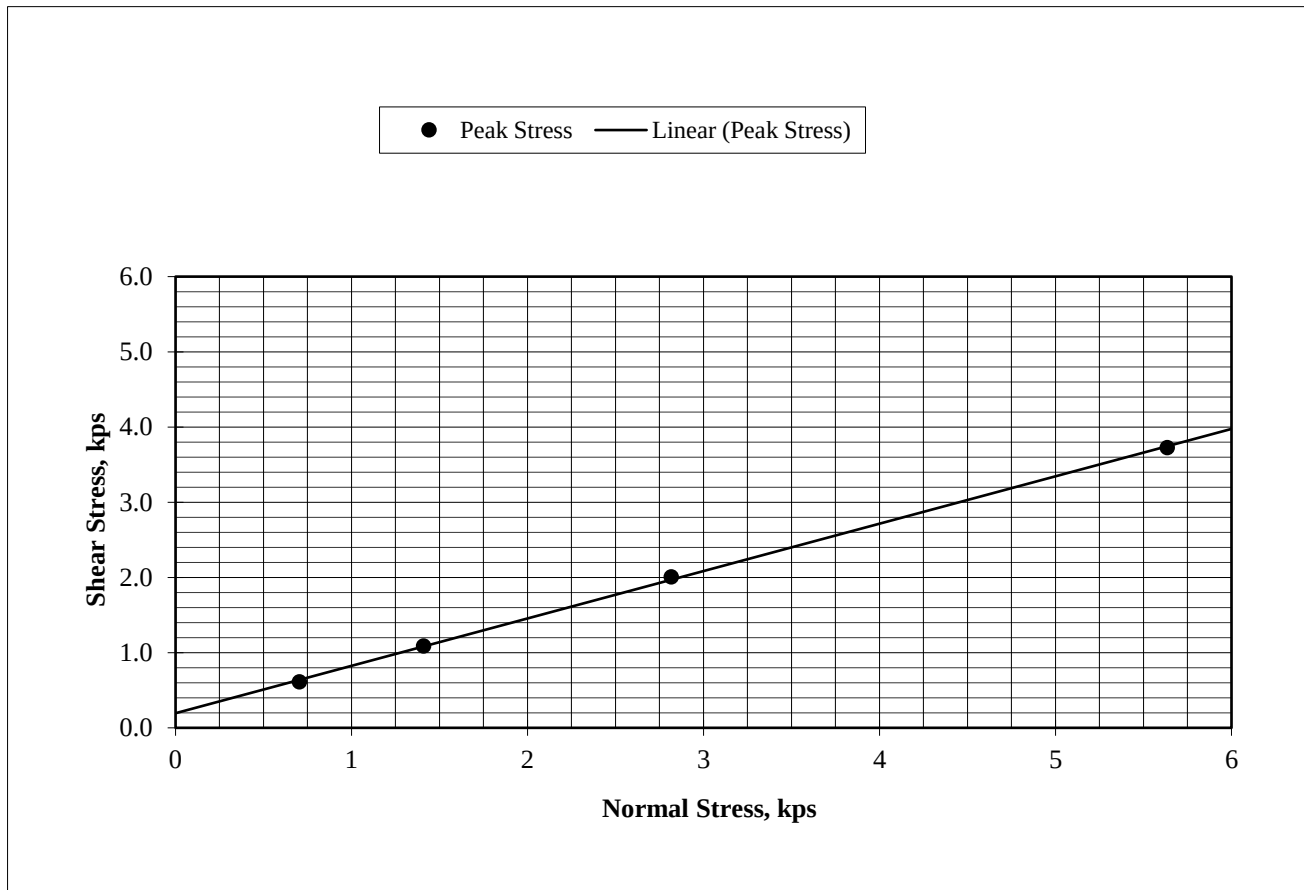
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Direct Shear ASTM D 3080-04 (modified for unconsolidated condition)

Job Number: 544-22319
Job Name Ranch @ Madison
Lab ID No. LN6-25412
Sample ID BH-1 Bulk 1 @ 0-5'
Classification Olive Brown Silty Sand (SM)
Sample Type Remolded @ 90% of Maximum Density

November 6, 2025
Initial Dry Density: 98.3 pcf
Initial Moisture Content: 11.5 %
Peak Friction Angle (ϕ): 32°
Cohesion (c): 190 psf

Test Results	1	2	3	4	Average
Moisture Content, %	21.8	21.8	21.8	21.8	21.8
Saturation, %	82.5	82.5	82.5	82.5	82.5
Normal Stress, kps	0.704	1.409	2.817	5.635	
Peak Stress, kps	0.610	1.090	2.006	3.728	





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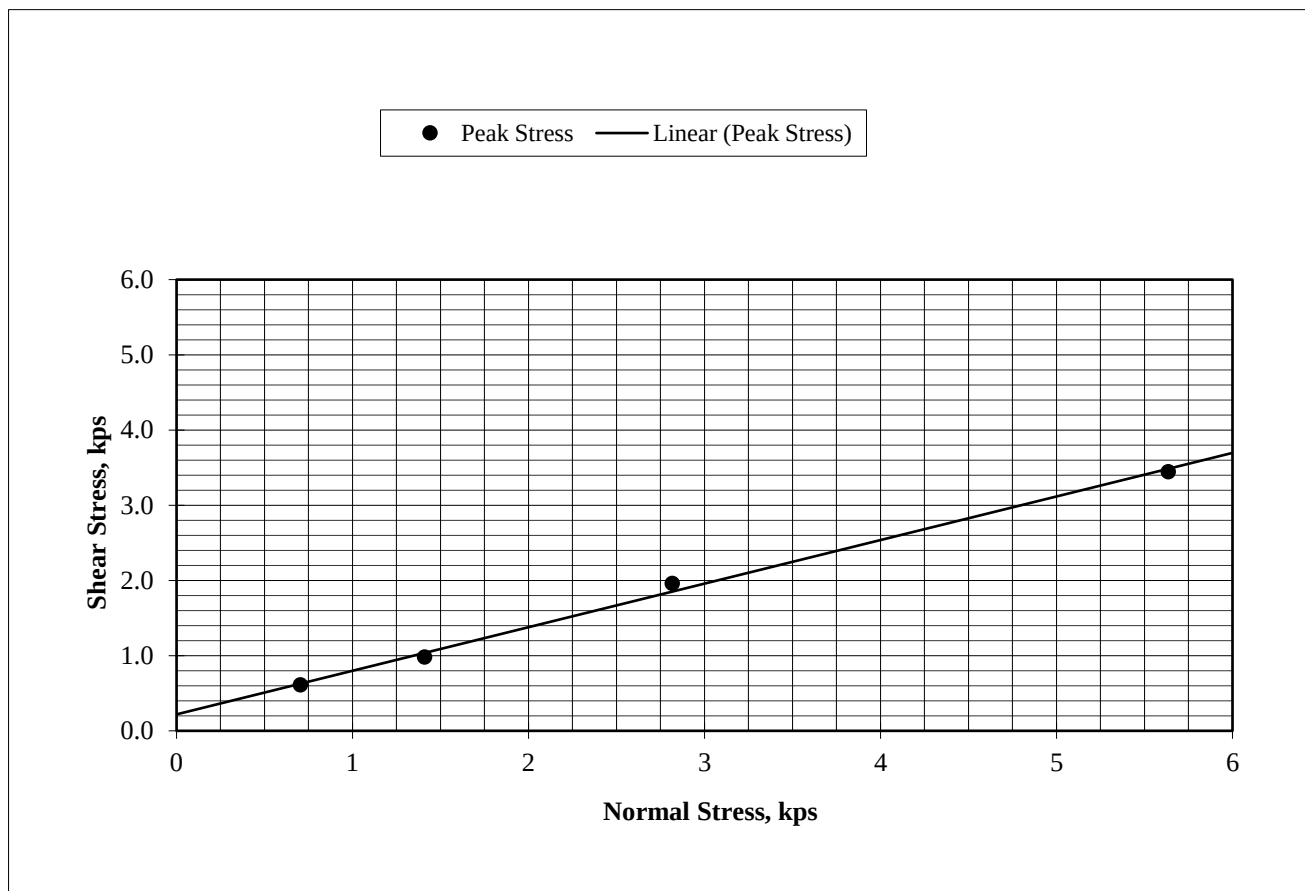
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Direct Shear ASTM D 3080-04 (modified for unconsolidated condition)

Job Number: 544-22319
Job Name Ranch @ Madison
Lab ID No. LN6-25412
Sample ID BH-6 Bulk 2 @ 0-5'
Classification Light Brown Sandy Silt (ML)
Sample Type Remolded @ 90% of Maximum Density

November 6, 2025
Initial Dry Density: 96.1 pcf
Initial Moisture Content: 15.4 %
Peak Friction Angle (ϕ): 30°
Cohesion (c): 220 psf

Test Results	1	2	3	4	Average
Moisture Content, %	26.9	26.9	26.9	26.9	26.9
Saturation, %	96.4	96.4	96.4	96.4	96.4
Normal Stress, kps	0.704	1.409	2.817	5.635	
Peak Stress, kps	0.610	0.981	1.962	3.444	





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Gradation

ASTM C117 & C136

Project Number: 544-22319

November 6, 2025

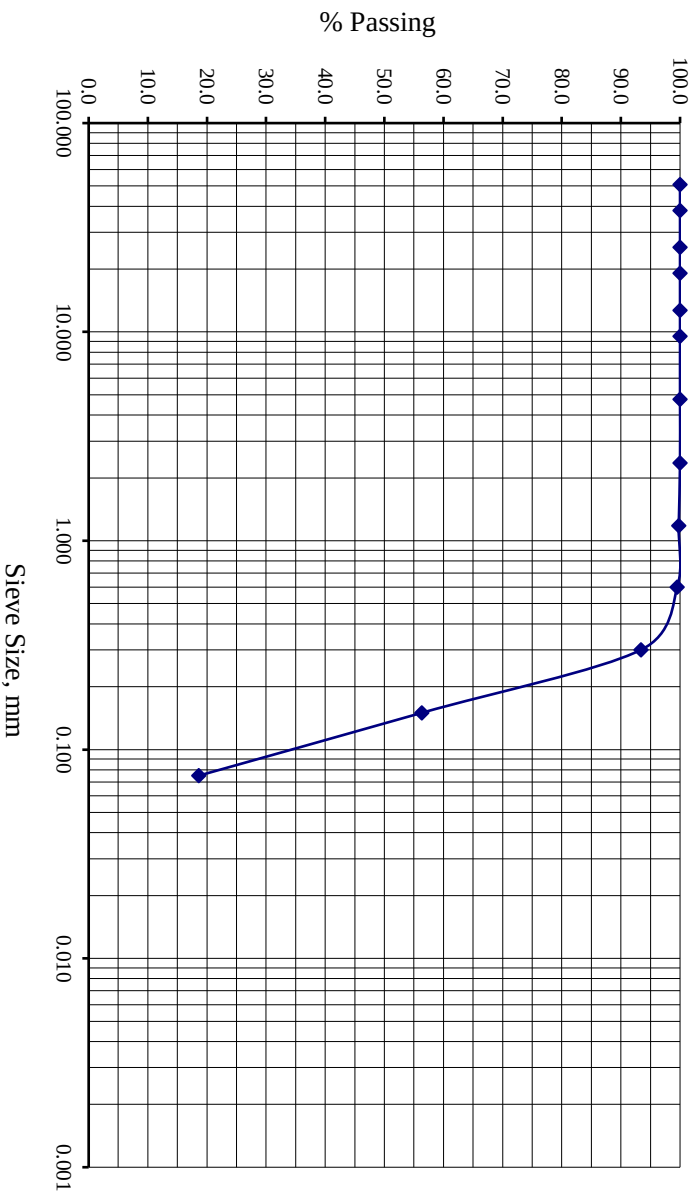
Project Name: Ranch @ Madison

Lab ID Number: LN6-25412

Sample ID: BH-1 Bulk 1 @ 0-5'

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	99.8
#30	0.60	99.5
#50	0.30	93.4
#100	0.15	56.3
#200	0.075	18.6





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Gradation

ASTM C117 & C136

Project Number: 544-22319

November 6, 2025

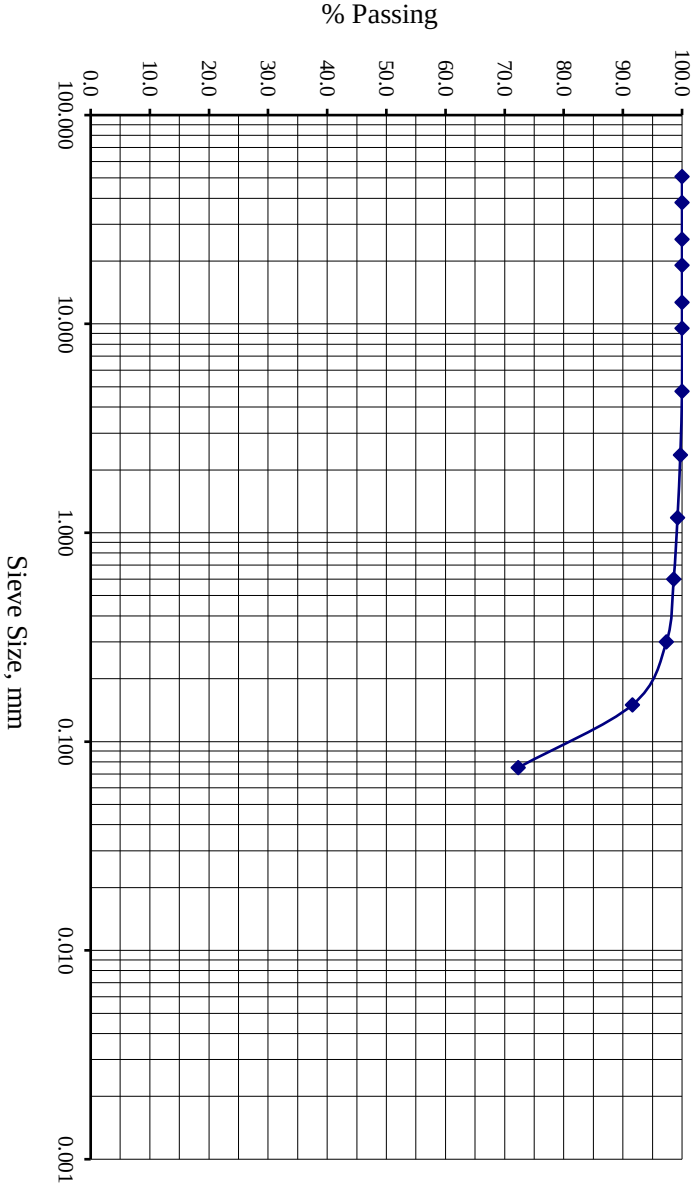
Project Name: Ranch @ Madison

Lab ID Number: LN6-25412

Sample ID: BH-6 Bulk 2 @ 0-5'

Soil Classification: ML

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	99.7
#16	1.18	99.2
#30	0.60	98.6
#50	0.30	97.4
#100	0.15	91.6
#200	0.075	72.3





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Gradation

ASTM C117 & C136

Project Number: 544-22319

Project Name: Ranch @ Madison

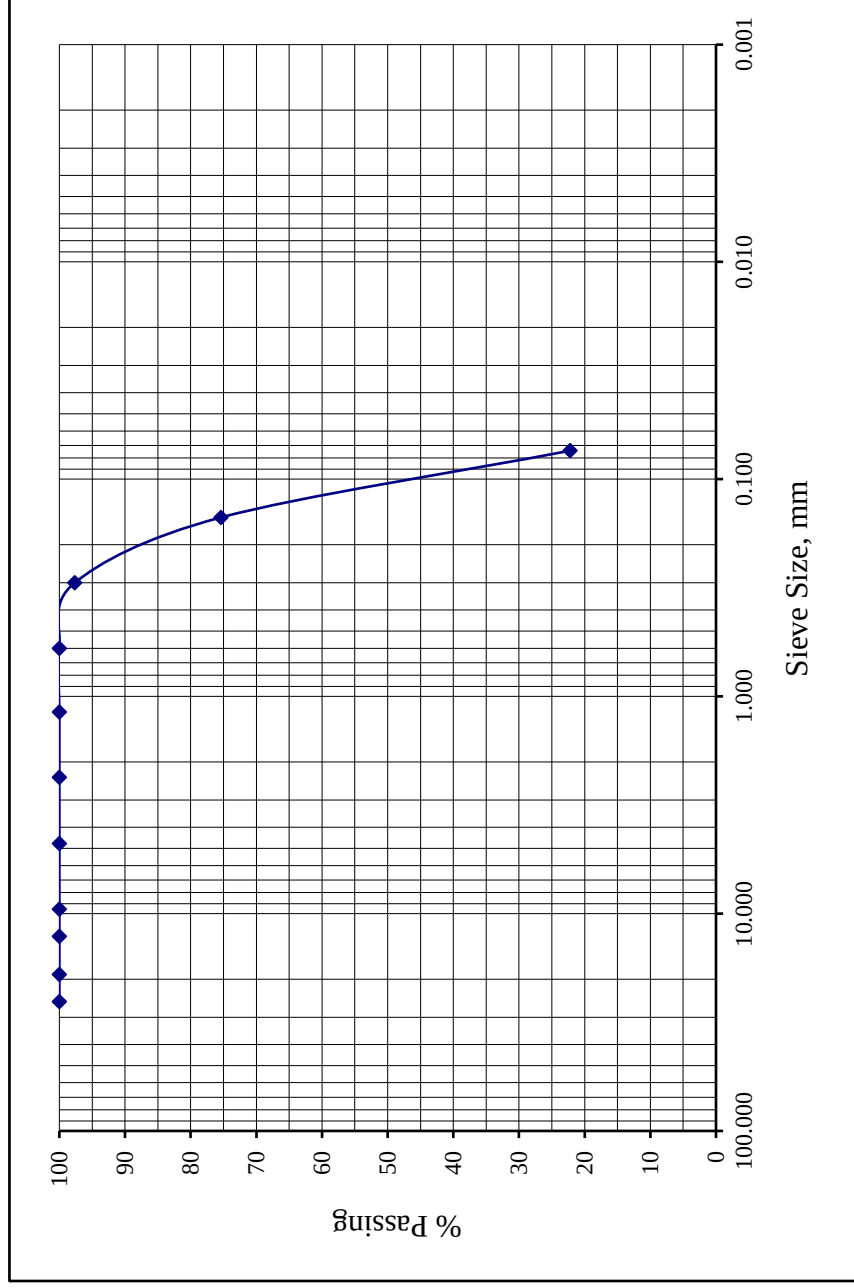
Lab ID Number: LN6-25412

Sample ID: BH-1 S-3 @ 10'

November 6, 2025

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	100.0
#50	0.30	97.7
#100	0.15	75.4
#200	0.074	22.2





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Gradation

ASTM C117 & C136

Project Number:

544-22319

Project Name:

Ranch @ Madison

Lab ID Number:

LN6-25412

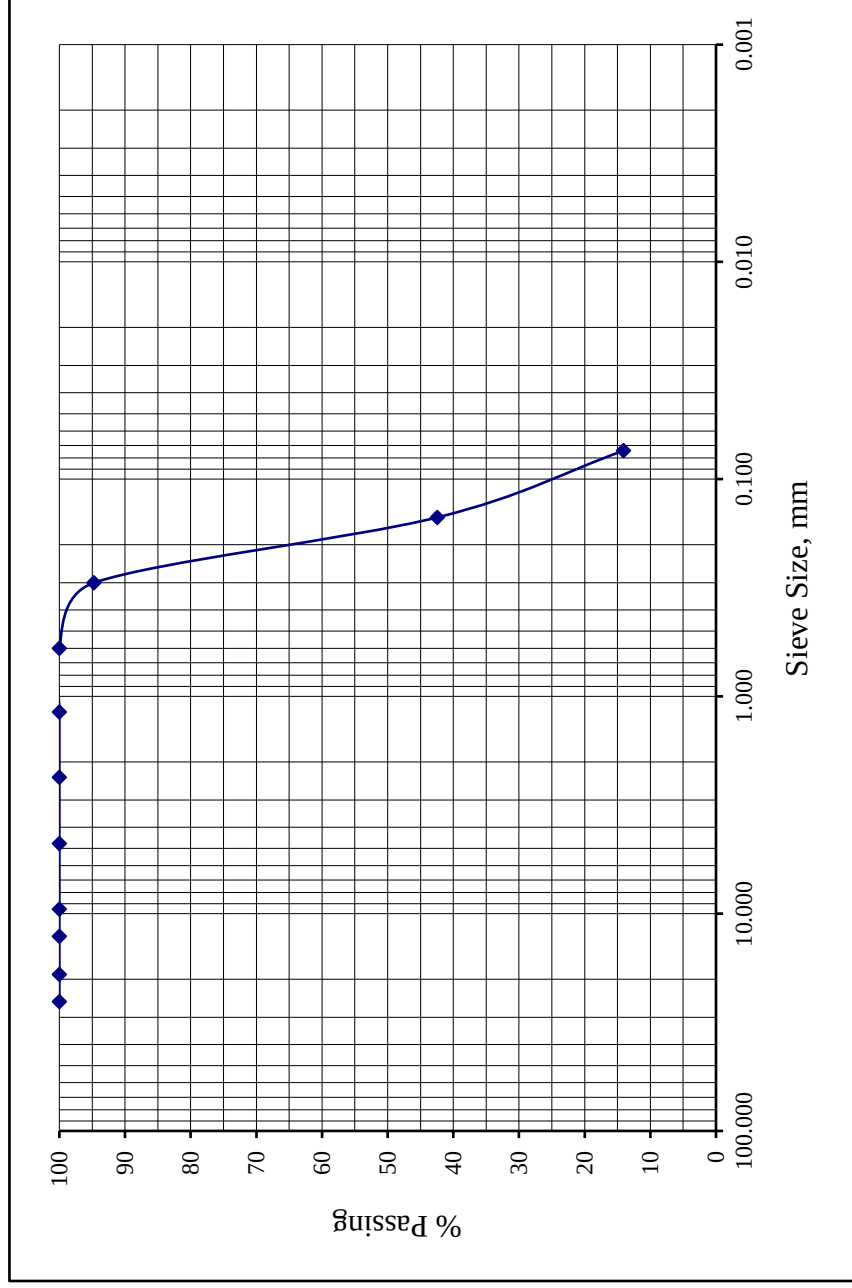
Sample ID:

BH-1 R-6 @ 25'

Soil Classification: SM

November 6, 2025

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	100.0
#50	0.30	94.8
#100	0.15	42.4
#200	0.074	14.1





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Gradation

ASTM C117 & C136

Project Number: 544-22319

Project Name: Ranch @ Madison

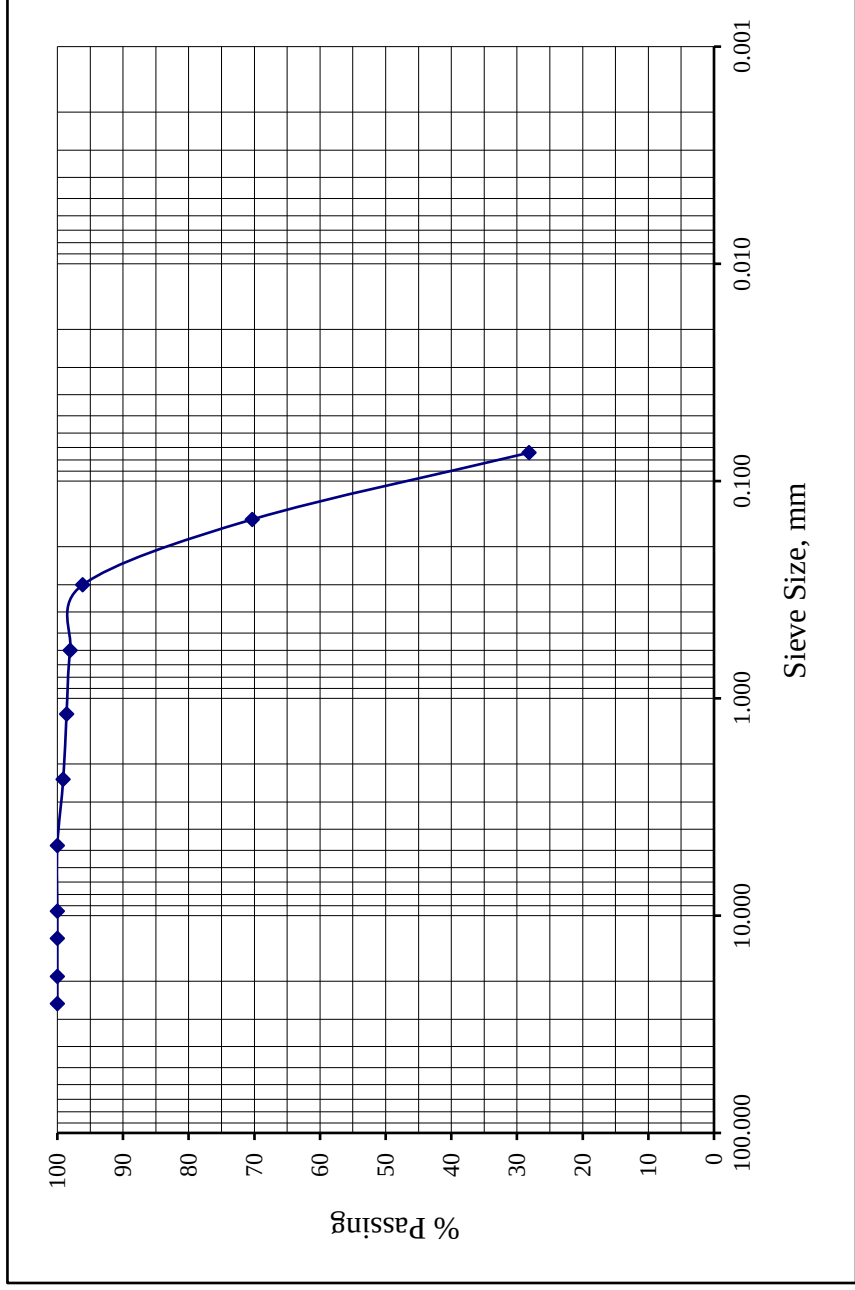
Lab ID Number: LN6-25412

Sample ID: BH-1 S-9 @ 40'

November 6, 2025

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	99.1
#16	1.18	98.6
#30	0.60	98.0
#50	0.30	96.1
#100	0.15	70.3
#200	0.074	28.2





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Gradation

ASTM C117 & C136

Project Number: 544-22319

Project Name: Ranch @ Madison

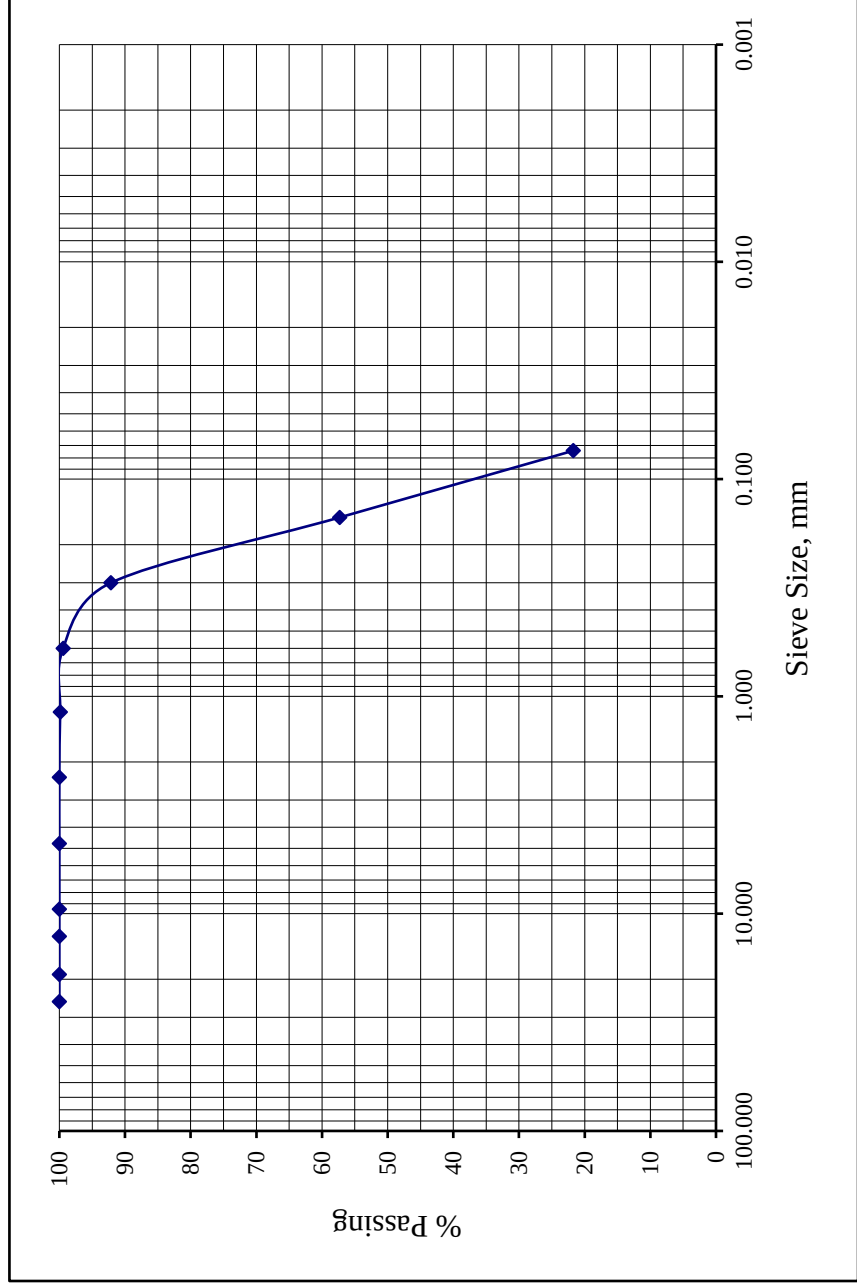
Lab ID Number: LN6-25412

Sample ID: BH-5 S-5 @ 25'

November 6, 2025

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	99.9
#30	0.60	99.4
#50	0.30	92.2
#100	0.15	57.3
#200	0.074	21.7





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Gradation

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Project Number:

544-22319

Project Name:

Ranch @ Madison

Lab ID Number:

LN6-25412

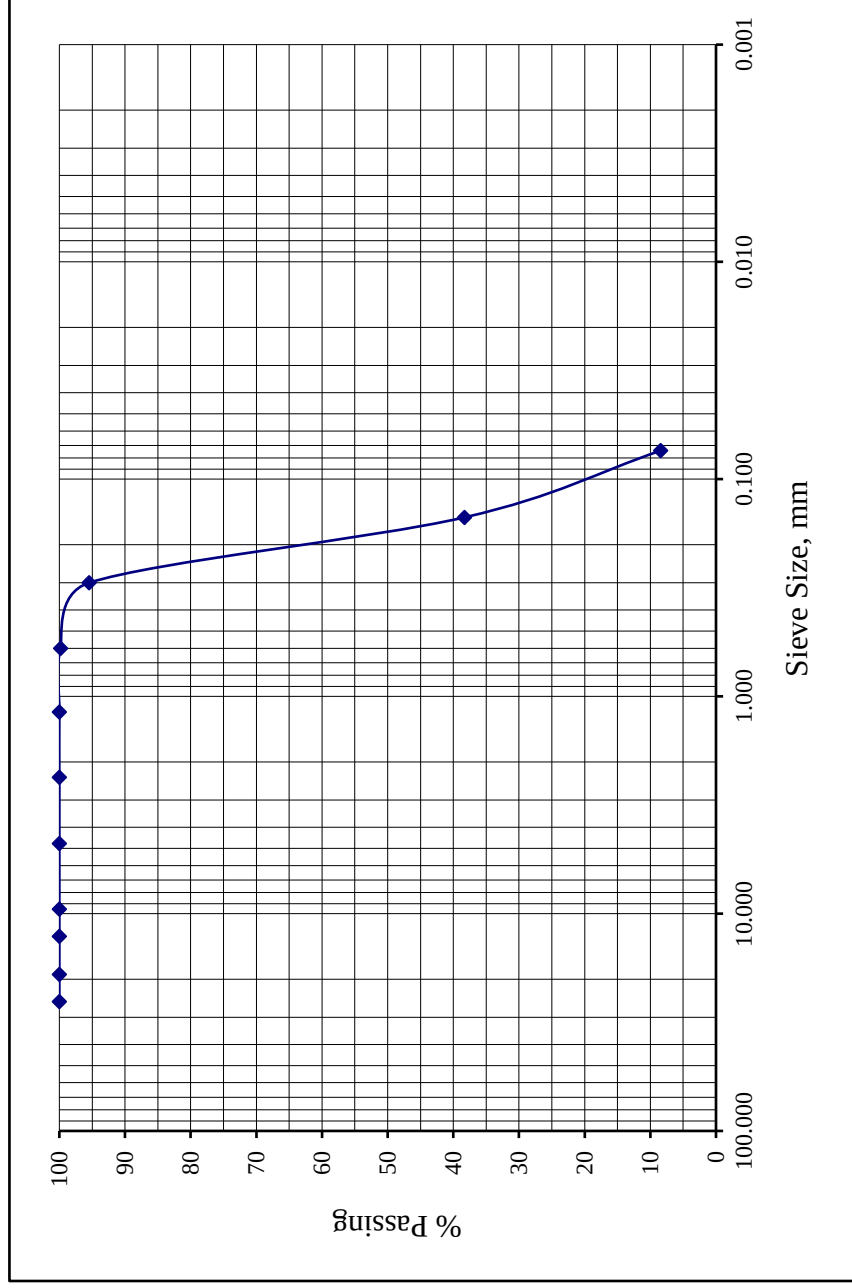
Sample ID:

BH-5 S-7 @ 35'

Soil Classification: SP-SM

November 6, 2025

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	99.8
#50	0.30	95.5
#100	0.15	38.3
#200	0.074	8.5





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Gradation

ASTM C117 & C136

Project Number:

544-22319

Project Name:

Ranch @ Madison

Lab ID Number:

LN6-25412

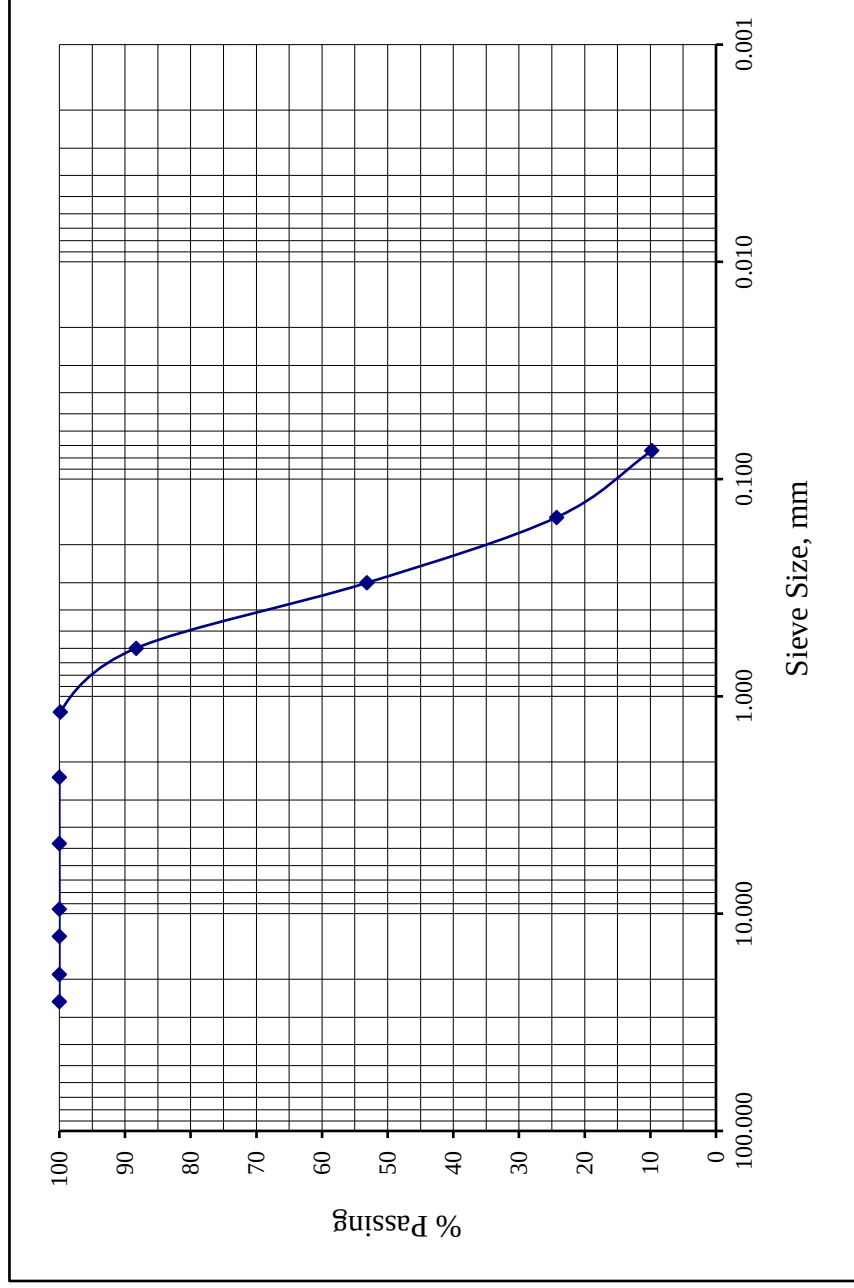
Sample ID:

BH-5 R-10 @ 50'

Soil Classification: SP-SM

November 6, 2025

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	99.9
#30	0.60	88.3
#50	0.30	53.2
#100	0.15	24.3
#200	0.074	9.8





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One Dimensional Consolidation

ASTM D2435 & D5333

Job Number: 544-22319
Job Name: Ranch @ Madison

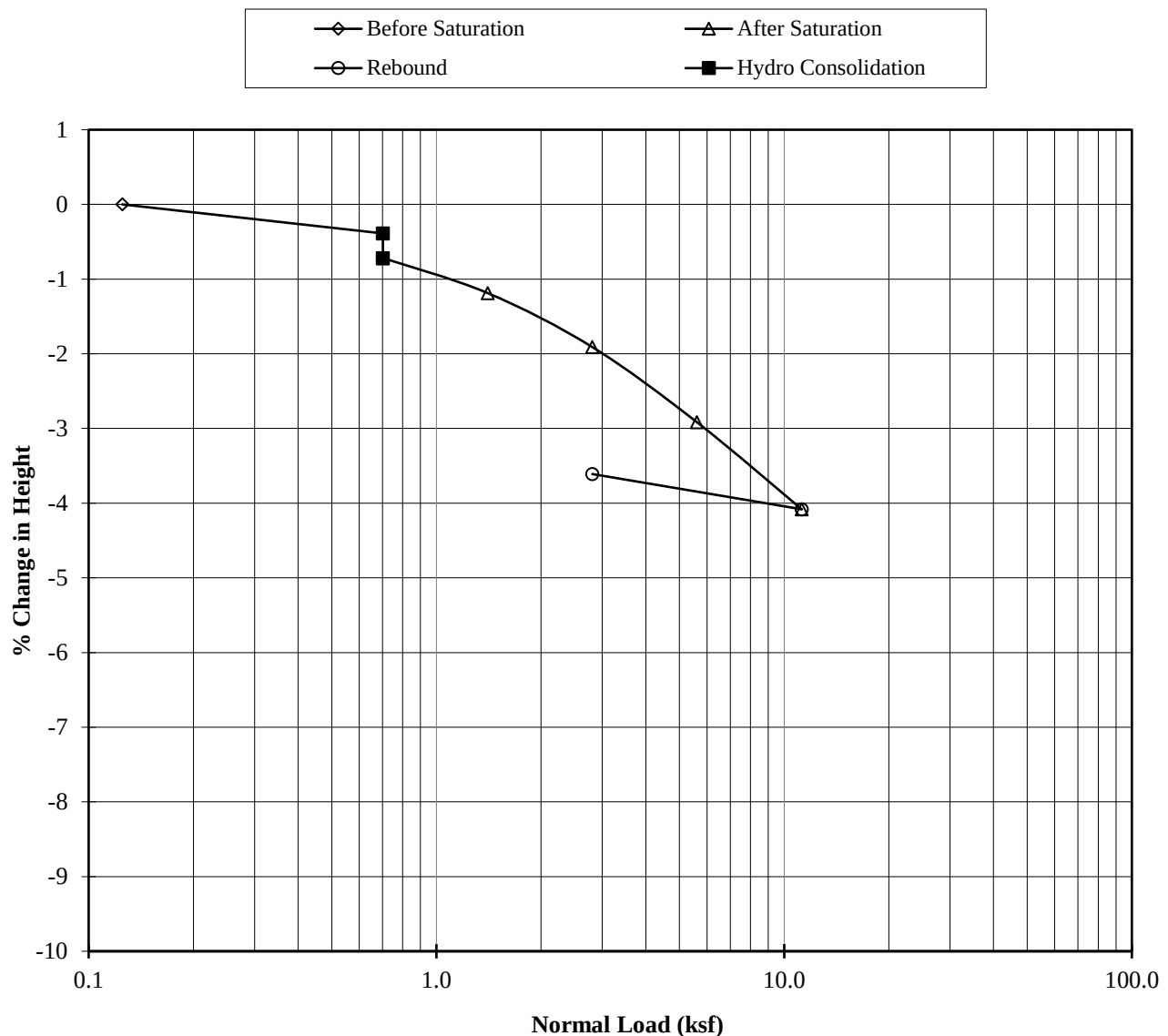
November 6, 2025

Lab ID Number: LN6-25412
Sample ID: BH-1 R-2 @ 5'
Soil Description: Olive Brown Silty Sand

Initial Dry Density, pcf: 95.7
Initial Moisture, %: 3.0
Initial Void Ratio: 0.742
Specific Gravity: 2.67

Hydrocollapse: 0.3% @ 0.702 ksf

% Change in Height vs Normal Pressure Diagram





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One Dimensional Consolidation

ASTM D2435 & D5333

Job Number: 544-22319
Job Name: Ranch @ Madison

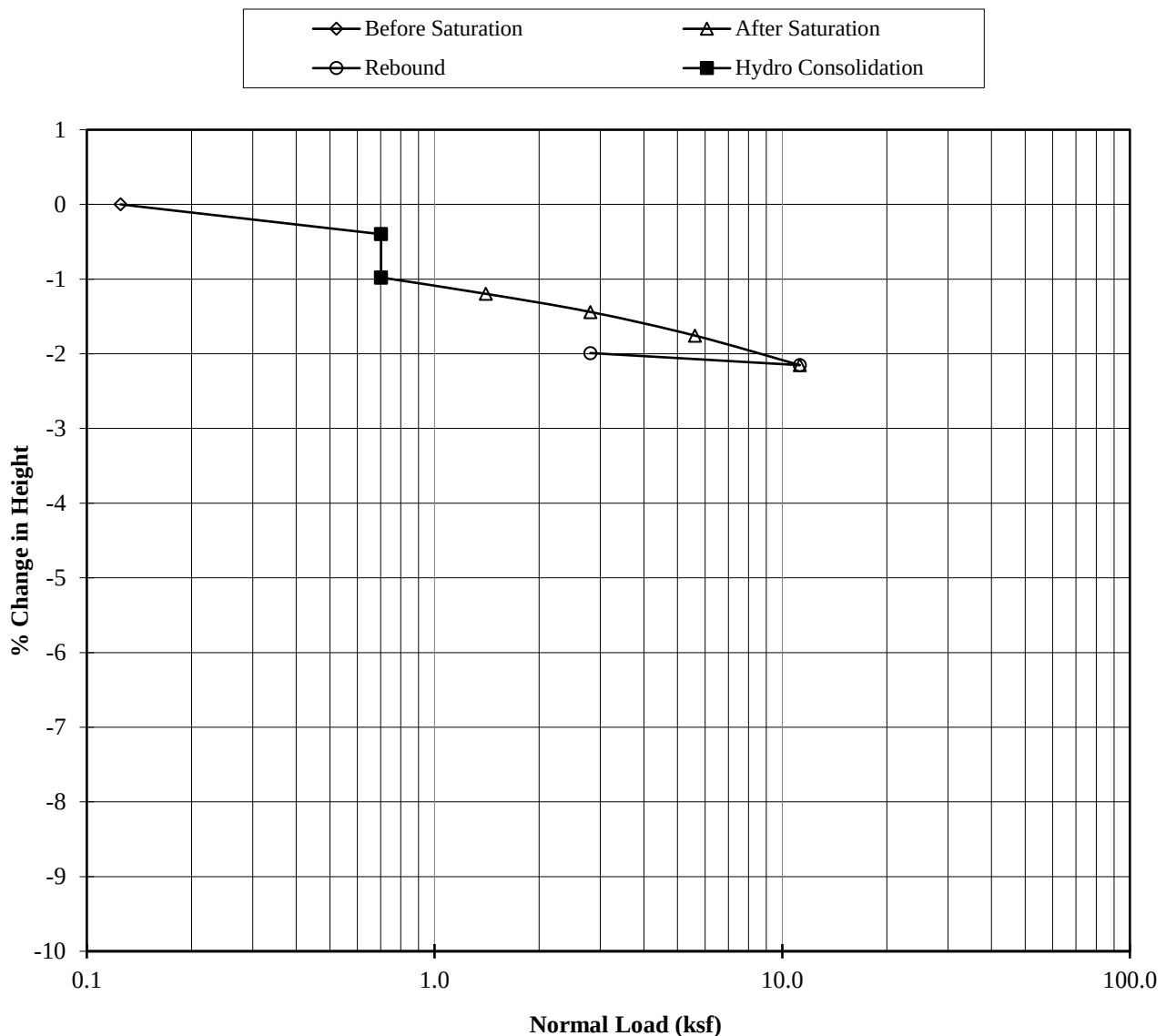
November 6, 2025

Lab ID Number: LN6-25412
Sample ID: BH-5 R-2 @ 10'
Soil Description: Light Brown Sandy Silt

Initial Dry Density, pcf: 101.1
Initial Moisture, %: 1.6
Initial Void Ratio: 0.649
Specific Gravity: 2.67

Hydrocollapse: 0.6% @ 0.702 ksf

% Change in Height vs Normal Pressure Diagram





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RESISTANCE 'R' VALUE AND EXPANSION PRESSURE

CTM 301

November 6, 2025

Project Number: 544-22319

Project Name: Ranch @ Madison

Lab ID Number: LN6-25412

Sample ID: BH-1 Bulk 1 @ 0-5'

Sample Description: Olive Brown Silty Sand (SM)

Specified Traffic Index: 5.0

Dry Density @ 300 psi Exudation Pressure: 107.9-pcf

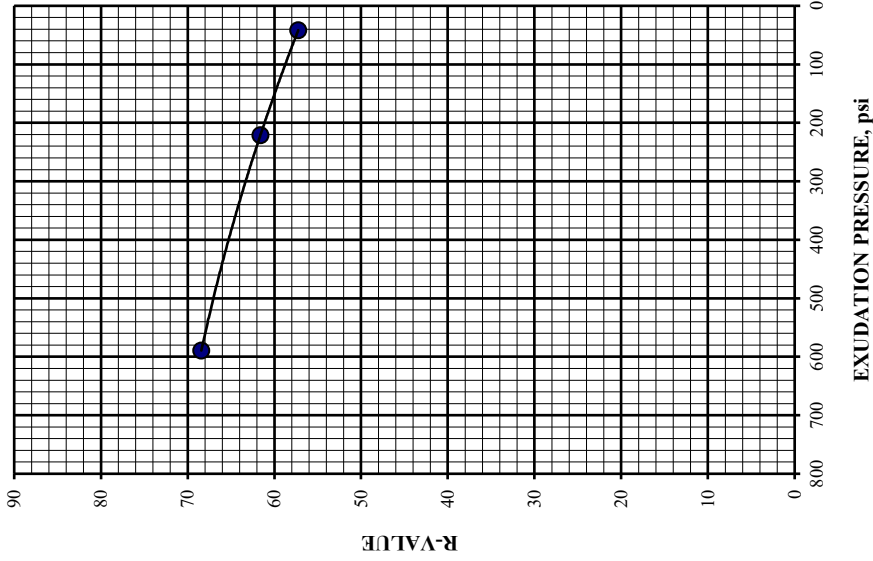
%Moisture @ 300 psi Exudation Pressure: 13.5%

R-Value - Exudation Pressure: 63

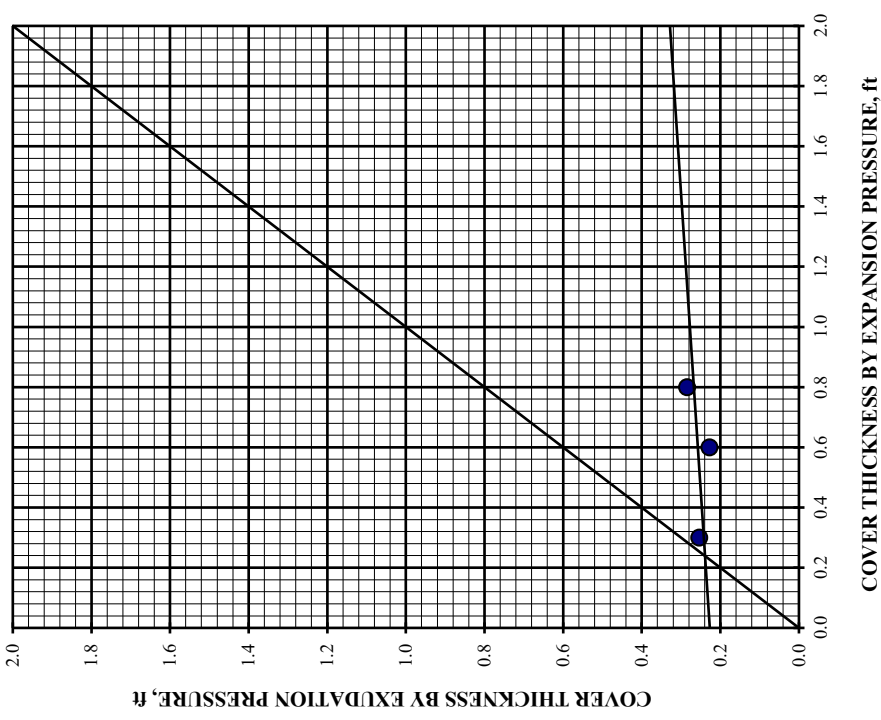
R-Value - Expansion Pressure: 62

R-Value @ Equilibrium: 62

**EXUDATION PRESSURE
CHART**



EXPANSION PRESSURE CHART





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RESISTANCE 'R' VALUE AND EXPANSION PRESSURE

CTM 301

November 6, 2025

Project Number: 544-22319

Project Name: Ranch @ Madison

Lab ID Number: LN6-25412

Sample ID: BH-6 Bulk 2 @ 0-5'

Sample Description: Olive Brown Silt with Sand (ML)

Specified Traffic Index: 5.0

Dry Density @ 300 psi Exudation Pressure: 107.5-pcf

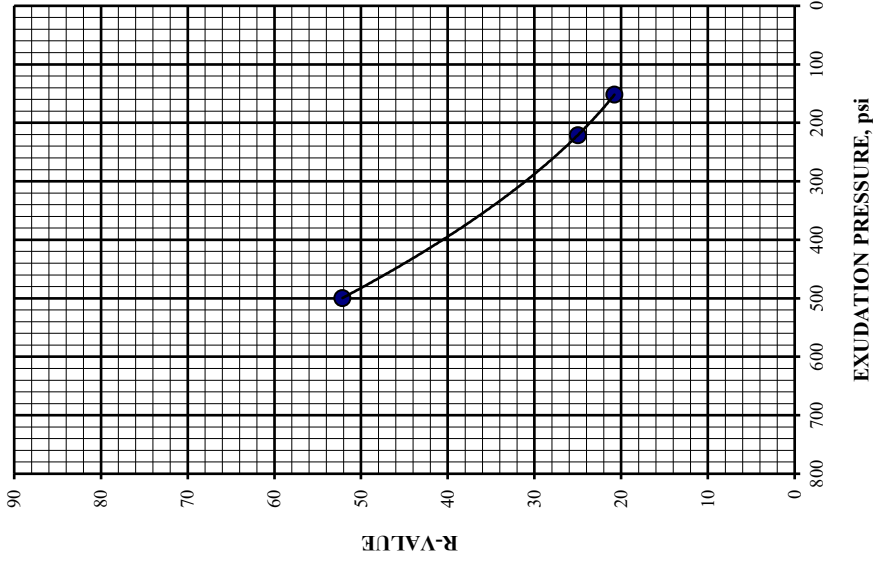
%Moisture @ 300 psi Exudation Pressure: 16.8%

R-Value - Exudation Pressure: 31

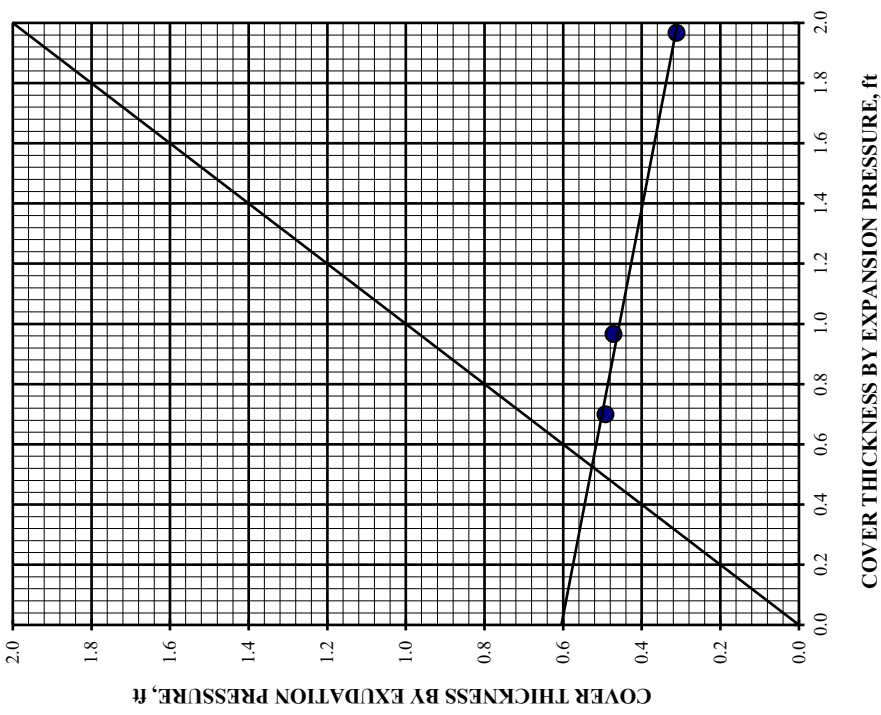
R-Value - Expansion Pressure: 16

R-Value @ Equilibrium: 19

**EXUDATION PRESSURE
CHART**



EXPANSION PRESSURE CHART





Sladden Engineering

6782 Stanton Ave., Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
45090 Golf Center Pkwy, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Date: October 31st, 2025

Account No.: 544-22319

Customer: Discovery MM Club, LLC Attn: John Gamlin

Location: APN: 780-010-013, Ranch @ Madison East of Monroe Street & North of Avenue 53, La Quinta Area

Analytical Report

Corrosion Series

BH-1 @ 0-5'

pH per CA 643	Soluble Sulfates per CA 417 ppm	Soluble Chloride per CA 422 ppm	Min. Resistivity per CA 643 ohm-cm
7.8	40	110	3,500

BH-6 @ 0-5'

pH per CA 643	Soluble Sulfates per CA 417 ppm	Soluble Chloride per CA 422 ppm	Min. Resistivity per CA 643 ohm-cm
8.4	260	170	1,700

APPENDIX C

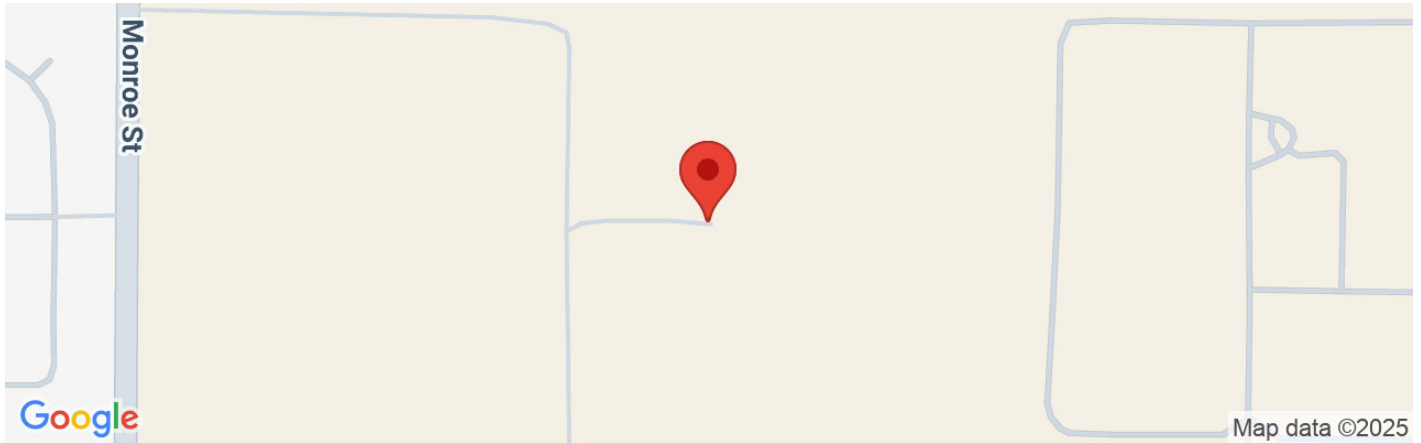
SEISMIC DESIGN MAP AND REPORT SITE-SPECIFIC GROUND MOTION PARAMETERS

Announcement
ASCE 7-22 is now available.



The Ranch At Madison, La Quinta Area

Latitude, Longitude: 33.6657, -116.2283



Date	11/25/2025, 2:14:10 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D

Type	Value	Description
S_S	1.622	MCE_R ground motion. (for 0.2 second period)
S_1	0.668	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.622	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.082	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.709	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.78	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
S_{sRT}	1.919	Probabilistic risk-targeted ground motion. (0.2 second)
S_{sUH}	2.137	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S_{sD}	1.622	Factored deterministic acceleration value. (0.2 second)
S_{1RT}	0.753	Probabilistic risk-targeted ground motion. (1.0 second)
S_{1UH}	0.852	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.

Type	Value	Description
S1D	0.668	Factored deterministic acceleration value. (1.0 second)
PGAd	0.709	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA _{UH}	0.845	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C _{RS}	0.898	Mapped value of the risk coefficient at short periods
C _{R1}	0.883	Mapped value of the risk coefficient at a period of 1 s
C _V	1.424	Vertical coefficient

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SITE-SPECIFIC GROUND MOTION ANALYSIS (ASCE 7-16)

Project: The Ranch at Madison, La Quinta Area; APN 780-010-013
Project Number: 544-22319
Client: Discovery MM Club, LLC
Site Lat/Long: 33.6657/-116.2283
Controlling Seismic Source: San Andreas

REFERENCE	NOTATION	VALUE	REFERENCE	NOTATION	VALUE	REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured	F _v (Table 11.4-2)[Used for General Spectrum]	F _v	1.7			
Site Class D - Table 11.4-1	F _a	1.0	Design Maps	S _s	1.622	0.2*(S _{D1} /S _{DS})	T ₀	0.14*
Site Class D - 21.3(ii)	F _v	2.5	Design Maps	S ₁	0.668	S _{D1} /S _{DS}	T _s	0.70*
0.2*(S _{D1} /S _{DS})	T ₀	0.206	Equation 11.4-1 - F _A *S _s	S _{MS}	1.622*	Equation 11.4-4 - 2/3*S _{M1}	S _{D1}	0.7571*
S _{D1} /S _{DS}	T _s	1.030	Equation 11.4-3 - 2/3*S _{MS}	S _{DS}	1.081*	Equation 11.4-2 - F _v *S ₁	S _{M1}	1.1356*
Fundamental Period (12.8.2)	T	Period	Design Maps	PGA	0.709			
Seismic Design Maps or Fig 22-14	T _L	8	Table 11.8-1	F _{PGA}	1.1			
Equation 11.4-4 - 2/3*S _{M1}	S _{D1}	1.1133	Equation 11.8-1 - F _{PGA} *PGA	PGA _M	0.78*			
Equation 11.4-2 - F _v *S ₁ ¹	S _{M1}	1.6700	Section 21.5.3	80% of PGA _M	0.624			
¹ - F _v as determined by Section 21.3			Design Maps	C _{RS}	0.898			
			Design Maps	C _{R1}	0.883			
<u>RISK COEFFICIENT</u>								
Cr - At Periods <=0.2, Cr=C _{RS}	C _{RS}	0.898				Cr - At Periods between 0.2 and 1.0 use trendline formula to complete	Period	Cr
Cr - At Periods >=1.0, Cr=C _{R1}	C _{R1}	0.883					0.200	0.898
							0.300	0.896
							0.400	0.894
							0.500	0.892
							0.600	0.891
							0.680	0.889
							1.000	0.883

* **Code based design value.** See accompanying data for Site Specific Design values.

Mapped values from <https://hazards.atcouncil.org/>
<https://www.seismicmaps.org/>



Sladden Engineering

PROBABILISTIC SPECTRA¹
2% in 50 year Exceedence

Project No: 544-22319

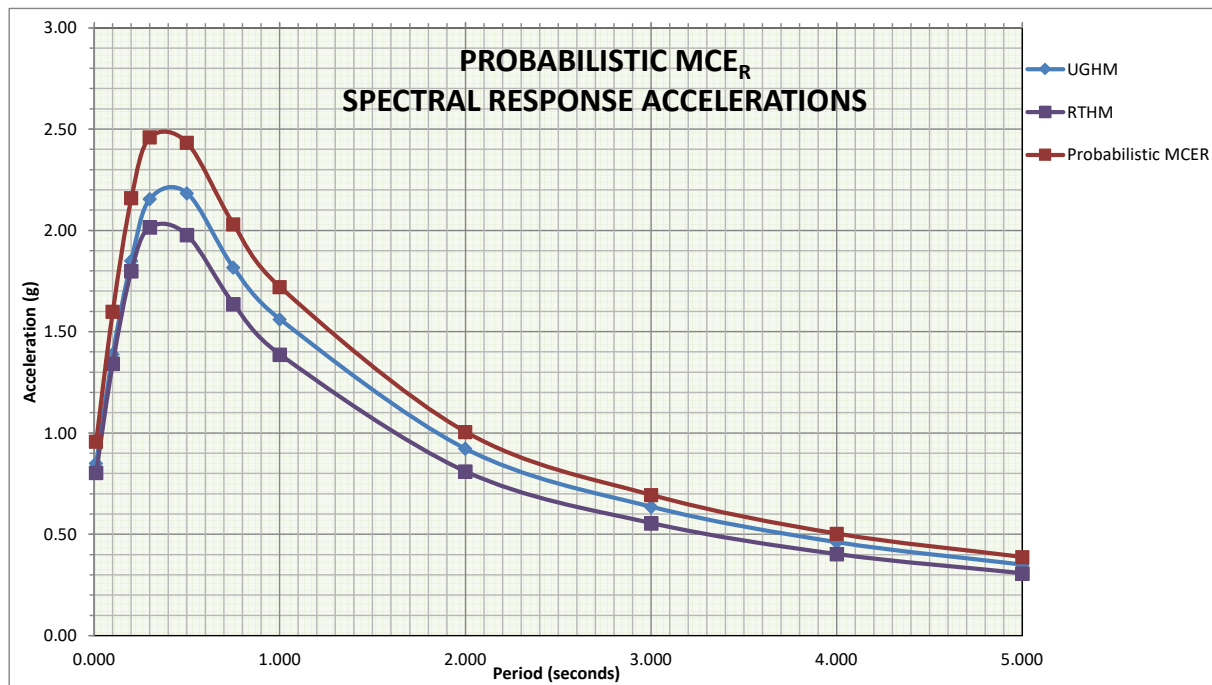
Period	UGHM	RTGM	Max Directional Scale Factor ²	Probabilistic MCE
0.010	0.851	0.805	1.19	0.958
0.100	1.389	1.344	1.19	1.599
0.200	1.851	1.800	1.20	2.160
0.300	2.156	2.016	1.22	2.460
0.500	2.184	1.978	1.23	2.433
0.750	1.817	1.638	1.24	2.031
1.000	1.562	1.388	1.24	1.721
2.000	0.923	0.811	1.24	1.006
3.000	0.636	0.556	1.25	0.695
4.000	0.462	0.403	1.25	0.504
5.000	0.350	0.308	1.26	0.388

¹ Data Sources:

<https://earthquake.usgs.gov/hazards/interactive/>
<https://earthquake.usgs.gov/designmaps/rtgm/>

² Shahi-Baker RotD100/RotD50 Factors (2014)

Probabilistic PGA: 0.851
 Is Probabilistic $S_{a(max)} < 1.2F_a$? **NO**



DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations¹
Controlling Source: San Andreas

Is Probabilistic $S_{a(max)} < 1.2F_a$? **NO**

Period	Deterministic $P_s a$ Median + 1.σ for 5% Damping	Max Directional Scale Factor ²	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.739	1.19	0.879	0.879
0.020	0.739	1.19	0.880	0.880
0.030	0.716	1.19	0.852	0.852
0.050	0.772	1.19	0.918	0.918
0.075	0.909	1.19	1.082	1.082
0.100	1.079	1.19	1.284	1.284
0.150	1.327	1.20	1.593	1.593
0.200	1.488	1.20	1.786	1.786
0.250	1.602	1.21	1.938	1.938
0.300	1.663	1.22	2.029	2.029
0.400	1.685	1.23	2.073	2.073
0.500	1.634	1.23	2.010	2.010
0.750	1.329	1.24	1.648	1.648
1.000	1.120	1.24	1.389	1.389
1.500	0.809	1.24	1.004	1.004
2.000	0.619	1.24	0.768	0.768
3.000	0.426	1.25	0.533	0.533
4.000	0.301	1.25	0.376	0.376
5.000	0.223	1.26	0.282	0.282

Project No: 544-22319

Is Deterministic $S_{a(max)} < 1.5 * F_a$? **NO**

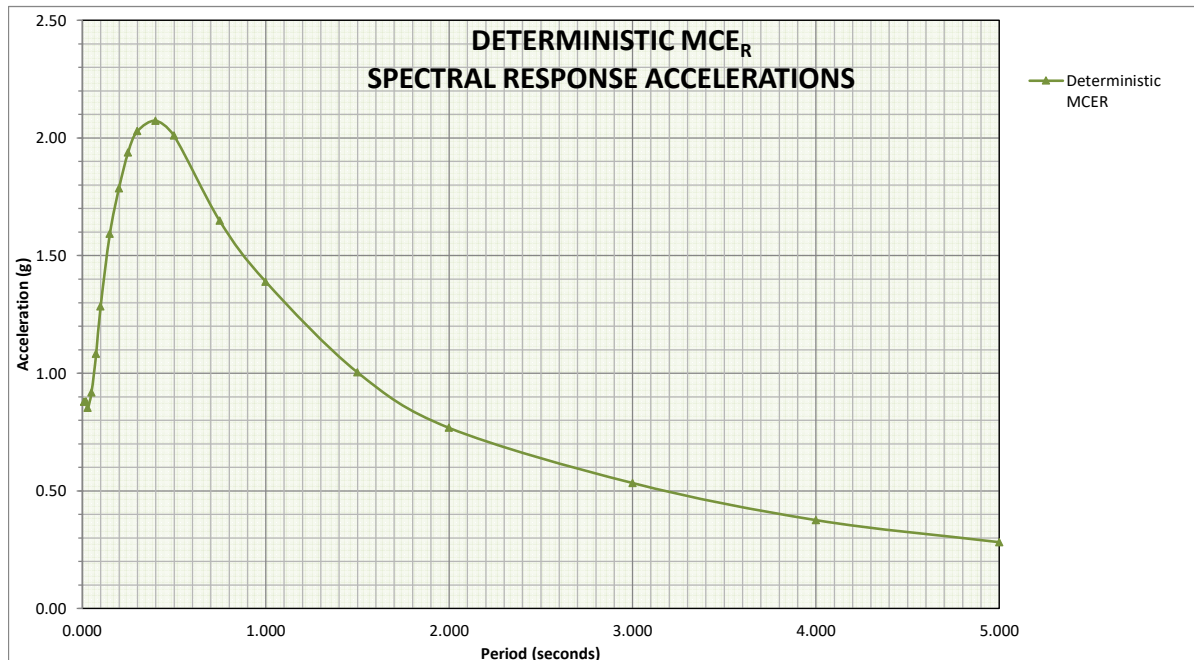
Section 21.2.2 Scaling Factor: **N/A**

Deterministic PGA: **0.739**

Is Deterministic PGA $\geq F_{PGA} * 0.5$? **YES**

¹ NGAWest 2 GMPE worksheet and
Uniform California Earthquake Rupture
Forecast, Version 3 (UCERF3) - Time
Dependent Model

² Shahi-Baker RotD100/RotD50 Factors
(2014)



SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	0.958	0.879	0.879	0.586
0.100	1.599	1.284	1.284	0.856
0.200	2.160	1.786	1.786	1.190
0.300	2.460	2.029	2.029	1.352
0.500	2.433	2.010	2.010	1.340
0.750	2.031	1.648	1.648	1.098
1.000	1.721	1.389	1.389	0.926
2.000	1.006	0.768	0.768	0.512
3.000	0.695	0.533	0.533	0.355
4.000	0.504	0.376	0.376	0.250
5.000	0.388	0.282	0.282	0.188

ASCE 7-16: Section 21.4

Site Specific

	Calculated Value	Design Value
SDS:	1.217	1.217
SD1:	1.066	1.066
SMS:	1.826	1.826
SM1:	1.599	1.599
Site Specific PGAm:	0.739	0.739
Site Class:	D measured	

Seismic Design Category - Short*

D

Seismic Design Category - 1s*

D

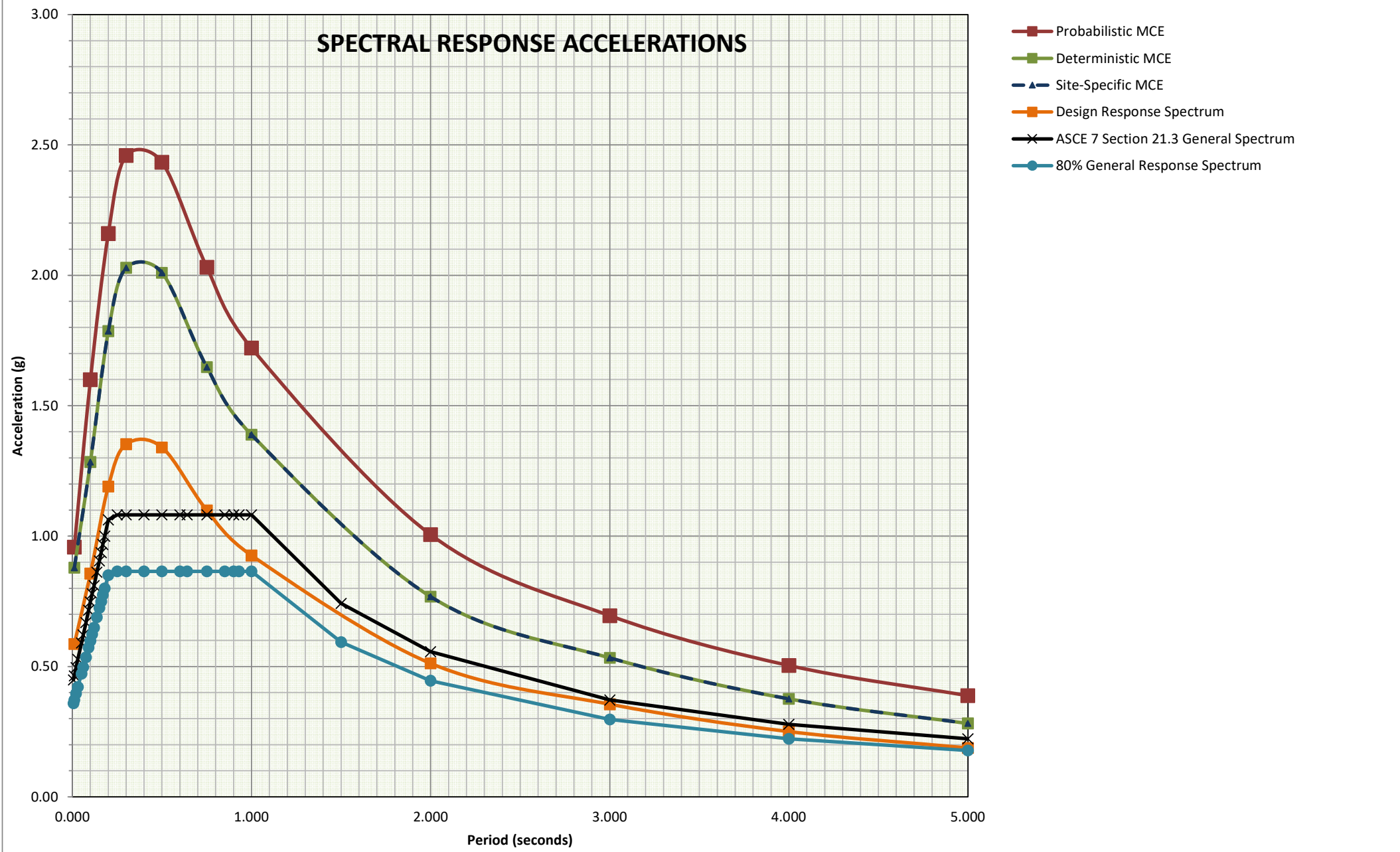
* Risk Categories I, II, or III

Period	ASCE 7 SECTION 21.3 General Spectrum	80% General Response Spectrum
0.005	0.448	0.359
0.010	0.464	0.371
0.020	0.496	0.396
0.030	0.527	0.422
0.050	0.590	0.472
0.060	0.622	0.497
0.075	0.669	0.535
0.090	0.716	0.573
0.100	0.748	0.598
0.110	0.779	0.623
0.120	0.811	0.648
0.136	0.861	0.689
0.150	0.905	0.724
0.160	0.937	0.749
0.170	0.968	0.775
0.180	1.000	0.800
0.200	1.063	0.850
0.250	1.081	0.865
0.300	1.081	0.865
0.400	1.081	0.865
0.500	1.081	0.865
0.600	1.081	0.865
0.640	1.081	0.865
0.750	1.081	0.865
0.850	1.081	0.865
0.900	1.081	0.865
0.930	1.081	0.865
1.000	1.081	0.865
1.500	0.742	0.594
2.000	0.557	0.445
3.000	0.371	0.297
4.000	0.278	0.223
5.000	0.223	0.178

Project No: 544-22319



SPECTRAL RESPONSE ACCELERATIONS



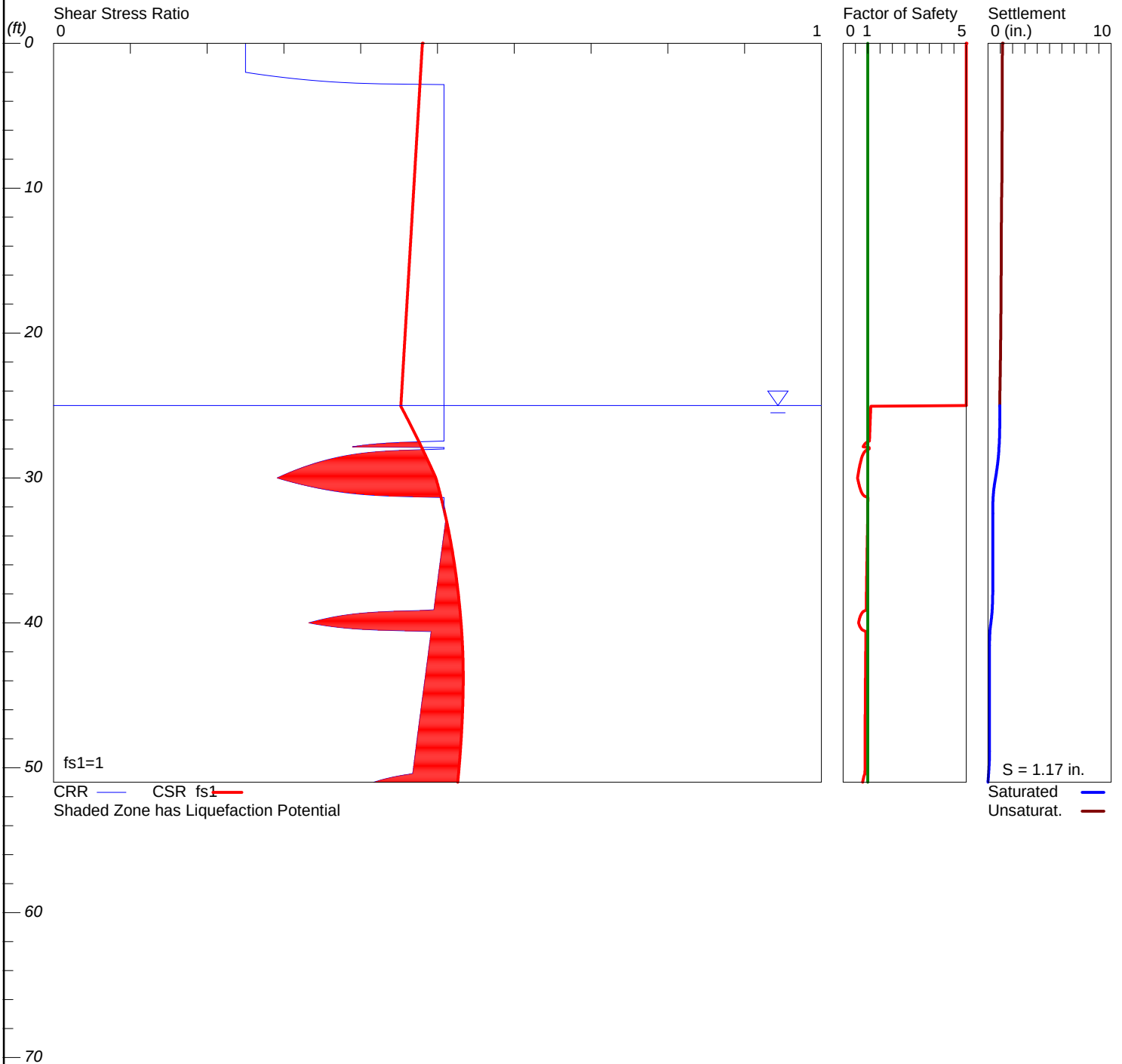
APPENDIX D
LIQUEFACTION ANALYSIS

SEISMIC SETTLEMENT ANALYSIS

The Ranch at Madison

Hole No.=BH-1 Water Depth=25 ft Surface Elev.=-15

Magnitude=7.45
Acceleration=0.739g



LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: D:\Liquefy5\544-22319 BH-1.liq
Title: The Ranch at Madison
Subtitle: 544-22319

Surface Elev.=-15
Hole No.=BH-1
Depth of Hole= 51.00 ft
Water Table during Earthquake= 25.00 ft
Water Table during In-Situ Testing= 51.00 ft
Max. Acceleration= 0.74 g
Earthquake Magnitude= 7.45

Input Data:

Surface Elev.=-15
Hole No.=BH-1
Depth of Hole=51.00 ft
Water Table during Earthquake= 25.00 ft
Water Table during In-Situ Testing= 51.00 ft
Max. Acceleration=0.74 g
Earthquake Magnitude=7.45
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.4
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
Plot one CSR curve (fs1=1)
10. Use Curve Smoothing: Yes*
- * Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
-------	-----	-------	-------

ft		pcf	%
0.00	10.00	94.30	13.00
2.00	10.00	94.30	13.00
5.00	21.00	96.30	32.80
10.00	13.00	96.30	22.20
15.00	23.30	109.60	89.20
20.00	17.00	109.60	86.10
25.00	24.60	94.90	14.10
30.00	16.00	94.90	20.00
35.00	32.70	103.90	11.60
40.00	19.00	103.90	28.20
45.00	42.00	116.10	8.90
50.00	28.00	116.10	10.70

Output Results:

Settlement of Saturated Sands=0.96 in.

Settlement of Unsaturated Sands=0.21 in.

Total Settlement of Saturated and Unsaturated Sands=1.17 in.

Differential Settlement=0.584 to 0.771 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.25	0.48	5.00	0.96	0.21	1.17
0.05	0.25	0.48	5.00	0.96	0.21	1.17
0.10	0.25	0.48	5.00	0.96	0.21	1.17
0.15	0.25	0.48	5.00	0.96	0.21	1.17
0.20	0.25	0.48	5.00	0.96	0.21	1.17
0.25	0.25	0.48	5.00	0.96	0.21	1.17
0.30	0.25	0.48	5.00	0.96	0.21	1.17
0.35	0.25	0.48	5.00	0.96	0.21	1.17
0.40	0.25	0.48	5.00	0.96	0.21	1.17
0.45	0.25	0.48	5.00	0.96	0.21	1.17
0.50	0.25	0.48	5.00	0.96	0.21	1.17
0.55	0.25	0.48	5.00	0.96	0.21	1.17
0.60	0.25	0.48	5.00	0.96	0.21	1.17
0.65	0.25	0.48	5.00	0.96	0.21	1.17
0.70	0.25	0.48	5.00	0.96	0.21	1.17
0.75	0.25	0.48	5.00	0.96	0.21	1.17
0.80	0.25	0.48	5.00	0.96	0.21	1.17
0.85	0.25	0.48	5.00	0.96	0.21	1.17
0.90	0.25	0.48	5.00	0.96	0.21	1.17
0.95	0.25	0.48	5.00	0.96	0.21	1.17
1.00	0.25	0.48	5.00	0.96	0.21	1.17
1.05	0.25	0.48	5.00	0.96	0.21	1.17
1.10	0.25	0.48	5.00	0.96	0.21	1.17
1.15	0.25	0.48	5.00	0.96	0.21	1.17
1.20	0.25	0.48	5.00	0.96	0.21	1.17

1.25	0.25	0.48	5.00	0.96	0.21	1.16
1.30	0.25	0.48	5.00	0.96	0.21	1.16
1.35	0.25	0.48	5.00	0.96	0.21	1.16
1.40	0.25	0.48	5.00	0.96	0.21	1.16
1.45	0.25	0.48	5.00	0.96	0.21	1.16
1.50	0.25	0.48	5.00	0.96	0.21	1.16
1.55	0.25	0.48	5.00	0.96	0.21	1.16
1.60	0.25	0.48	5.00	0.96	0.21	1.16
1.65	0.25	0.48	5.00	0.96	0.21	1.16
1.70	0.25	0.48	5.00	0.96	0.21	1.16
1.75	0.25	0.48	5.00	0.96	0.21	1.16
1.80	0.25	0.48	5.00	0.96	0.21	1.16
1.85	0.25	0.48	5.00	0.96	0.21	1.16
1.90	0.25	0.48	5.00	0.96	0.21	1.16
1.95	0.25	0.48	5.00	0.96	0.20	1.16
2.00	0.25	0.48	5.00	0.96	0.20	1.16
2.05	0.26	0.48	5.00	0.96	0.20	1.16
2.10	0.26	0.48	5.00	0.96	0.20	1.16
2.15	0.27	0.48	5.00	0.96	0.20	1.16
2.20	0.28	0.48	5.00	0.96	0.20	1.16
2.25	0.28	0.48	5.00	0.96	0.20	1.16
2.30	0.29	0.48	5.00	0.96	0.20	1.16
2.35	0.30	0.48	5.00	0.96	0.20	1.16
2.40	0.31	0.48	5.00	0.96	0.20	1.16
2.45	0.32	0.48	5.00	0.96	0.20	1.16
2.50	0.32	0.48	5.00	0.96	0.20	1.16
2.55	0.34	0.48	5.00	0.96	0.20	1.16
2.60	0.35	0.48	5.00	0.96	0.20	1.16
2.65	0.36	0.48	5.00	0.96	0.20	1.16
2.70	0.37	0.48	5.00	0.96	0.20	1.16
2.75	0.39	0.48	5.00	0.96	0.20	1.16
2.80	0.43	0.48	5.00	0.96	0.20	1.16
2.85	0.51	0.48	5.00	0.96	0.20	1.16
2.90	0.51	0.48	5.00	0.96	0.20	1.16
2.95	0.51	0.48	5.00	0.96	0.20	1.16
3.00	0.51	0.48	5.00	0.96	0.20	1.16
3.05	0.51	0.48	5.00	0.96	0.20	1.16
3.10	0.51	0.48	5.00	0.96	0.20	1.16
3.15	0.51	0.48	5.00	0.96	0.20	1.16
3.20	0.51	0.48	5.00	0.96	0.20	1.16
3.25	0.51	0.48	5.00	0.96	0.20	1.16
3.30	0.51	0.48	5.00	0.96	0.20	1.16
3.35	0.51	0.48	5.00	0.96	0.20	1.15
3.40	0.51	0.48	5.00	0.96	0.20	1.15
3.45	0.51	0.48	5.00	0.96	0.20	1.15
3.50	0.51	0.48	5.00	0.96	0.20	1.15
3.55	0.51	0.48	5.00	0.96	0.20	1.15
3.60	0.51	0.48	5.00	0.96	0.20	1.15
3.65	0.51	0.48	5.00	0.96	0.20	1.15
3.70	0.51	0.48	5.00	0.96	0.20	1.15

3.75	0.51	0.48	5.00	0.96	0.20	1.15
3.80	0.51	0.48	5.00	0.96	0.20	1.15
3.85	0.51	0.48	5.00	0.96	0.20	1.15
3.90	0.51	0.48	5.00	0.96	0.20	1.15
3.95	0.51	0.48	5.00	0.96	0.20	1.15
4.00	0.51	0.48	5.00	0.96	0.20	1.15
4.05	0.51	0.48	5.00	0.96	0.20	1.15
4.10	0.51	0.48	5.00	0.96	0.20	1.15
4.15	0.51	0.48	5.00	0.96	0.20	1.15
4.20	0.51	0.48	5.00	0.96	0.20	1.15
4.25	0.51	0.48	5.00	0.96	0.20	1.15
4.30	0.51	0.48	5.00	0.96	0.20	1.15
4.35	0.51	0.48	5.00	0.96	0.20	1.15
4.40	0.51	0.48	5.00	0.96	0.20	1.15
4.45	0.51	0.48	5.00	0.96	0.20	1.15
4.50	0.51	0.48	5.00	0.96	0.20	1.15
4.55	0.51	0.48	5.00	0.96	0.19	1.15
4.60	0.51	0.48	5.00	0.96	0.19	1.15
4.65	0.51	0.48	5.00	0.96	0.19	1.15
4.70	0.51	0.48	5.00	0.96	0.19	1.15
4.75	0.51	0.48	5.00	0.96	0.19	1.15
4.80	0.51	0.47	5.00	0.96	0.19	1.15
4.85	0.51	0.47	5.00	0.96	0.19	1.15
4.90	0.51	0.47	5.00	0.96	0.19	1.15
4.95	0.51	0.47	5.00	0.96	0.19	1.15
5.00	0.51	0.47	5.00	0.96	0.19	1.15
5.05	0.51	0.47	5.00	0.96	0.19	1.15
5.10	0.51	0.47	5.00	0.96	0.19	1.15
5.15	0.51	0.47	5.00	0.96	0.19	1.15
5.20	0.51	0.47	5.00	0.96	0.19	1.15
5.25	0.51	0.47	5.00	0.96	0.19	1.15
5.30	0.51	0.47	5.00	0.96	0.19	1.15
5.35	0.51	0.47	5.00	0.96	0.19	1.15
5.40	0.51	0.47	5.00	0.96	0.19	1.15
5.45	0.51	0.47	5.00	0.96	0.19	1.15
5.50	0.51	0.47	5.00	0.96	0.19	1.15
5.55	0.51	0.47	5.00	0.96	0.19	1.15
5.60	0.51	0.47	5.00	0.96	0.19	1.15
5.65	0.51	0.47	5.00	0.96	0.19	1.15
5.70	0.51	0.47	5.00	0.96	0.19	1.15
5.75	0.51	0.47	5.00	0.96	0.19	1.15
5.80	0.51	0.47	5.00	0.96	0.19	1.15
5.85	0.51	0.47	5.00	0.96	0.19	1.15
5.90	0.51	0.47	5.00	0.96	0.19	1.15
5.95	0.51	0.47	5.00	0.96	0.19	1.15
6.00	0.51	0.47	5.00	0.96	0.19	1.15
6.05	0.51	0.47	5.00	0.96	0.19	1.15
6.10	0.51	0.47	5.00	0.96	0.19	1.15
6.15	0.51	0.47	5.00	0.96	0.19	1.15
6.20	0.51	0.47	5.00	0.96	0.19	1.15

6.25	0.51	0.47	5.00	0.96	0.19	1.15
6.30	0.51	0.47	5.00	0.96	0.19	1.15
6.35	0.51	0.47	5.00	0.96	0.19	1.15
6.40	0.51	0.47	5.00	0.96	0.19	1.15
6.45	0.51	0.47	5.00	0.96	0.19	1.15
6.50	0.51	0.47	5.00	0.96	0.19	1.15
6.55	0.51	0.47	5.00	0.96	0.19	1.15
6.60	0.51	0.47	5.00	0.96	0.19	1.15
6.65	0.51	0.47	5.00	0.96	0.19	1.15
6.70	0.51	0.47	5.00	0.96	0.19	1.15
6.75	0.51	0.47	5.00	0.96	0.19	1.14
6.80	0.51	0.47	5.00	0.96	0.19	1.14
6.85	0.51	0.47	5.00	0.96	0.19	1.14
6.90	0.51	0.47	5.00	0.96	0.19	1.14
6.95	0.51	0.47	5.00	0.96	0.19	1.14
7.00	0.51	0.47	5.00	0.96	0.19	1.14
7.05	0.51	0.47	5.00	0.96	0.19	1.14
7.10	0.51	0.47	5.00	0.96	0.19	1.14
7.15	0.51	0.47	5.00	0.96	0.19	1.14
7.20	0.51	0.47	5.00	0.96	0.19	1.14
7.25	0.51	0.47	5.00	0.96	0.19	1.14
7.30	0.51	0.47	5.00	0.96	0.19	1.14
7.35	0.51	0.47	5.00	0.96	0.19	1.14
7.40	0.51	0.47	5.00	0.96	0.19	1.14
7.45	0.51	0.47	5.00	0.96	0.19	1.14
7.50	0.51	0.47	5.00	0.96	0.19	1.14
7.55	0.51	0.47	5.00	0.96	0.19	1.14
7.60	0.51	0.47	5.00	0.96	0.19	1.14
7.65	0.51	0.47	5.00	0.96	0.19	1.14
7.70	0.51	0.47	5.00	0.96	0.19	1.14
7.75	0.51	0.47	5.00	0.96	0.18	1.14
7.80	0.51	0.47	5.00	0.96	0.18	1.14
7.85	0.51	0.47	5.00	0.96	0.18	1.14
7.90	0.51	0.47	5.00	0.96	0.18	1.14
7.95	0.51	0.47	5.00	0.96	0.18	1.14
8.00	0.51	0.47	5.00	0.96	0.18	1.14
8.05	0.51	0.47	5.00	0.96	0.18	1.14
8.10	0.51	0.47	5.00	0.96	0.18	1.14
8.15	0.51	0.47	5.00	0.96	0.18	1.14
8.20	0.51	0.47	5.00	0.96	0.18	1.14
8.25	0.51	0.47	5.00	0.96	0.18	1.14
8.30	0.51	0.47	5.00	0.96	0.18	1.14
8.35	0.51	0.47	5.00	0.96	0.18	1.14
8.40	0.51	0.47	5.00	0.96	0.18	1.14
8.45	0.51	0.47	5.00	0.96	0.18	1.14
8.50	0.51	0.47	5.00	0.96	0.18	1.14
8.55	0.51	0.47	5.00	0.96	0.18	1.14
8.60	0.51	0.47	5.00	0.96	0.18	1.14
8.65	0.51	0.47	5.00	0.96	0.18	1.14
8.70	0.51	0.47	5.00	0.96	0.18	1.14

8.75	0.51	0.47	5.00	0.96	0.18	1.14
8.80	0.51	0.47	5.00	0.96	0.18	1.14
8.85	0.51	0.47	5.00	0.96	0.18	1.14
8.90	0.51	0.47	5.00	0.96	0.18	1.14
8.95	0.51	0.47	5.00	0.96	0.18	1.13
9.00	0.51	0.47	5.00	0.96	0.18	1.13
9.05	0.51	0.47	5.00	0.96	0.18	1.13
9.10	0.51	0.47	5.00	0.96	0.18	1.13
9.15	0.51	0.47	5.00	0.96	0.18	1.13
9.20	0.51	0.47	5.00	0.96	0.18	1.13
9.25	0.51	0.47	5.00	0.96	0.18	1.13
9.30	0.51	0.47	5.00	0.96	0.18	1.13
9.35	0.51	0.47	5.00	0.96	0.17	1.13
9.40	0.51	0.47	5.00	0.96	0.17	1.13
9.45	0.51	0.47	5.00	0.96	0.17	1.13
9.50	0.51	0.47	5.00	0.96	0.17	1.13
9.55	0.51	0.47	5.00	0.96	0.17	1.13
9.60	0.51	0.47	5.00	0.96	0.17	1.13
9.65	0.51	0.47	5.00	0.96	0.17	1.13
9.70	0.51	0.47	5.00	0.96	0.17	1.13
9.75	0.51	0.47	5.00	0.96	0.17	1.13
9.80	0.51	0.47	5.00	0.96	0.17	1.12
9.85	0.51	0.47	5.00	0.96	0.17	1.12
9.90	0.51	0.47	5.00	0.96	0.17	1.12
9.95	0.51	0.47	5.00	0.96	0.17	1.12
10.00	0.51	0.47	5.00	0.96	0.16	1.12
10.05	0.51	0.47	5.00	0.96	0.16	1.12
10.10	0.51	0.47	5.00	0.96	0.16	1.12
10.15	0.51	0.47	5.00	0.96	0.16	1.12
10.20	0.51	0.47	5.00	0.96	0.16	1.12
10.25	0.51	0.47	5.00	0.96	0.16	1.12
10.30	0.51	0.47	5.00	0.96	0.16	1.11
10.35	0.51	0.47	5.00	0.96	0.16	1.11
10.40	0.51	0.47	5.00	0.96	0.16	1.11
10.45	0.51	0.47	5.00	0.96	0.15	1.11
10.50	0.51	0.47	5.00	0.96	0.15	1.11
10.55	0.51	0.47	5.00	0.96	0.15	1.11
10.60	0.51	0.47	5.00	0.96	0.15	1.11
10.65	0.51	0.47	5.00	0.96	0.15	1.11
10.70	0.51	0.47	5.00	0.96	0.15	1.11
10.75	0.51	0.47	5.00	0.96	0.15	1.11
10.80	0.51	0.47	5.00	0.96	0.15	1.11
10.85	0.51	0.47	5.00	0.96	0.15	1.10
10.90	0.51	0.47	5.00	0.96	0.15	1.10
10.95	0.51	0.47	5.00	0.96	0.15	1.10
11.00	0.51	0.47	5.00	0.96	0.15	1.10
11.05	0.51	0.47	5.00	0.96	0.14	1.10
11.10	0.51	0.47	5.00	0.96	0.14	1.10
11.15	0.51	0.47	5.00	0.96	0.14	1.10
11.20	0.51	0.47	5.00	0.96	0.14	1.10

11.25	0.51	0.47	5.00	0.96	0.14	1.10
11.30	0.51	0.47	5.00	0.96	0.14	1.10
11.35	0.51	0.47	5.00	0.96	0.14	1.10
11.40	0.51	0.47	5.00	0.96	0.14	1.10
11.45	0.51	0.47	5.00	0.96	0.14	1.10
11.50	0.51	0.47	5.00	0.96	0.14	1.10
11.55	0.51	0.47	5.00	0.96	0.14	1.09
11.60	0.51	0.47	5.00	0.96	0.14	1.09
11.65	0.51	0.47	5.00	0.96	0.14	1.09
11.70	0.51	0.47	5.00	0.96	0.14	1.09
11.75	0.51	0.47	5.00	0.96	0.14	1.09
11.80	0.51	0.47	5.00	0.96	0.14	1.09
11.85	0.51	0.47	5.00	0.96	0.13	1.09
11.90	0.51	0.47	5.00	0.96	0.13	1.09
11.95	0.51	0.47	5.00	0.96	0.13	1.09
12.00	0.51	0.47	5.00	0.96	0.13	1.09
12.05	0.51	0.47	5.00	0.96	0.13	1.09
12.10	0.51	0.47	5.00	0.96	0.13	1.09
12.15	0.51	0.47	5.00	0.96	0.13	1.09
12.20	0.51	0.47	5.00	0.96	0.13	1.09
12.25	0.51	0.47	5.00	0.96	0.13	1.09
12.30	0.51	0.47	5.00	0.96	0.13	1.09
12.35	0.51	0.47	5.00	0.96	0.13	1.09
12.40	0.51	0.47	5.00	0.96	0.13	1.09
12.45	0.51	0.47	5.00	0.96	0.13	1.09
12.50	0.51	0.47	5.00	0.96	0.13	1.09
12.55	0.51	0.47	5.00	0.96	0.13	1.09
12.60	0.51	0.47	5.00	0.96	0.13	1.09
12.65	0.51	0.47	5.00	0.96	0.13	1.09
12.70	0.51	0.47	5.00	0.96	0.13	1.09
12.75	0.51	0.47	5.00	0.96	0.13	1.09
12.80	0.51	0.47	5.00	0.96	0.13	1.09
12.85	0.51	0.47	5.00	0.96	0.13	1.09
12.90	0.51	0.47	5.00	0.96	0.13	1.09
12.95	0.51	0.47	5.00	0.96	0.13	1.09
13.00	0.51	0.47	5.00	0.96	0.13	1.08
13.05	0.51	0.47	5.00	0.96	0.13	1.08
13.10	0.51	0.47	5.00	0.96	0.13	1.08
13.15	0.51	0.47	5.00	0.96	0.13	1.08
13.20	0.51	0.47	5.00	0.96	0.13	1.08
13.25	0.51	0.47	5.00	0.96	0.13	1.08
13.30	0.51	0.47	5.00	0.96	0.13	1.08
13.35	0.51	0.47	5.00	0.96	0.13	1.08
13.40	0.51	0.47	5.00	0.96	0.13	1.08
13.45	0.51	0.47	5.00	0.96	0.13	1.08
13.50	0.51	0.47	5.00	0.96	0.13	1.08
13.55	0.51	0.47	5.00	0.96	0.13	1.08
13.60	0.51	0.47	5.00	0.96	0.13	1.08
13.65	0.51	0.47	5.00	0.96	0.12	1.08
13.70	0.51	0.47	5.00	0.96	0.12	1.08

13.75	0.51	0.46	5.00	0.96	0.12	1.08
13.80	0.51	0.46	5.00	0.96	0.12	1.08
13.85	0.51	0.46	5.00	0.96	0.12	1.08
13.90	0.51	0.46	5.00	0.96	0.12	1.08
13.95	0.51	0.46	5.00	0.96	0.12	1.08
14.00	0.51	0.46	5.00	0.96	0.12	1.08
14.05	0.51	0.46	5.00	0.96	0.12	1.08
14.10	0.51	0.46	5.00	0.96	0.12	1.08
14.15	0.51	0.46	5.00	0.96	0.12	1.08
14.20	0.51	0.46	5.00	0.96	0.12	1.08
14.25	0.51	0.46	5.00	0.96	0.12	1.08
14.30	0.51	0.46	5.00	0.96	0.12	1.08
14.35	0.51	0.46	5.00	0.96	0.12	1.08
14.40	0.51	0.46	5.00	0.96	0.12	1.08
14.45	0.51	0.46	5.00	0.96	0.12	1.08
14.50	0.51	0.46	5.00	0.96	0.12	1.08
14.55	0.51	0.46	5.00	0.96	0.12	1.08
14.60	0.51	0.46	5.00	0.96	0.12	1.08
14.65	0.51	0.46	5.00	0.96	0.12	1.08
14.70	0.51	0.46	5.00	0.96	0.12	1.08
14.75	0.51	0.46	5.00	0.96	0.12	1.08
14.80	0.51	0.46	5.00	0.96	0.12	1.08
14.85	0.51	0.46	5.00	0.96	0.12	1.07
14.90	0.51	0.46	5.00	0.96	0.12	1.07
14.95	0.51	0.46	5.00	0.96	0.12	1.07
15.00	0.51	0.46	5.00	0.96	0.12	1.07
15.05	0.51	0.46	5.00	0.96	0.12	1.07
15.10	0.51	0.46	5.00	0.96	0.12	1.07
15.15	0.51	0.46	5.00	0.96	0.12	1.07
15.20	0.51	0.46	5.00	0.96	0.12	1.07
15.25	0.51	0.46	5.00	0.96	0.12	1.07
15.30	0.51	0.46	5.00	0.96	0.12	1.07
15.35	0.51	0.46	5.00	0.96	0.12	1.07
15.40	0.51	0.46	5.00	0.96	0.12	1.07
15.45	0.51	0.46	5.00	0.96	0.12	1.07
15.50	0.51	0.46	5.00	0.96	0.12	1.07
15.55	0.51	0.46	5.00	0.96	0.11	1.07
15.60	0.51	0.46	5.00	0.96	0.11	1.07
15.65	0.51	0.46	5.00	0.96	0.11	1.07
15.70	0.51	0.46	5.00	0.96	0.11	1.07
15.75	0.51	0.46	5.00	0.96	0.11	1.07
15.80	0.51	0.46	5.00	0.96	0.11	1.07
15.85	0.51	0.46	5.00	0.96	0.11	1.07
15.90	0.51	0.46	5.00	0.96	0.11	1.07
15.95	0.51	0.46	5.00	0.96	0.11	1.07
16.00	0.51	0.46	5.00	0.96	0.11	1.07
16.05	0.51	0.46	5.00	0.96	0.11	1.07
16.10	0.51	0.46	5.00	0.96	0.11	1.07
16.15	0.51	0.46	5.00	0.96	0.11	1.07
16.20	0.51	0.46	5.00	0.96	0.11	1.07

16.25	0.51	0.46	5.00	0.96	0.11	1.07
16.30	0.51	0.46	5.00	0.96	0.11	1.07
16.35	0.51	0.46	5.00	0.96	0.11	1.07
16.40	0.51	0.46	5.00	0.96	0.11	1.07
16.45	0.51	0.46	5.00	0.96	0.11	1.07
16.50	0.51	0.46	5.00	0.96	0.11	1.07
16.55	0.51	0.46	5.00	0.96	0.11	1.07
16.60	0.51	0.46	5.00	0.96	0.11	1.07
16.65	0.51	0.46	5.00	0.96	0.11	1.06
16.70	0.51	0.46	5.00	0.96	0.11	1.06
16.75	0.51	0.46	5.00	0.96	0.11	1.06
16.80	0.51	0.46	5.00	0.96	0.11	1.06
16.85	0.51	0.46	5.00	0.96	0.11	1.06
16.90	0.51	0.46	5.00	0.96	0.11	1.06
16.95	0.51	0.46	5.00	0.96	0.11	1.06
17.00	0.51	0.46	5.00	0.96	0.11	1.06
17.05	0.51	0.46	5.00	0.96	0.11	1.06
17.10	0.51	0.46	5.00	0.96	0.11	1.06
17.15	0.51	0.46	5.00	0.96	0.10	1.06
17.20	0.51	0.46	5.00	0.96	0.10	1.06
17.25	0.51	0.46	5.00	0.96	0.10	1.06
17.30	0.51	0.46	5.00	0.96	0.10	1.06
17.35	0.51	0.46	5.00	0.96	0.10	1.06
17.40	0.51	0.46	5.00	0.96	0.10	1.06
17.45	0.51	0.46	5.00	0.96	0.10	1.06
17.50	0.51	0.46	5.00	0.96	0.10	1.06
17.55	0.51	0.46	5.00	0.96	0.10	1.06
17.60	0.51	0.46	5.00	0.96	0.10	1.06
17.65	0.51	0.46	5.00	0.96	0.10	1.06
17.70	0.51	0.46	5.00	0.96	0.10	1.06
17.75	0.51	0.46	5.00	0.96	0.10	1.06
17.80	0.51	0.46	5.00	0.96	0.10	1.06
17.85	0.51	0.46	5.00	0.96	0.10	1.06
17.90	0.51	0.46	5.00	0.96	0.10	1.06
17.95	0.51	0.46	5.00	0.96	0.10	1.06
18.00	0.51	0.46	5.00	0.96	0.10	1.05
18.05	0.51	0.46	5.00	0.96	0.10	1.05
18.10	0.51	0.46	5.00	0.96	0.10	1.05
18.15	0.51	0.46	5.00	0.96	0.10	1.05
18.20	0.51	0.46	5.00	0.96	0.10	1.05
18.25	0.51	0.46	5.00	0.96	0.10	1.05
18.30	0.51	0.46	5.00	0.96	0.10	1.05
18.35	0.51	0.46	5.00	0.96	0.10	1.05
18.40	0.51	0.46	5.00	0.96	0.09	1.05
18.45	0.51	0.46	5.00	0.96	0.09	1.05
18.50	0.51	0.46	5.00	0.96	0.09	1.05
18.55	0.51	0.46	5.00	0.96	0.09	1.05
18.60	0.51	0.46	5.00	0.96	0.09	1.05
18.65	0.51	0.46	5.00	0.96	0.09	1.05
18.70	0.51	0.46	5.00	0.96	0.09	1.05

18.75	0.51	0.46	5.00	0.96	0.09	1.05
18.80	0.51	0.46	5.00	0.96	0.09	1.05
18.85	0.51	0.46	5.00	0.96	0.09	1.05
18.90	0.51	0.46	5.00	0.96	0.09	1.05
18.95	0.51	0.46	5.00	0.96	0.09	1.05
19.00	0.51	0.46	5.00	0.96	0.09	1.05
19.05	0.51	0.46	5.00	0.96	0.09	1.05
19.10	0.51	0.46	5.00	0.96	0.09	1.04
19.15	0.51	0.46	5.00	0.96	0.09	1.04
19.20	0.51	0.46	5.00	0.96	0.09	1.04
19.25	0.51	0.46	5.00	0.96	0.09	1.04
19.30	0.51	0.46	5.00	0.96	0.09	1.04
19.35	0.51	0.46	5.00	0.96	0.09	1.04
19.40	0.51	0.46	5.00	0.96	0.09	1.04
19.45	0.51	0.46	5.00	0.96	0.08	1.04
19.50	0.51	0.46	5.00	0.96	0.08	1.04
19.55	0.51	0.46	5.00	0.96	0.08	1.04
19.60	0.51	0.46	5.00	0.96	0.08	1.04
19.65	0.51	0.46	5.00	0.96	0.08	1.04
19.70	0.51	0.46	5.00	0.96	0.08	1.04
19.75	0.51	0.46	5.00	0.96	0.08	1.04
19.80	0.51	0.46	5.00	0.96	0.08	1.04
19.85	0.51	0.46	5.00	0.96	0.08	1.04
19.90	0.51	0.46	5.00	0.96	0.08	1.04
19.95	0.51	0.46	5.00	0.96	0.08	1.04
20.00	0.51	0.46	5.00	0.96	0.08	1.04
20.05	0.51	0.46	5.00	0.96	0.08	1.03
20.10	0.51	0.46	5.00	0.96	0.08	1.03
20.15	0.51	0.46	5.00	0.96	0.08	1.03
20.20	0.51	0.46	5.00	0.96	0.08	1.03
20.25	0.51	0.46	5.00	0.96	0.08	1.03
20.30	0.51	0.46	5.00	0.96	0.08	1.03
20.35	0.51	0.46	5.00	0.96	0.07	1.03
20.40	0.51	0.46	5.00	0.96	0.07	1.03
20.45	0.51	0.46	5.00	0.96	0.07	1.03
20.50	0.51	0.46	5.00	0.96	0.07	1.03
20.55	0.51	0.46	5.00	0.96	0.07	1.03
20.60	0.51	0.46	5.00	0.96	0.07	1.03
20.65	0.51	0.46	5.00	0.96	0.07	1.03
20.70	0.51	0.46	5.00	0.96	0.07	1.03
20.75	0.51	0.46	5.00	0.96	0.07	1.03
20.80	0.51	0.46	5.00	0.96	0.07	1.03
20.85	0.51	0.46	5.00	0.96	0.07	1.02
20.90	0.51	0.46	5.00	0.96	0.07	1.02
20.95	0.51	0.46	5.00	0.96	0.07	1.02
21.00	0.51	0.46	5.00	0.96	0.07	1.02
21.05	0.51	0.46	5.00	0.96	0.07	1.02
21.10	0.51	0.46	5.00	0.96	0.06	1.02
21.15	0.51	0.46	5.00	0.96	0.06	1.02
21.20	0.51	0.46	5.00	0.96	0.06	1.02

21.25	0.51	0.46	5.00	0.96	0.06	1.02
21.30	0.51	0.46	5.00	0.96	0.06	1.02
21.35	0.51	0.46	5.00	0.96	0.06	1.02
21.40	0.51	0.46	5.00	0.96	0.06	1.02
21.45	0.51	0.46	5.00	0.96	0.06	1.02
21.50	0.51	0.46	5.00	0.96	0.06	1.02
21.55	0.51	0.46	5.00	0.96	0.06	1.01
21.60	0.51	0.46	5.00	0.96	0.06	1.01
21.65	0.51	0.46	5.00	0.96	0.06	1.01
21.70	0.51	0.46	5.00	0.96	0.06	1.01
21.75	0.51	0.46	5.00	0.96	0.06	1.01
21.80	0.51	0.46	5.00	0.96	0.05	1.01
21.85	0.51	0.46	5.00	0.96	0.05	1.01
21.90	0.51	0.46	5.00	0.96	0.05	1.01
21.95	0.51	0.46	5.00	0.96	0.05	1.01
22.00	0.51	0.46	5.00	0.96	0.05	1.01
22.05	0.51	0.46	5.00	0.96	0.05	1.01
22.10	0.51	0.46	5.00	0.96	0.05	1.01
22.15	0.51	0.46	5.00	0.96	0.05	1.01
22.20	0.51	0.46	5.00	0.96	0.05	1.00
22.25	0.51	0.46	5.00	0.96	0.05	1.00
22.30	0.51	0.46	5.00	0.96	0.05	1.00
22.35	0.51	0.46	5.00	0.96	0.05	1.00
22.40	0.51	0.46	5.00	0.96	0.04	1.00
22.45	0.51	0.46	5.00	0.96	0.04	1.00
22.50	0.51	0.46	5.00	0.96	0.04	1.00
22.55	0.51	0.46	5.00	0.96	0.04	1.00
22.60	0.51	0.46	5.00	0.96	0.04	1.00
22.65	0.51	0.45	5.00	0.96	0.04	1.00
22.70	0.51	0.45	5.00	0.96	0.04	1.00
22.75	0.51	0.45	5.00	0.96	0.04	1.00
22.80	0.51	0.45	5.00	0.96	0.04	0.99
22.85	0.51	0.45	5.00	0.96	0.04	0.99
22.90	0.51	0.45	5.00	0.96	0.04	0.99
22.95	0.51	0.45	5.00	0.96	0.04	0.99
23.00	0.51	0.45	5.00	0.96	0.03	0.99
23.05	0.51	0.45	5.00	0.96	0.03	0.99
23.10	0.51	0.45	5.00	0.96	0.03	0.99
23.15	0.51	0.45	5.00	0.96	0.03	0.99
23.20	0.51	0.45	5.00	0.96	0.03	0.99
23.25	0.51	0.45	5.00	0.96	0.03	0.99
23.30	0.51	0.45	5.00	0.96	0.03	0.98
23.35	0.51	0.45	5.00	0.96	0.03	0.98
23.40	0.51	0.45	5.00	0.96	0.03	0.98
23.45	0.51	0.45	5.00	0.96	0.03	0.98
23.50	0.51	0.45	5.00	0.96	0.02	0.98
23.55	0.51	0.45	5.00	0.96	0.02	0.98
23.60	0.51	0.45	5.00	0.96	0.02	0.98
23.65	0.51	0.45	5.00	0.96	0.02	0.98
23.70	0.51	0.45	5.00	0.96	0.02	0.98

23.75	0.51	0.45	5.00	0.96	0.02	0.98
23.80	0.51	0.45	5.00	0.96	0.02	0.97
23.85	0.51	0.45	5.00	0.96	0.02	0.97
23.90	0.51	0.45	5.00	0.96	0.02	0.97
23.95	0.51	0.45	5.00	0.96	0.01	0.97
24.00	0.51	0.45	5.00	0.96	0.01	0.97
24.05	0.51	0.45	5.00	0.96	0.01	0.97
24.10	0.51	0.45	5.00	0.96	0.01	0.97
24.15	0.51	0.45	5.00	0.96	0.01	0.97
24.20	0.51	0.45	5.00	0.96	0.01	0.97
24.25	0.51	0.45	5.00	0.96	0.01	0.97
24.30	0.51	0.45	5.00	0.96	0.01	0.96
24.35	0.51	0.45	5.00	0.96	0.01	0.96
24.40	0.51	0.45	5.00	0.96	0.01	0.96
24.45	0.51	0.45	5.00	0.96	0.01	0.96
24.50	0.51	0.45	5.00	0.96	0.01	0.96
24.55	0.51	0.45	5.00	0.96	0.01	0.96
24.60	0.51	0.45	5.00	0.96	0.01	0.96
24.65	0.51	0.45	5.00	0.96	0.00	0.96
24.70	0.51	0.45	5.00	0.96	0.00	0.96
24.75	0.51	0.45	5.00	0.96	0.00	0.96
24.80	0.51	0.45	5.00	0.96	0.00	0.96
24.85	0.51	0.45	5.00	0.96	0.00	0.96
24.90	0.51	0.45	5.00	0.96	0.00	0.96
24.95	0.51	0.45	5.00	0.96	0.00	0.96
25.00	0.51	0.45	5.00	0.96	0.00	0.96
25.05	0.51	0.45	1.12	0.96	0.00	0.96
25.10	0.51	0.45	1.12	0.96	0.00	0.96
25.15	0.51	0.45	1.12	0.96	0.00	0.96
25.20	0.51	0.45	1.12	0.96	0.00	0.96
25.25	0.51	0.45	1.12	0.96	0.00	0.96
25.30	0.51	0.45	1.12	0.96	0.00	0.96
25.35	0.51	0.46	1.12	0.96	0.00	0.96
25.40	0.51	0.46	1.12	0.96	0.00	0.96
25.45	0.51	0.46	1.11	0.96	0.00	0.96
25.50	0.51	0.46	1.11	0.96	0.00	0.96
25.55	0.51	0.46	1.11	0.96	0.00	0.96
25.60	0.51	0.46	1.11	0.96	0.00	0.96
25.65	0.51	0.46	1.11	0.96	0.00	0.96
25.70	0.51	0.46	1.11	0.96	0.00	0.96
25.75	0.51	0.46	1.11	0.96	0.00	0.96
25.80	0.51	0.46	1.11	0.96	0.00	0.96
25.85	0.51	0.46	1.10	0.96	0.00	0.96
25.90	0.51	0.46	1.10	0.96	0.00	0.96
25.95	0.51	0.46	1.10	0.96	0.00	0.96
26.00	0.51	0.46	1.10	0.96	0.00	0.96
26.05	0.51	0.46	1.10	0.96	0.00	0.96
26.10	0.51	0.46	1.10	0.96	0.00	0.96
26.15	0.51	0.46	1.10	0.96	0.00	0.96
26.20	0.51	0.46	1.10	0.96	0.00	0.96

26.25	0.51	0.46	1.10	0.96	0.00	0.96
26.30	0.51	0.46	1.09	0.95	0.00	0.95
26.35	0.51	0.47	1.09	0.95	0.00	0.95
26.40	0.51	0.47	1.09	0.95	0.00	0.95
26.45	0.51	0.47	1.09	0.95	0.00	0.95
26.50	0.51	0.47	1.09	0.95	0.00	0.95
26.55	0.51	0.47	1.09	0.95	0.00	0.95
26.60	0.51	0.47	1.09	0.95	0.00	0.95
26.65	0.51	0.47	1.09	0.95	0.00	0.95
26.70	0.51	0.47	1.09	0.95	0.00	0.95
26.75	0.51	0.47	1.08	0.95	0.00	0.95
26.80	0.51	0.47	1.08	0.95	0.00	0.95
26.85	0.51	0.47	1.08	0.95	0.00	0.95
26.90	0.51	0.47	1.08	0.94	0.00	0.94
26.95	0.51	0.47	1.08	0.94	0.00	0.94
27.00	0.51	0.47	1.08	0.94	0.00	0.94
27.05	0.51	0.47	1.08	0.94	0.00	0.94
27.10	0.51	0.47	1.08	0.94	0.00	0.94
27.15	0.51	0.47	1.08	0.94	0.00	0.94
27.20	0.51	0.47	1.07	0.93	0.00	0.93
27.25	0.51	0.47	1.07	0.93	0.00	0.93
27.30	0.51	0.47	1.07	0.93	0.00	0.93
27.35	0.51	0.47	1.07	0.93	0.00	0.93
27.40	0.51	0.47	1.07	0.93	0.00	0.93
27.45	0.51	0.48	1.07	0.92	0.00	0.92
27.50	0.48	0.48	1.00	0.92	0.00	0.92
27.55	0.45	0.48	0.95*	0.92	0.00	0.92
27.60	0.43	0.48	0.91*	0.92	0.00	0.92
27.65	0.42	0.48	0.88*	0.91	0.00	0.91
27.70	0.41	0.48	0.86*	0.91	0.00	0.91
27.75	0.40	0.48	0.84*	0.90	0.00	0.90
27.80	0.40	0.48	0.83*	0.90	0.00	0.90
27.85	0.39	0.48	0.81*	0.90	0.00	0.90
27.90	0.51	0.48	1.06	0.89	0.00	0.89
27.95	0.51	0.48	1.06	0.89	0.00	0.89
28.00	0.51	0.48	1.06	0.89	0.00	0.89
28.05	0.48	0.48	0.99*	0.88	0.00	0.88
28.10	0.45	0.48	0.93*	0.88	0.00	0.88
28.15	0.43	0.48	0.90*	0.88	0.00	0.88
28.20	0.42	0.48	0.87*	0.87	0.00	0.87
28.25	0.41	0.48	0.85*	0.87	0.00	0.87
28.30	0.40	0.48	0.83*	0.87	0.00	0.87
28.35	0.39	0.48	0.81*	0.86	0.00	0.86
28.40	0.39	0.48	0.80*	0.86	0.00	0.86
28.45	0.38	0.48	0.79*	0.85	0.00	0.85
28.50	0.38	0.48	0.78*	0.85	0.00	0.85
28.55	0.37	0.49	0.77*	0.84	0.00	0.84
28.60	0.37	0.49	0.76*	0.83	0.00	0.83
28.65	0.36	0.49	0.75*	0.83	0.00	0.83
28.70	0.36	0.49	0.74*	0.82	0.00	0.82

28.75	0.36	0.49	0.73*	0.82	0.00	0.82
28.80	0.35	0.49	0.72*	0.81	0.00	0.81
28.85	0.35	0.49	0.72*	0.80	0.00	0.80
28.90	0.35	0.49	0.71*	0.80	0.00	0.80
28.95	0.34	0.49	0.70*	0.79	0.00	0.79
29.00	0.34	0.49	0.69*	0.78	0.00	0.78
29.05	0.34	0.49	0.69*	0.78	0.00	0.78
29.10	0.33	0.49	0.68*	0.77	0.00	0.77
29.15	0.33	0.49	0.67*	0.76	0.00	0.76
29.20	0.33	0.49	0.67*	0.75	0.00	0.75
29.25	0.33	0.49	0.66*	0.75	0.00	0.75
29.30	0.32	0.49	0.66*	0.74	0.00	0.74
29.35	0.32	0.49	0.65*	0.73	0.00	0.73
29.40	0.32	0.49	0.64*	0.72	0.00	0.72
29.45	0.32	0.49	0.64*	0.71	0.00	0.71
29.50	0.31	0.49	0.63*	0.70	0.00	0.70
29.55	0.31	0.49	0.63*	0.70	0.00	0.70
29.60	0.31	0.49	0.62*	0.69	0.00	0.69
29.65	0.31	0.49	0.62*	0.68	0.00	0.68
29.70	0.30	0.50	0.61*	0.67	0.00	0.67
29.75	0.30	0.50	0.61*	0.66	0.00	0.66
29.80	0.30	0.50	0.60*	0.65	0.00	0.65
29.85	0.30	0.50	0.60*	0.64	0.00	0.64
29.90	0.30	0.50	0.59*	0.63	0.00	0.63
29.95	0.29	0.50	0.59*	0.62	0.00	0.62
30.00	0.29	0.50	0.58*	0.61	0.00	0.61
30.05	0.29	0.50	0.59*	0.60	0.00	0.60
30.10	0.30	0.50	0.60*	0.59	0.00	0.59
30.15	0.30	0.50	0.60*	0.58	0.00	0.58
30.20	0.30	0.50	0.61*	0.57	0.00	0.57
30.25	0.31	0.50	0.62*	0.56	0.00	0.56
30.30	0.31	0.50	0.62*	0.55	0.00	0.55
30.35	0.32	0.50	0.63*	0.54	0.00	0.54
30.40	0.32	0.50	0.64*	0.53	0.00	0.53
30.45	0.32	0.50	0.65*	0.53	0.00	0.53
30.50	0.33	0.50	0.65*	0.52	0.00	0.52
30.55	0.33	0.50	0.66*	0.51	0.00	0.51
30.60	0.34	0.50	0.67*	0.50	0.00	0.50
30.65	0.34	0.50	0.68*	0.49	0.00	0.49
30.70	0.34	0.50	0.69*	0.49	0.00	0.49
30.75	0.35	0.50	0.70*	0.48	0.00	0.48
30.80	0.35	0.50	0.71*	0.47	0.00	0.47
30.85	0.36	0.50	0.72*	0.47	0.00	0.47
30.90	0.37	0.50	0.73*	0.46	0.00	0.46
30.95	0.37	0.50	0.74*	0.45	0.00	0.45
31.00	0.38	0.50	0.75*	0.45	0.00	0.45
31.05	0.39	0.50	0.77*	0.44	0.00	0.44
31.10	0.39	0.50	0.78*	0.44	0.00	0.44
31.15	0.40	0.50	0.80*	0.43	0.00	0.43
31.20	0.42	0.50	0.83*	0.43	0.00	0.43

31.25	0.44	0.50	0.87*	0.42	0.00	0.42
31.30	0.47	0.50	0.93*	0.42	0.00	0.42
31.35	0.51	0.50	1.01	0.41	0.00	0.41
31.40	0.51	0.50	1.01	0.41	0.00	0.41
31.45	0.51	0.51	1.01	0.41	0.00	0.41
31.50	0.51	0.51	1.01	0.41	0.00	0.41
31.55	0.51	0.51	1.01	0.40	0.00	0.40
31.60	0.51	0.51	1.01	0.40	0.00	0.40
31.65	0.51	0.51	1.00	0.40	0.00	0.40
31.70	0.51	0.51	1.00	0.40	0.00	0.40
31.75	0.51	0.51	1.00	0.40	0.00	0.40
31.80	0.51	0.51	1.00	0.40	0.00	0.40
31.85	0.51	0.51	1.00	0.39	0.00	0.39
31.90	0.51	0.51	1.00	0.39	0.00	0.39
31.95	0.51	0.51	1.00	0.39	0.00	0.39
32.00	0.51	0.51	1.00	0.39	0.00	0.39
32.05	0.51	0.51	1.00	0.39	0.00	0.39
32.10	0.51	0.51	1.00	0.39	0.00	0.39
32.15	0.51	0.51	1.00	0.39	0.00	0.39
32.20	0.51	0.51	1.00*	0.39	0.00	0.39
32.25	0.51	0.51	1.00*	0.39	0.00	0.39
32.30	0.51	0.51	1.00*	0.39	0.00	0.39
32.35	0.51	0.51	1.00*	0.38	0.00	0.38
32.40	0.51	0.51	1.00*	0.38	0.00	0.38
32.45	0.51	0.51	1.00*	0.38	0.00	0.38
32.50	0.51	0.51	1.00*	0.38	0.00	0.38
32.55	0.51	0.51	1.00*	0.38	0.00	0.38
32.60	0.51	0.51	1.00	0.38	0.00	0.38
32.65	0.51	0.51	1.00	0.38	0.00	0.38
32.70	0.51	0.51	1.00	0.38	0.00	0.38
32.75	0.51	0.51	1.00	0.38	0.00	0.38
32.80	0.51	0.51	1.00*	0.38	0.00	0.38
32.85	0.51	0.51	1.00*	0.38	0.00	0.38
32.90	0.51	0.51	1.00*	0.38	0.00	0.38
32.95	0.51	0.51	1.00*	0.38	0.00	0.38
33.00	0.51	0.51	1.00*	0.38	0.00	0.38
33.05	0.51	0.51	1.00*	0.38	0.00	0.38
33.10	0.51	0.51	1.00*	0.38	0.00	0.38
33.15	0.51	0.51	1.00*	0.38	0.00	0.38
33.20	0.51	0.51	0.99*	0.38	0.00	0.38
33.25	0.51	0.51	0.99*	0.38	0.00	0.38
33.30	0.51	0.51	0.99*	0.38	0.00	0.38
33.35	0.51	0.51	0.99*	0.38	0.00	0.38
33.40	0.51	0.51	0.99*	0.38	0.00	0.38
33.45	0.51	0.51	0.99*	0.38	0.00	0.38
33.50	0.51	0.51	0.99*	0.38	0.00	0.38
33.55	0.51	0.51	0.99*	0.38	0.00	0.38
33.60	0.51	0.51	0.99*	0.38	0.00	0.38
33.65	0.51	0.51	0.99*	0.38	0.00	0.38
33.70	0.51	0.51	0.99*	0.38	0.00	0.38

33.75	0.51	0.51	0.99*	0.38	0.00	0.38
33.80	0.51	0.52	0.99*	0.38	0.00	0.38
33.85	0.51	0.52	0.99*	0.38	0.00	0.38
33.90	0.51	0.52	0.99*	0.38	0.00	0.38
33.95	0.51	0.52	0.99*	0.38	0.00	0.38
34.00	0.51	0.52	0.99*	0.38	0.00	0.38
34.05	0.51	0.52	0.98*	0.38	0.00	0.38
34.10	0.51	0.52	0.98*	0.38	0.00	0.38
34.15	0.51	0.52	0.98*	0.38	0.00	0.38
34.20	0.51	0.52	0.98*	0.38	0.00	0.38
34.25	0.51	0.52	0.98*	0.38	0.00	0.38
34.30	0.51	0.52	0.98*	0.38	0.00	0.38
34.35	0.51	0.52	0.98*	0.38	0.00	0.38
34.40	0.51	0.52	0.98*	0.38	0.00	0.38
34.45	0.51	0.52	0.98*	0.38	0.00	0.38
34.50	0.51	0.52	0.98*	0.38	0.00	0.38
34.55	0.51	0.52	0.98*	0.38	0.00	0.38
34.60	0.51	0.52	0.98*	0.38	0.00	0.38
34.65	0.51	0.52	0.98*	0.38	0.00	0.38
34.70	0.51	0.52	0.98*	0.38	0.00	0.38
34.75	0.51	0.52	0.98*	0.38	0.00	0.38
34.80	0.51	0.52	0.98*	0.38	0.00	0.38
34.85	0.51	0.52	0.98*	0.38	0.00	0.38
34.90	0.51	0.52	0.97*	0.38	0.00	0.38
34.95	0.51	0.52	0.97*	0.38	0.00	0.38
35.00	0.51	0.52	0.97*	0.38	0.00	0.38
35.05	0.51	0.52	0.97*	0.38	0.00	0.38
35.10	0.51	0.52	0.97*	0.38	0.00	0.38
35.15	0.51	0.52	0.97*	0.38	0.00	0.38
35.20	0.51	0.52	0.97*	0.38	0.00	0.38
35.25	0.50	0.52	0.97*	0.38	0.00	0.38
35.30	0.50	0.52	0.97*	0.38	0.00	0.38
35.35	0.50	0.52	0.97*	0.38	0.00	0.38
35.40	0.50	0.52	0.97*	0.38	0.00	0.38
35.45	0.50	0.52	0.97*	0.38	0.00	0.38
35.50	0.50	0.52	0.97*	0.38	0.00	0.38
35.55	0.50	0.52	0.97*	0.38	0.00	0.38
35.60	0.50	0.52	0.97*	0.38	0.00	0.38
35.65	0.50	0.52	0.97*	0.38	0.00	0.38
35.70	0.50	0.52	0.97*	0.38	0.00	0.38
35.75	0.50	0.52	0.97*	0.38	0.00	0.38
35.80	0.50	0.52	0.97*	0.38	0.00	0.38
35.85	0.50	0.52	0.96*	0.38	0.00	0.38
35.90	0.50	0.52	0.96*	0.38	0.00	0.38
35.95	0.50	0.52	0.96*	0.38	0.00	0.38
36.00	0.50	0.52	0.96*	0.38	0.00	0.38
36.05	0.50	0.52	0.96*	0.38	0.00	0.38
36.10	0.50	0.52	0.96*	0.38	0.00	0.38
36.15	0.50	0.52	0.96*	0.38	0.00	0.38
36.20	0.50	0.52	0.96*	0.38	0.00	0.38

36.25	0.50	0.52	0.96*	0.38	0.00	0.38
36.30	0.50	0.52	0.96*	0.38	0.00	0.38
36.35	0.50	0.52	0.96*	0.38	0.00	0.38
36.40	0.50	0.52	0.96*	0.38	0.00	0.38
36.45	0.50	0.52	0.96*	0.38	0.00	0.38
36.50	0.50	0.52	0.96*	0.38	0.00	0.38
36.55	0.50	0.52	0.96*	0.38	0.00	0.38
36.60	0.50	0.52	0.96*	0.38	0.00	0.38
36.65	0.50	0.52	0.96*	0.38	0.00	0.38
36.70	0.50	0.52	0.96*	0.38	0.00	0.38
36.75	0.50	0.52	0.96*	0.38	0.00	0.38
36.80	0.50	0.52	0.96*	0.38	0.00	0.38
36.85	0.50	0.52	0.96*	0.38	0.00	0.38
36.90	0.50	0.52	0.95*	0.38	0.00	0.38
36.95	0.50	0.52	0.95*	0.38	0.00	0.38
37.00	0.50	0.52	0.95*	0.38	0.00	0.38
37.05	0.50	0.52	0.95*	0.38	0.00	0.38
37.10	0.50	0.53	0.95*	0.38	0.00	0.38
37.15	0.50	0.53	0.95*	0.38	0.00	0.38
37.20	0.50	0.53	0.95*	0.38	0.00	0.38
37.25	0.50	0.53	0.95*	0.38	0.00	0.38
37.30	0.50	0.53	0.95*	0.38	0.00	0.38
37.35	0.50	0.53	0.95*	0.38	0.00	0.38
37.40	0.50	0.53	0.95*	0.38	0.00	0.38
37.45	0.50	0.53	0.95*	0.38	0.00	0.38
37.50	0.50	0.53	0.95*	0.38	0.00	0.38
37.55	0.50	0.53	0.95*	0.38	0.00	0.38
37.60	0.50	0.53	0.95*	0.38	0.00	0.38
37.65	0.50	0.53	0.95*	0.38	0.00	0.38
37.70	0.50	0.53	0.95*	0.38	0.00	0.38
37.75	0.50	0.53	0.95*	0.38	0.00	0.38
37.80	0.50	0.53	0.95*	0.38	0.00	0.38
37.85	0.50	0.53	0.95*	0.38	0.00	0.38
37.90	0.50	0.53	0.95*	0.38	0.00	0.38
37.95	0.50	0.53	0.95*	0.38	0.00	0.38
38.00	0.50	0.53	0.94*	0.38	0.00	0.38
38.05	0.50	0.53	0.94*	0.38	0.00	0.38
38.10	0.50	0.53	0.94*	0.38	0.00	0.38
38.15	0.50	0.53	0.94*	0.38	0.00	0.38
38.20	0.50	0.53	0.94*	0.38	0.00	0.38
38.25	0.50	0.53	0.94*	0.38	0.00	0.38
38.30	0.50	0.53	0.94*	0.38	0.00	0.38
38.35	0.50	0.53	0.94*	0.38	0.00	0.38
38.40	0.50	0.53	0.94*	0.37	0.00	0.37
38.45	0.50	0.53	0.94*	0.37	0.00	0.37
38.50	0.50	0.53	0.94*	0.37	0.00	0.37
38.55	0.50	0.53	0.94*	0.37	0.00	0.37
38.60	0.50	0.53	0.94*	0.37	0.00	0.37
38.65	0.50	0.53	0.94*	0.37	0.00	0.37
38.70	0.50	0.53	0.94*	0.36	0.00	0.36

38.75	0.50	0.53	0.94*	0.36	0.00	0.36
38.80	0.50	0.53	0.94*	0.36	0.00	0.36
38.85	0.50	0.53	0.94*	0.36	0.00	0.36
38.90	0.50	0.53	0.94*	0.35	0.00	0.35
38.95	0.50	0.53	0.94*	0.35	0.00	0.35
39.00	0.50	0.53	0.94*	0.35	0.00	0.35
39.05	0.50	0.53	0.94*	0.34	0.00	0.34
39.10	0.50	0.53	0.94*	0.34	0.00	0.34
39.15	0.48	0.53	0.90*	0.34	0.00	0.34
39.20	0.44	0.53	0.84*	0.33	0.00	0.33
39.25	0.42	0.53	0.80*	0.33	0.00	0.33
39.30	0.41	0.53	0.77*	0.33	0.00	0.33
39.35	0.40	0.53	0.75*	0.32	0.00	0.32
39.40	0.39	0.53	0.74*	0.32	0.00	0.32
39.45	0.38	0.53	0.72*	0.31	0.00	0.31
39.50	0.38	0.53	0.71*	0.30	0.00	0.30
39.55	0.37	0.53	0.70*	0.30	0.00	0.30
39.60	0.36	0.53	0.69*	0.29	0.00	0.29
39.65	0.36	0.53	0.68*	0.28	0.00	0.28
39.70	0.36	0.53	0.67*	0.28	0.00	0.28
39.75	0.35	0.53	0.66*	0.27	0.00	0.27
39.80	0.35	0.53	0.65*	0.26	0.00	0.26
39.85	0.34	0.53	0.65*	0.26	0.00	0.26
39.90	0.34	0.53	0.64*	0.25	0.00	0.25
39.95	0.34	0.53	0.63*	0.24	0.00	0.24
40.00	0.33	0.53	0.63*	0.23	0.00	0.23
40.05	0.34	0.53	0.64*	0.23	0.00	0.23
40.10	0.34	0.53	0.65*	0.22	0.00	0.22
40.15	0.35	0.53	0.66*	0.21	0.00	0.21
40.20	0.35	0.53	0.67*	0.20	0.00	0.20
40.25	0.36	0.53	0.68*	0.20	0.00	0.20
40.30	0.37	0.53	0.70*	0.19	0.00	0.19
40.35	0.38	0.53	0.71*	0.18	0.00	0.18
40.40	0.39	0.53	0.73*	0.18	0.00	0.18
40.45	0.40	0.53	0.76*	0.17	0.00	0.17
40.50	0.42	0.53	0.79*	0.17	0.00	0.17
40.55	0.46	0.53	0.86*	0.16	0.00	0.16
40.60	0.49	0.53	0.93*	0.16	0.00	0.16
40.65	0.49	0.53	0.92*	0.15	0.00	0.15
40.70	0.49	0.53	0.92*	0.15	0.00	0.15
40.75	0.49	0.53	0.92*	0.15	0.00	0.15
40.80	0.49	0.53	0.92*	0.15	0.00	0.15
40.85	0.49	0.53	0.92*	0.14	0.00	0.14
40.90	0.49	0.53	0.92*	0.14	0.00	0.14
40.95	0.49	0.53	0.92*	0.14	0.00	0.14
41.00	0.49	0.53	0.92*	0.14	0.00	0.14
41.05	0.49	0.53	0.92*	0.13	0.00	0.13
41.10	0.49	0.53	0.92*	0.13	0.00	0.13
41.15	0.49	0.53	0.92*	0.13	0.00	0.13
41.20	0.49	0.53	0.92*	0.13	0.00	0.13

41.25	0.49	0.53	0.92*	0.13	0.00	0.13
41.30	0.49	0.53	0.92*	0.13	0.00	0.13
41.35	0.49	0.53	0.92*	0.13	0.00	0.13
41.40	0.49	0.53	0.92*	0.12	0.00	0.12
41.45	0.49	0.53	0.92*	0.12	0.00	0.12
41.50	0.49	0.53	0.92*	0.12	0.00	0.12
41.55	0.49	0.53	0.92*	0.12	0.00	0.12
41.60	0.49	0.53	0.92*	0.12	0.00	0.12
41.65	0.49	0.53	0.92*	0.12	0.00	0.12
41.70	0.49	0.53	0.92*	0.12	0.00	0.12
41.75	0.49	0.53	0.92*	0.12	0.00	0.12
41.80	0.49	0.53	0.92*	0.12	0.00	0.12
41.85	0.49	0.53	0.92*	0.12	0.00	0.12
41.90	0.49	0.53	0.92*	0.12	0.00	0.12
41.95	0.49	0.53	0.92*	0.12	0.00	0.12
42.00	0.49	0.53	0.92*	0.12	0.00	0.12
42.05	0.49	0.53	0.92*	0.12	0.00	0.12
42.10	0.49	0.53	0.92*	0.12	0.00	0.12
42.15	0.49	0.53	0.92*	0.12	0.00	0.12
42.20	0.49	0.53	0.92*	0.12	0.00	0.12
42.25	0.49	0.53	0.92*	0.12	0.00	0.12
42.30	0.49	0.53	0.91*	0.12	0.00	0.12
42.35	0.49	0.53	0.91*	0.12	0.00	0.12
42.40	0.49	0.53	0.91*	0.12	0.00	0.12
42.45	0.49	0.53	0.91*	0.12	0.00	0.12
42.50	0.49	0.53	0.91*	0.12	0.00	0.12
42.55	0.49	0.53	0.91*	0.12	0.00	0.12
42.60	0.49	0.53	0.91*	0.12	0.00	0.12
42.65	0.49	0.53	0.91*	0.12	0.00	0.12
42.70	0.49	0.53	0.91*	0.12	0.00	0.12
42.75	0.49	0.53	0.91*	0.12	0.00	0.12
42.80	0.49	0.53	0.91*	0.12	0.00	0.12
42.85	0.49	0.53	0.91*	0.12	0.00	0.12
42.90	0.49	0.53	0.91*	0.12	0.00	0.12
42.95	0.49	0.53	0.91*	0.12	0.00	0.12
43.00	0.49	0.53	0.91*	0.12	0.00	0.12
43.05	0.49	0.53	0.91*	0.12	0.00	0.12
43.10	0.49	0.53	0.91*	0.12	0.00	0.12
43.15	0.49	0.53	0.91*	0.12	0.00	0.12
43.20	0.49	0.53	0.91*	0.12	0.00	0.12
43.25	0.49	0.53	0.91*	0.12	0.00	0.12
43.30	0.49	0.53	0.91*	0.12	0.00	0.12
43.35	0.49	0.53	0.91*	0.12	0.00	0.12
43.40	0.48	0.53	0.91*	0.12	0.00	0.12
43.45	0.48	0.53	0.91*	0.12	0.00	0.12
43.50	0.48	0.53	0.91*	0.12	0.00	0.12
43.55	0.48	0.53	0.91*	0.12	0.00	0.12
43.60	0.48	0.53	0.91*	0.12	0.00	0.12
43.65	0.48	0.53	0.91*	0.12	0.00	0.12
43.70	0.48	0.53	0.91*	0.12	0.00	0.12

43.75	0.48	0.53	0.91*	0.12	0.00	0.12
43.80	0.48	0.53	0.91*	0.12	0.00	0.12
43.85	0.48	0.53	0.91*	0.12	0.00	0.12
43.90	0.48	0.53	0.91*	0.12	0.00	0.12
43.95	0.48	0.53	0.91*	0.12	0.00	0.12
44.00	0.48	0.53	0.91*	0.12	0.00	0.12
44.05	0.48	0.53	0.91*	0.12	0.00	0.12
44.10	0.48	0.53	0.91*	0.12	0.00	0.12
44.15	0.48	0.53	0.91*	0.12	0.00	0.12
44.20	0.48	0.53	0.91*	0.12	0.00	0.12
44.25	0.48	0.53	0.91*	0.12	0.00	0.12
44.30	0.48	0.53	0.90*	0.12	0.00	0.12
44.35	0.48	0.53	0.90*	0.12	0.00	0.12
44.40	0.48	0.53	0.90*	0.12	0.00	0.12
44.45	0.48	0.53	0.90*	0.12	0.00	0.12
44.50	0.48	0.53	0.90*	0.12	0.00	0.12
44.55	0.48	0.53	0.90*	0.12	0.00	0.12
44.60	0.48	0.53	0.90*	0.12	0.00	0.12
44.65	0.48	0.53	0.90*	0.12	0.00	0.12
44.70	0.48	0.53	0.90*	0.12	0.00	0.12
44.75	0.48	0.53	0.90*	0.12	0.00	0.12
44.80	0.48	0.53	0.90*	0.12	0.00	0.12
44.85	0.48	0.53	0.90*	0.12	0.00	0.12
44.90	0.48	0.53	0.90*	0.12	0.00	0.12
44.95	0.48	0.53	0.90*	0.12	0.00	0.12
45.00	0.48	0.53	0.90*	0.12	0.00	0.12
45.05	0.48	0.53	0.90*	0.12	0.00	0.12
45.10	0.48	0.53	0.90*	0.12	0.00	0.12
45.15	0.48	0.53	0.90*	0.12	0.00	0.12
45.20	0.48	0.53	0.90*	0.12	0.00	0.12
45.25	0.48	0.53	0.90*	0.12	0.00	0.12
45.30	0.48	0.53	0.90*	0.12	0.00	0.12
45.35	0.48	0.53	0.90*	0.12	0.00	0.12
45.40	0.48	0.53	0.90*	0.12	0.00	0.12
45.45	0.48	0.53	0.90*	0.12	0.00	0.12
45.50	0.48	0.53	0.90*	0.12	0.00	0.12
45.55	0.48	0.53	0.90*	0.12	0.00	0.12
45.60	0.48	0.53	0.90*	0.12	0.00	0.12
45.65	0.48	0.53	0.90*	0.12	0.00	0.12
45.70	0.48	0.53	0.90*	0.12	0.00	0.12
45.75	0.48	0.53	0.90*	0.12	0.00	0.12
45.80	0.48	0.53	0.90*	0.12	0.00	0.12
45.85	0.48	0.53	0.90*	0.12	0.00	0.12
45.90	0.48	0.53	0.90*	0.12	0.00	0.12
45.95	0.48	0.53	0.90*	0.12	0.00	0.12
46.00	0.48	0.53	0.90*	0.12	0.00	0.12
46.05	0.48	0.53	0.90*	0.12	0.00	0.12
46.10	0.48	0.53	0.90*	0.12	0.00	0.12
46.15	0.48	0.53	0.90*	0.12	0.00	0.12
46.20	0.48	0.53	0.90*	0.12	0.00	0.12

46.25	0.48	0.53	0.90*	0.12	0.00	0.12
46.30	0.48	0.53	0.90*	0.12	0.00	0.12
46.35	0.48	0.53	0.90*	0.12	0.00	0.12
46.40	0.48	0.53	0.90*	0.12	0.00	0.12
46.45	0.48	0.53	0.90*	0.12	0.00	0.12
46.50	0.48	0.53	0.90*	0.12	0.00	0.12
46.55	0.48	0.53	0.90*	0.12	0.00	0.12
46.60	0.48	0.53	0.90*	0.12	0.00	0.12
46.65	0.48	0.53	0.90*	0.12	0.00	0.12
46.70	0.48	0.53	0.90*	0.12	0.00	0.12
46.75	0.48	0.53	0.90*	0.12	0.00	0.12
46.80	0.48	0.53	0.90*	0.12	0.00	0.12
46.85	0.48	0.53	0.90*	0.12	0.00	0.12
46.90	0.48	0.53	0.90*	0.12	0.00	0.12
46.95	0.48	0.53	0.90*	0.12	0.00	0.12
47.00	0.48	0.53	0.89*	0.12	0.00	0.12
47.05	0.48	0.53	0.89*	0.12	0.00	0.12
47.10	0.48	0.53	0.89*	0.12	0.00	0.12
47.15	0.48	0.53	0.89*	0.12	0.00	0.12
47.20	0.48	0.53	0.89*	0.12	0.00	0.12
47.25	0.48	0.53	0.89*	0.12	0.00	0.12
47.30	0.48	0.53	0.89*	0.12	0.00	0.12
47.35	0.48	0.53	0.89*	0.12	0.00	0.12
47.40	0.48	0.53	0.89*	0.12	0.00	0.12
47.45	0.47	0.53	0.89*	0.12	0.00	0.12
47.50	0.47	0.53	0.89*	0.12	0.00	0.12
47.55	0.47	0.53	0.89*	0.12	0.00	0.12
47.60	0.47	0.53	0.89*	0.12	0.00	0.12
47.65	0.47	0.53	0.89*	0.12	0.00	0.12
47.70	0.47	0.53	0.89*	0.12	0.00	0.12
47.75	0.47	0.53	0.89*	0.12	0.00	0.12
47.80	0.47	0.53	0.89*	0.12	0.00	0.12
47.85	0.47	0.53	0.89*	0.12	0.00	0.12
47.90	0.47	0.53	0.89*	0.12	0.00	0.12
47.95	0.47	0.53	0.89*	0.12	0.00	0.12
48.00	0.47	0.53	0.89*	0.12	0.00	0.12
48.05	0.47	0.53	0.89*	0.12	0.00	0.12
48.10	0.47	0.53	0.89*	0.12	0.00	0.12
48.15	0.47	0.53	0.89*	0.12	0.00	0.12
48.20	0.47	0.53	0.89*	0.12	0.00	0.12
48.25	0.47	0.53	0.89*	0.12	0.00	0.12
48.30	0.47	0.53	0.89*	0.12	0.00	0.12
48.35	0.47	0.53	0.89*	0.12	0.00	0.12
48.40	0.47	0.53	0.89*	0.12	0.00	0.12
48.45	0.47	0.53	0.89*	0.12	0.00	0.12
48.50	0.47	0.53	0.89*	0.12	0.00	0.12
48.55	0.47	0.53	0.89*	0.12	0.00	0.12
48.60	0.47	0.53	0.89*	0.12	0.00	0.12
48.65	0.47	0.53	0.89*	0.12	0.00	0.12
48.70	0.47	0.53	0.89*	0.12	0.00	0.12

48.75	0.47	0.53	0.89*	0.12	0.00	0.12
48.80	0.47	0.53	0.89*	0.12	0.00	0.12
48.85	0.47	0.53	0.89*	0.12	0.00	0.12
48.90	0.47	0.53	0.89*	0.12	0.00	0.12
48.95	0.47	0.53	0.89*	0.12	0.00	0.12
49.00	0.47	0.53	0.89*	0.12	0.00	0.12
49.05	0.47	0.53	0.89*	0.12	0.00	0.12
49.10	0.47	0.53	0.89*	0.12	0.00	0.12
49.15	0.47	0.53	0.89*	0.12	0.00	0.12
49.20	0.47	0.53	0.89*	0.12	0.00	0.12
49.25	0.47	0.53	0.89*	0.12	0.00	0.12
49.30	0.47	0.53	0.89*	0.12	0.00	0.12
49.35	0.47	0.53	0.89*	0.11	0.00	0.11
49.40	0.47	0.53	0.89*	0.11	0.00	0.11
49.45	0.47	0.53	0.89*	0.11	0.00	0.11
49.50	0.47	0.53	0.89*	0.11	0.00	0.11
49.55	0.47	0.53	0.89*	0.11	0.00	0.11
49.60	0.47	0.53	0.89*	0.10	0.00	0.10
49.65	0.47	0.53	0.89*	0.10	0.00	0.10
49.70	0.47	0.53	0.89*	0.10	0.00	0.10
49.75	0.47	0.53	0.89*	0.10	0.00	0.10
49.80	0.47	0.53	0.89*	0.09	0.00	0.09
49.85	0.47	0.53	0.89*	0.09	0.00	0.09
49.90	0.47	0.53	0.89*	0.09	0.00	0.09
49.95	0.47	0.53	0.89*	0.08	0.00	0.08
50.00	0.47	0.53	0.89*	0.08	0.00	0.08
50.05	0.47	0.53	0.89*	0.08	0.00	0.08
50.10	0.47	0.53	0.89*	0.07	0.00	0.07
50.15	0.47	0.53	0.89*	0.07	0.00	0.07
50.20	0.47	0.53	0.89*	0.07	0.00	0.07
50.25	0.47	0.53	0.89*	0.06	0.00	0.06
50.30	0.47	0.53	0.89*	0.06	0.00	0.06
50.35	0.47	0.53	0.89*	0.05	0.00	0.05
50.40	0.47	0.53	0.89*	0.05	0.00	0.05
50.45	0.46	0.53	0.88*	0.05	0.00	0.05
50.50	0.46	0.53	0.87*	0.04	0.00	0.04
50.55	0.45	0.53	0.86*	0.04	0.00	0.04
50.60	0.45	0.53	0.85*	0.04	0.00	0.04
50.65	0.44	0.53	0.84*	0.03	0.00	0.03
50.70	0.44	0.53	0.83*	0.03	0.00	0.03
50.75	0.43	0.53	0.82*	0.02	0.00	0.02
50.80	0.43	0.53	0.82*	0.02	0.00	0.02
50.85	0.43	0.53	0.81*	0.01	0.00	0.01
50.90	0.42	0.53	0.80*	0.01	0.00	0.01
50.95	0.42	0.53	0.80*	0.00	0.00	0.00
51.00	0.42	0.53	0.79*	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

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

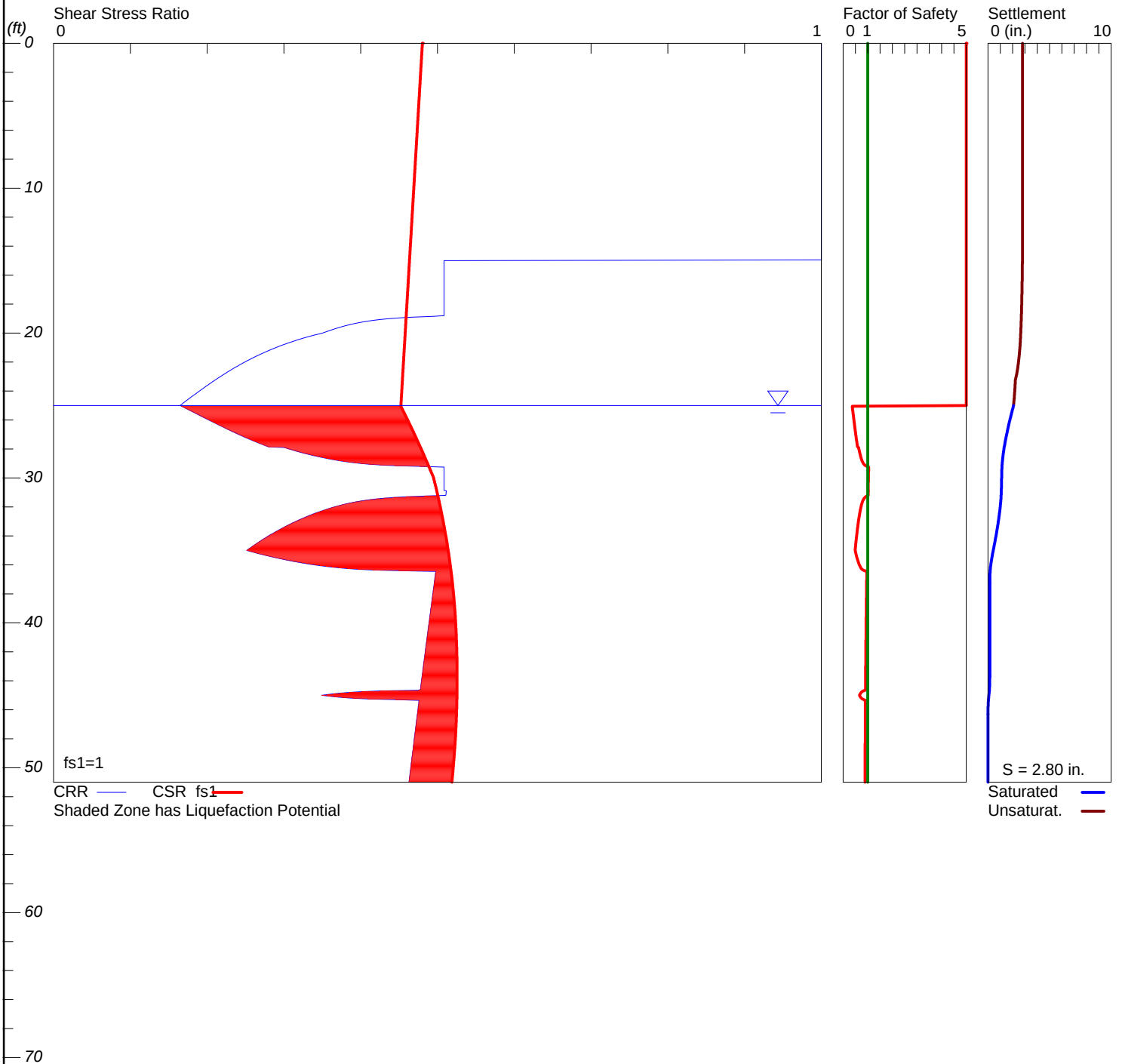
1 atm (atmosphere)	= 1 tsf (ton/ft ²)
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated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

SEISMIC SETTLEMENT ANALYSIS

The Ranch at Madison

Hole No.=BH-5 Water Depth=25 ft Surface Elev.=-15

Magnitude=7.45
Acceleration=0.739g



LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: D:\Liquefy5\544-22319 BH-5.liq
Title: The Ranch at Madison
Subtitle: 544-22319

Surface Elev.=-15
Hole No.=BH-5
Depth of Hole= 51.00 ft
Water Table during Earthquake= 25.00 ft
Water Table during In-Situ Testing= 51.00 ft
Max. Acceleration= 0.74 g
Earthquake Magnitude= 7.45

Input Data:

Surface Elev.=-15
Hole No.=BH-5
Depth of Hole=51.00 ft
Water Table during Earthquake= 25.00 ft
Water Table during In-Situ Testing= 51.00 ft
Max. Acceleration=0.74 g
Earthquake Magnitude=7.45
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.4
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
Plot one CSR curve (fs1=1)
10. Use Curve Smoothing: Yes*
- * Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
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ft		pcf	%
0.00	20.00	103.30	NoLiq
5.00	20.00	103.30	NoLiq
10.00	26.70	103.30	NoLiq
15.00	7.00	103.30	NoLiq
20.00	16.60	110.30	15.30
25.00	8.00	110.30	21.70
30.00	21.30	102.00	24.00
35.00	18.00	102.00	8.50
40.00	22.00	110.70	NoLiq
45.00	22.00	110.70	26.50
50.00	46.70	117.20	9.80

Output Results:

Settlement of Saturated Sands=2.06 in.

Settlement of Unsaturated Sands=0.73 in.

Total Settlement of Saturated and Unsaturated Sands=2.80 in.

Differential Settlement=1.398 to 1.845 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.48	5.00	2.06	0.73	2.80
0.05	2.00	0.48	5.00	2.06	0.73	2.80
0.10	2.00	0.48	5.00	2.06	0.73	2.80
0.15	2.00	0.48	5.00	2.06	0.73	2.80
0.20	2.00	0.48	5.00	2.06	0.73	2.80
0.25	2.00	0.48	5.00	2.06	0.73	2.80
0.30	2.00	0.48	5.00	2.06	0.73	2.80
0.35	2.00	0.48	5.00	2.06	0.73	2.80
0.40	2.00	0.48	5.00	2.06	0.73	2.80
0.45	2.00	0.48	5.00	2.06	0.73	2.80
0.50	2.00	0.48	5.00	2.06	0.73	2.80
0.55	2.00	0.48	5.00	2.06	0.73	2.80
0.60	2.00	0.48	5.00	2.06	0.73	2.80
0.65	2.00	0.48	5.00	2.06	0.73	2.80
0.70	2.00	0.48	5.00	2.06	0.73	2.80
0.75	2.00	0.48	5.00	2.06	0.73	2.80
0.80	2.00	0.48	5.00	2.06	0.73	2.80
0.85	2.00	0.48	5.00	2.06	0.73	2.80
0.90	2.00	0.48	5.00	2.06	0.73	2.80
0.95	2.00	0.48	5.00	2.06	0.73	2.80
1.00	2.00	0.48	5.00	2.06	0.73	2.80
1.05	2.00	0.48	5.00	2.06	0.73	2.80
1.10	2.00	0.48	5.00	2.06	0.73	2.80
1.15	2.00	0.48	5.00	2.06	0.73	2.80
1.20	2.00	0.48	5.00	2.06	0.73	2.80
1.25	2.00	0.48	5.00	2.06	0.73	2.80

1.30	2.00	0.48	5.00	2.06	0.73	2.80
1.35	2.00	0.48	5.00	2.06	0.73	2.80
1.40	2.00	0.48	5.00	2.06	0.73	2.80
1.45	2.00	0.48	5.00	2.06	0.73	2.80
1.50	2.00	0.48	5.00	2.06	0.73	2.80
1.55	2.00	0.48	5.00	2.06	0.73	2.80
1.60	2.00	0.48	5.00	2.06	0.73	2.80
1.65	2.00	0.48	5.00	2.06	0.73	2.80
1.70	2.00	0.48	5.00	2.06	0.73	2.80
1.75	2.00	0.48	5.00	2.06	0.73	2.80
1.80	2.00	0.48	5.00	2.06	0.73	2.80
1.85	2.00	0.48	5.00	2.06	0.73	2.80
1.90	2.00	0.48	5.00	2.06	0.73	2.80
1.95	2.00	0.48	5.00	2.06	0.73	2.80
2.00	2.00	0.48	5.00	2.06	0.73	2.80
2.05	2.00	0.48	5.00	2.06	0.73	2.80
2.10	2.00	0.48	5.00	2.06	0.73	2.80
2.15	2.00	0.48	5.00	2.06	0.73	2.80
2.20	2.00	0.48	5.00	2.06	0.73	2.80
2.25	2.00	0.48	5.00	2.06	0.73	2.80
2.30	2.00	0.48	5.00	2.06	0.73	2.80
2.35	2.00	0.48	5.00	2.06	0.73	2.80
2.40	2.00	0.48	5.00	2.06	0.73	2.80
2.45	2.00	0.48	5.00	2.06	0.73	2.80
2.50	2.00	0.48	5.00	2.06	0.73	2.80
2.55	2.00	0.48	5.00	2.06	0.73	2.80
2.60	2.00	0.48	5.00	2.06	0.73	2.80
2.65	2.00	0.48	5.00	2.06	0.73	2.80
2.70	2.00	0.48	5.00	2.06	0.73	2.80
2.75	2.00	0.48	5.00	2.06	0.73	2.80
2.80	2.00	0.48	5.00	2.06	0.73	2.80
2.85	2.00	0.48	5.00	2.06	0.73	2.80
2.90	2.00	0.48	5.00	2.06	0.73	2.80
2.95	2.00	0.48	5.00	2.06	0.73	2.80
3.00	2.00	0.48	5.00	2.06	0.73	2.80
3.05	2.00	0.48	5.00	2.06	0.73	2.80
3.10	2.00	0.48	5.00	2.06	0.73	2.80
3.15	2.00	0.48	5.00	2.06	0.73	2.80
3.20	2.00	0.48	5.00	2.06	0.73	2.80
3.25	2.00	0.48	5.00	2.06	0.73	2.80
3.30	2.00	0.48	5.00	2.06	0.73	2.80
3.35	2.00	0.48	5.00	2.06	0.73	2.80
3.40	2.00	0.48	5.00	2.06	0.73	2.80
3.45	2.00	0.48	5.00	2.06	0.73	2.80
3.50	2.00	0.48	5.00	2.06	0.73	2.80
3.55	2.00	0.48	5.00	2.06	0.73	2.80
3.60	2.00	0.48	5.00	2.06	0.73	2.80
3.65	2.00	0.48	5.00	2.06	0.73	2.80
3.70	2.00	0.48	5.00	2.06	0.73	2.80
3.75	2.00	0.48	5.00	2.06	0.73	2.80

3.80	2.00	0.48	5.00	2.06	0.73	2.80
3.85	2.00	0.48	5.00	2.06	0.73	2.80
3.90	2.00	0.48	5.00	2.06	0.73	2.80
3.95	2.00	0.48	5.00	2.06	0.73	2.80
4.00	2.00	0.48	5.00	2.06	0.73	2.80
4.05	2.00	0.48	5.00	2.06	0.73	2.80
4.10	2.00	0.48	5.00	2.06	0.73	2.80
4.15	2.00	0.48	5.00	2.06	0.73	2.80
4.20	2.00	0.48	5.00	2.06	0.73	2.80
4.25	2.00	0.48	5.00	2.06	0.73	2.80
4.30	2.00	0.48	5.00	2.06	0.73	2.80
4.35	2.00	0.48	5.00	2.06	0.73	2.80
4.40	2.00	0.48	5.00	2.06	0.73	2.80
4.45	2.00	0.48	5.00	2.06	0.73	2.80
4.50	2.00	0.48	5.00	2.06	0.73	2.80
4.55	2.00	0.48	5.00	2.06	0.73	2.80
4.60	2.00	0.48	5.00	2.06	0.73	2.80
4.65	2.00	0.48	5.00	2.06	0.73	2.80
4.70	2.00	0.48	5.00	2.06	0.73	2.80
4.75	2.00	0.48	5.00	2.06	0.73	2.80
4.80	2.00	0.47	5.00	2.06	0.73	2.80
4.85	2.00	0.47	5.00	2.06	0.73	2.80
4.90	2.00	0.47	5.00	2.06	0.73	2.80
4.95	2.00	0.47	5.00	2.06	0.73	2.80
5.00	2.00	0.47	5.00	2.06	0.73	2.80
5.05	2.00	0.47	5.00	2.06	0.73	2.80
5.10	2.00	0.47	5.00	2.06	0.73	2.80
5.15	2.00	0.47	5.00	2.06	0.73	2.80
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5.25	2.00	0.47	5.00	2.06	0.73	2.80
5.30	2.00	0.47	5.00	2.06	0.73	2.80
5.35	2.00	0.47	5.00	2.06	0.73	2.80
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5.50	2.00	0.47	5.00	2.06	0.73	2.80
5.55	2.00	0.47	5.00	2.06	0.73	2.80
5.60	2.00	0.47	5.00	2.06	0.73	2.80
5.65	2.00	0.47	5.00	2.06	0.73	2.80
5.70	2.00	0.47	5.00	2.06	0.73	2.80
5.75	2.00	0.47	5.00	2.06	0.73	2.80
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5.90	2.00	0.47	5.00	2.06	0.73	2.80
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6.00	2.00	0.47	5.00	2.06	0.73	2.80
6.05	2.00	0.47	5.00	2.06	0.73	2.80
6.10	2.00	0.47	5.00	2.06	0.73	2.80
6.15	2.00	0.47	5.00	2.06	0.73	2.80
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6.50	2.00	0.47	5.00	2.06	0.73	2.80
6.55	2.00	0.47	5.00	2.06	0.73	2.80
6.60	2.00	0.47	5.00	2.06	0.73	2.80
6.65	2.00	0.47	5.00	2.06	0.73	2.80
6.70	2.00	0.47	5.00	2.06	0.73	2.80
6.75	2.00	0.47	5.00	2.06	0.73	2.80
6.80	2.00	0.47	5.00	2.06	0.73	2.80
6.85	2.00	0.47	5.00	2.06	0.73	2.80
6.90	2.00	0.47	5.00	2.06	0.73	2.80
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7.00	2.00	0.47	5.00	2.06	0.73	2.80
7.05	2.00	0.47	5.00	2.06	0.73	2.80
7.10	2.00	0.47	5.00	2.06	0.73	2.80
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7.35	2.00	0.47	5.00	2.06	0.73	2.80
7.40	2.00	0.47	5.00	2.06	0.73	2.80
7.45	2.00	0.47	5.00	2.06	0.73	2.80
7.50	2.00	0.47	5.00	2.06	0.73	2.80
7.55	2.00	0.47	5.00	2.06	0.73	2.80
7.60	2.00	0.47	5.00	2.06	0.73	2.80
7.65	2.00	0.47	5.00	2.06	0.73	2.80
7.70	2.00	0.47	5.00	2.06	0.73	2.80
7.75	2.00	0.47	5.00	2.06	0.73	2.80
7.80	2.00	0.47	5.00	2.06	0.73	2.80
7.85	2.00	0.47	5.00	2.06	0.73	2.80
7.90	2.00	0.47	5.00	2.06	0.73	2.80
7.95	2.00	0.47	5.00	2.06	0.73	2.80
8.00	2.00	0.47	5.00	2.06	0.73	2.80
8.05	2.00	0.47	5.00	2.06	0.73	2.80
8.10	2.00	0.47	5.00	2.06	0.73	2.80
8.15	2.00	0.47	5.00	2.06	0.73	2.80
8.20	2.00	0.47	5.00	2.06	0.73	2.80
8.25	2.00	0.47	5.00	2.06	0.73	2.80
8.30	2.00	0.47	5.00	2.06	0.73	2.80
8.35	2.00	0.47	5.00	2.06	0.73	2.80
8.40	2.00	0.47	5.00	2.06	0.73	2.80
8.45	2.00	0.47	5.00	2.06	0.73	2.80
8.50	2.00	0.47	5.00	2.06	0.73	2.80
8.55	2.00	0.47	5.00	2.06	0.73	2.80
8.60	2.00	0.47	5.00	2.06	0.73	2.80
8.65	2.00	0.47	5.00	2.06	0.73	2.80
8.70	2.00	0.47	5.00	2.06	0.73	2.80
8.75	2.00	0.47	5.00	2.06	0.73	2.80

8.80	2.00	0.47	5.00	2.06	0.73	2.80
8.85	2.00	0.47	5.00	2.06	0.73	2.80
8.90	2.00	0.47	5.00	2.06	0.73	2.80
8.95	2.00	0.47	5.00	2.06	0.73	2.80
9.00	2.00	0.47	5.00	2.06	0.73	2.80
9.05	2.00	0.47	5.00	2.06	0.73	2.80
9.10	2.00	0.47	5.00	2.06	0.73	2.80
9.15	2.00	0.47	5.00	2.06	0.73	2.80
9.20	2.00	0.47	5.00	2.06	0.73	2.80
9.25	2.00	0.47	5.00	2.06	0.73	2.80
9.30	2.00	0.47	5.00	2.06	0.73	2.80
9.35	2.00	0.47	5.00	2.06	0.73	2.80
9.40	2.00	0.47	5.00	2.06	0.73	2.80
9.45	2.00	0.47	5.00	2.06	0.73	2.80
9.50	2.00	0.47	5.00	2.06	0.73	2.80
9.55	2.00	0.47	5.00	2.06	0.73	2.80
9.60	2.00	0.47	5.00	2.06	0.73	2.80
9.65	2.00	0.47	5.00	2.06	0.73	2.80
9.70	2.00	0.47	5.00	2.06	0.73	2.80
9.75	2.00	0.47	5.00	2.06	0.73	2.80
9.80	2.00	0.47	5.00	2.06	0.73	2.80
9.85	2.00	0.47	5.00	2.06	0.73	2.80
9.90	2.00	0.47	5.00	2.06	0.73	2.80
9.95	2.00	0.47	5.00	2.06	0.73	2.80
10.00	2.00	0.47	5.00	2.06	0.73	2.80
10.05	2.00	0.47	5.00	2.06	0.73	2.80
10.10	2.00	0.47	5.00	2.06	0.73	2.80
10.15	2.00	0.47	5.00	2.06	0.73	2.80
10.20	2.00	0.47	5.00	2.06	0.73	2.80
10.25	2.00	0.47	5.00	2.06	0.73	2.80
10.30	2.00	0.47	5.00	2.06	0.73	2.80
10.35	2.00	0.47	5.00	2.06	0.73	2.80
10.40	2.00	0.47	5.00	2.06	0.73	2.80
10.45	2.00	0.47	5.00	2.06	0.73	2.80
10.50	2.00	0.47	5.00	2.06	0.73	2.80
10.55	2.00	0.47	5.00	2.06	0.73	2.80
10.60	2.00	0.47	5.00	2.06	0.73	2.80
10.65	2.00	0.47	5.00	2.06	0.73	2.80
10.70	2.00	0.47	5.00	2.06	0.73	2.80
10.75	2.00	0.47	5.00	2.06	0.73	2.80
10.80	2.00	0.47	5.00	2.06	0.73	2.80
10.85	2.00	0.47	5.00	2.06	0.73	2.80
10.90	2.00	0.47	5.00	2.06	0.73	2.80
10.95	2.00	0.47	5.00	2.06	0.73	2.80
11.00	2.00	0.47	5.00	2.06	0.73	2.80
11.05	2.00	0.47	5.00	2.06	0.73	2.80
11.10	2.00	0.47	5.00	2.06	0.73	2.80
11.15	2.00	0.47	5.00	2.06	0.73	2.80
11.20	2.00	0.47	5.00	2.06	0.73	2.80
11.25	2.00	0.47	5.00	2.06	0.73	2.80

11.30	2.00	0.47	5.00	2.06	0.73	2.80
11.35	2.00	0.47	5.00	2.06	0.73	2.80
11.40	2.00	0.47	5.00	2.06	0.73	2.80
11.45	2.00	0.47	5.00	2.06	0.73	2.80
11.50	2.00	0.47	5.00	2.06	0.73	2.80
11.55	2.00	0.47	5.00	2.06	0.73	2.80
11.60	2.00	0.47	5.00	2.06	0.73	2.80
11.65	2.00	0.47	5.00	2.06	0.73	2.80
11.70	2.00	0.47	5.00	2.06	0.73	2.80
11.75	2.00	0.47	5.00	2.06	0.73	2.80
11.80	2.00	0.47	5.00	2.06	0.73	2.80
11.85	2.00	0.47	5.00	2.06	0.73	2.80
11.90	2.00	0.47	5.00	2.06	0.73	2.80
11.95	2.00	0.47	5.00	2.06	0.73	2.80
12.00	2.00	0.47	5.00	2.06	0.73	2.80
12.05	2.00	0.47	5.00	2.06	0.73	2.80
12.10	2.00	0.47	5.00	2.06	0.73	2.80
12.15	2.00	0.47	5.00	2.06	0.73	2.80
12.20	2.00	0.47	5.00	2.06	0.73	2.80
12.25	2.00	0.47	5.00	2.06	0.73	2.80
12.30	2.00	0.47	5.00	2.06	0.73	2.80
12.35	2.00	0.47	5.00	2.06	0.73	2.80
12.40	2.00	0.47	5.00	2.06	0.73	2.80
12.45	2.00	0.47	5.00	2.06	0.73	2.80
12.50	2.00	0.47	5.00	2.06	0.73	2.80
12.55	2.00	0.47	5.00	2.06	0.73	2.80
12.60	2.00	0.47	5.00	2.06	0.73	2.80
12.65	2.00	0.47	5.00	2.06	0.73	2.80
12.70	2.00	0.47	5.00	2.06	0.73	2.80
12.75	2.00	0.47	5.00	2.06	0.73	2.80
12.80	2.00	0.47	5.00	2.06	0.73	2.80
12.85	2.00	0.47	5.00	2.06	0.73	2.80
12.90	2.00	0.47	5.00	2.06	0.73	2.80
12.95	2.00	0.47	5.00	2.06	0.73	2.80
13.00	2.00	0.47	5.00	2.06	0.73	2.80
13.05	2.00	0.47	5.00	2.06	0.73	2.80
13.10	2.00	0.47	5.00	2.06	0.73	2.80
13.15	2.00	0.47	5.00	2.06	0.73	2.80
13.20	2.00	0.47	5.00	2.06	0.73	2.80
13.25	2.00	0.47	5.00	2.06	0.73	2.80
13.30	2.00	0.47	5.00	2.06	0.73	2.80
13.35	2.00	0.47	5.00	2.06	0.73	2.80
13.40	2.00	0.47	5.00	2.06	0.73	2.80
13.45	2.00	0.47	5.00	2.06	0.73	2.80
13.50	2.00	0.47	5.00	2.06	0.73	2.80
13.55	2.00	0.47	5.00	2.06	0.73	2.80
13.60	2.00	0.47	5.00	2.06	0.73	2.80
13.65	2.00	0.47	5.00	2.06	0.73	2.80
13.70	2.00	0.47	5.00	2.06	0.73	2.80
13.75	2.00	0.46	5.00	2.06	0.73	2.80

13.80	2.00	0.46	5.00	2.06	0.73	2.80
13.85	2.00	0.46	5.00	2.06	0.73	2.80
13.90	2.00	0.46	5.00	2.06	0.73	2.80
13.95	2.00	0.46	5.00	2.06	0.73	2.80
14.00	2.00	0.46	5.00	2.06	0.73	2.80
14.05	2.00	0.46	5.00	2.06	0.73	2.80
14.10	2.00	0.46	5.00	2.06	0.73	2.80
14.15	2.00	0.46	5.00	2.06	0.73	2.80
14.20	2.00	0.46	5.00	2.06	0.73	2.80
14.25	2.00	0.46	5.00	2.06	0.73	2.80
14.30	2.00	0.46	5.00	2.06	0.73	2.80
14.35	2.00	0.46	5.00	2.06	0.73	2.80
14.40	2.00	0.46	5.00	2.06	0.73	2.80
14.45	2.00	0.46	5.00	2.06	0.73	2.80
14.50	2.00	0.46	5.00	2.06	0.73	2.80
14.55	2.00	0.46	5.00	2.06	0.73	2.80
14.60	2.00	0.46	5.00	2.06	0.73	2.80
14.65	2.00	0.46	5.00	2.06	0.73	2.80
14.70	2.00	0.46	5.00	2.06	0.73	2.80
14.75	2.00	0.46	5.00	2.06	0.73	2.80
14.80	2.00	0.46	5.00	2.06	0.73	2.80
14.85	2.00	0.46	5.00	2.06	0.73	2.80
14.90	2.00	0.46	5.00	2.06	0.73	2.80
14.95	2.00	0.46	5.00	2.06	0.73	2.80
15.00	0.51	0.46	5.00	2.06	0.73	2.80
15.05	0.51	0.46	5.00	2.06	0.73	2.80
15.10	0.51	0.46	5.00	2.06	0.73	2.80
15.15	0.51	0.46	5.00	2.06	0.73	2.80
15.20	0.51	0.46	5.00	2.06	0.73	2.79
15.25	0.51	0.46	5.00	2.06	0.73	2.79
15.30	0.51	0.46	5.00	2.06	0.73	2.79
15.35	0.51	0.46	5.00	2.06	0.73	2.79
15.40	0.51	0.46	5.00	2.06	0.73	2.79
15.45	0.51	0.46	5.00	2.06	0.73	2.79
15.50	0.51	0.46	5.00	2.06	0.73	2.79
15.55	0.51	0.46	5.00	2.06	0.72	2.79
15.60	0.51	0.46	5.00	2.06	0.72	2.79
15.65	0.51	0.46	5.00	2.06	0.72	2.79
15.70	0.51	0.46	5.00	2.06	0.72	2.79
15.75	0.51	0.46	5.00	2.06	0.72	2.79
15.80	0.51	0.46	5.00	2.06	0.72	2.79
15.85	0.51	0.46	5.00	2.06	0.72	2.78
15.90	0.51	0.46	5.00	2.06	0.72	2.78
15.95	0.51	0.46	5.00	2.06	0.72	2.78
16.00	0.51	0.46	5.00	2.06	0.72	2.78
16.05	0.51	0.46	5.00	2.06	0.72	2.78
16.10	0.51	0.46	5.00	2.06	0.72	2.78
16.15	0.51	0.46	5.00	2.06	0.71	2.78
16.20	0.51	0.46	5.00	2.06	0.71	2.78
16.25	0.51	0.46	5.00	2.06	0.71	2.78

16.30	0.51	0.46	5.00	2.06	0.71	2.78
16.35	0.51	0.46	5.00	2.06	0.71	2.78
16.40	0.51	0.46	5.00	2.06	0.71	2.77
16.45	0.51	0.46	5.00	2.06	0.71	2.77
16.50	0.51	0.46	5.00	2.06	0.71	2.77
16.55	0.51	0.46	5.00	2.06	0.71	2.77
16.60	0.51	0.46	5.00	2.06	0.71	2.77
16.65	0.51	0.46	5.00	2.06	0.71	2.77
16.70	0.51	0.46	5.00	2.06	0.70	2.77
16.75	0.51	0.46	5.00	2.06	0.70	2.77
16.80	0.51	0.46	5.00	2.06	0.70	2.77
16.85	0.51	0.46	5.00	2.06	0.70	2.77
16.90	0.51	0.46	5.00	2.06	0.70	2.76
16.95	0.51	0.46	5.00	2.06	0.70	2.76
17.00	0.51	0.46	5.00	2.06	0.70	2.76
17.05	0.51	0.46	5.00	2.06	0.70	2.76
17.10	0.51	0.46	5.00	2.06	0.70	2.76
17.15	0.51	0.46	5.00	2.06	0.69	2.76
17.20	0.51	0.46	5.00	2.06	0.69	2.76
17.25	0.51	0.46	5.00	2.06	0.69	2.76
17.30	0.51	0.46	5.00	2.06	0.69	2.76
17.35	0.51	0.46	5.00	2.06	0.69	2.75
17.40	0.51	0.46	5.00	2.06	0.69	2.75
17.45	0.51	0.46	5.00	2.06	0.69	2.75
17.50	0.51	0.46	5.00	2.06	0.69	2.75
17.55	0.51	0.46	5.00	2.06	0.68	2.75
17.60	0.51	0.46	5.00	2.06	0.68	2.75
17.65	0.51	0.46	5.00	2.06	0.68	2.75
17.70	0.51	0.46	5.00	2.06	0.68	2.75
17.75	0.51	0.46	5.00	2.06	0.68	2.74
17.80	0.51	0.46	5.00	2.06	0.68	2.74
17.85	0.51	0.46	5.00	2.06	0.68	2.74
17.90	0.51	0.46	5.00	2.06	0.68	2.74
17.95	0.51	0.46	5.00	2.06	0.67	2.74
18.00	0.51	0.46	5.00	2.06	0.67	2.74
18.05	0.51	0.46	5.00	2.06	0.67	2.74
18.10	0.51	0.46	5.00	2.06	0.67	2.73
18.15	0.51	0.46	5.00	2.06	0.67	2.73
18.20	0.51	0.46	5.00	2.06	0.67	2.73
18.25	0.51	0.46	5.00	2.06	0.67	2.73
18.30	0.51	0.46	5.00	2.06	0.66	2.73
18.35	0.51	0.46	5.00	2.06	0.66	2.73
18.40	0.51	0.46	5.00	2.06	0.66	2.73
18.45	0.51	0.46	5.00	2.06	0.66	2.72
18.50	0.51	0.46	5.00	2.06	0.66	2.72
18.55	0.51	0.46	5.00	2.06	0.66	2.72
18.60	0.51	0.46	5.00	2.06	0.65	2.72
18.65	0.51	0.46	5.00	2.06	0.65	2.72
18.70	0.51	0.46	5.00	2.06	0.65	2.72
18.75	0.51	0.46	5.00	2.06	0.65	2.71

18.80	0.51	0.46	5.00	2.06	0.65	2.71
18.85	0.49	0.46	5.00	2.06	0.64	2.71
18.90	0.47	0.46	5.00	2.06	0.64	2.71
18.95	0.45	0.46	5.00	2.06	0.64	2.71
19.00	0.44	0.46	5.00	2.06	0.64	2.70
19.05	0.43	0.46	5.00	2.06	0.64	2.70
19.10	0.42	0.46	5.00	2.06	0.64	2.70
19.15	0.41	0.46	5.00	2.06	0.63	2.70
19.20	0.41	0.46	5.00	2.06	0.63	2.70
19.25	0.40	0.46	5.00	2.06	0.63	2.69
19.30	0.40	0.46	5.00	2.06	0.63	2.69
19.35	0.39	0.46	5.00	2.06	0.62	2.69
19.40	0.39	0.46	5.00	2.06	0.62	2.69
19.45	0.38	0.46	5.00	2.06	0.62	2.69
19.50	0.38	0.46	5.00	2.06	0.62	2.68
19.55	0.38	0.46	5.00	2.06	0.62	2.68
19.60	0.37	0.46	5.00	2.06	0.61	2.68
19.65	0.37	0.46	5.00	2.06	0.61	2.68
19.70	0.37	0.46	5.00	2.06	0.61	2.67
19.75	0.36	0.46	5.00	2.06	0.61	2.67
19.80	0.36	0.46	5.00	2.06	0.60	2.67
19.85	0.36	0.46	5.00	2.06	0.60	2.67
19.90	0.36	0.46	5.00	2.06	0.60	2.66
19.95	0.35	0.46	5.00	2.06	0.60	2.66
20.00	0.35	0.46	5.00	2.06	0.59	2.66
20.05	0.35	0.46	5.00	2.06	0.59	2.66
20.10	0.34	0.46	5.00	2.06	0.59	2.65
20.15	0.34	0.46	5.00	2.06	0.59	2.65
20.20	0.34	0.46	5.00	2.06	0.58	2.65
20.25	0.33	0.46	5.00	2.06	0.58	2.64
20.30	0.33	0.46	5.00	2.06	0.58	2.64
20.35	0.33	0.46	5.00	2.06	0.57	2.64
20.40	0.32	0.46	5.00	2.06	0.57	2.64
20.45	0.32	0.46	5.00	2.06	0.57	2.63
20.50	0.32	0.46	5.00	2.06	0.56	2.63
20.55	0.31	0.46	5.00	2.06	0.56	2.63
20.60	0.31	0.46	5.00	2.06	0.56	2.62
20.65	0.31	0.46	5.00	2.06	0.55	2.62
20.70	0.30	0.46	5.00	2.06	0.55	2.61
20.75	0.30	0.46	5.00	2.06	0.55	2.61
20.80	0.30	0.46	5.00	2.06	0.54	2.61
20.85	0.30	0.46	5.00	2.06	0.54	2.60
20.90	0.29	0.46	5.00	2.06	0.53	2.60
20.95	0.29	0.46	5.00	2.06	0.53	2.59
21.00	0.29	0.46	5.00	2.06	0.53	2.59
21.05	0.29	0.46	5.00	2.06	0.52	2.59
21.10	0.28	0.46	5.00	2.06	0.52	2.58
21.15	0.28	0.46	5.00	2.06	0.51	2.58
21.20	0.28	0.46	5.00	2.06	0.51	2.57
21.25	0.28	0.46	5.00	2.06	0.50	2.57

21.30	0.28	0.46	5.00	2.06	0.50	2.56
21.35	0.27	0.46	5.00	2.06	0.49	2.56
21.40	0.27	0.46	5.00	2.06	0.49	2.55
21.45	0.27	0.46	5.00	2.06	0.48	2.55
21.50	0.27	0.46	5.00	2.06	0.48	2.54
21.55	0.27	0.46	5.00	2.06	0.47	2.54
21.60	0.26	0.46	5.00	2.06	0.47	2.53
21.65	0.26	0.46	5.00	2.06	0.46	2.52
21.70	0.26	0.46	5.00	2.06	0.45	2.52
21.75	0.26	0.46	5.00	2.06	0.45	2.51
21.80	0.26	0.46	5.00	2.06	0.44	2.51
21.85	0.25	0.46	5.00	2.06	0.44	2.50
21.90	0.25	0.46	5.00	2.06	0.43	2.49
21.95	0.25	0.46	5.00	2.06	0.42	2.49
22.00	0.25	0.46	5.00	2.06	0.41	2.48
22.05	0.25	0.46	5.00	2.06	0.41	2.47
22.10	0.25	0.46	5.00	2.06	0.40	2.46
22.15	0.24	0.46	5.00	2.06	0.39	2.46
22.20	0.24	0.46	5.00	2.06	0.38	2.45
22.25	0.24	0.46	5.00	2.06	0.38	2.44
22.30	0.24	0.46	5.00	2.06	0.37	2.43
22.35	0.24	0.46	5.00	2.06	0.36	2.42
22.40	0.24	0.46	5.00	2.06	0.35	2.42
22.45	0.23	0.46	5.00	2.06	0.34	2.41
22.50	0.23	0.46	5.00	2.06	0.33	2.40
22.55	0.23	0.46	5.00	2.06	0.32	2.39
22.60	0.23	0.46	5.00	2.06	0.31	2.38
22.65	0.23	0.45	5.00	2.06	0.30	2.37
22.70	0.23	0.45	5.00	2.06	0.29	2.36
22.75	0.22	0.45	5.00	2.06	0.28	2.35
22.80	0.22	0.45	5.00	2.06	0.27	2.34
22.85	0.22	0.45	5.00	2.06	0.26	2.32
22.90	0.22	0.45	5.00	2.06	0.25	2.31
22.95	0.22	0.45	5.00	2.06	0.24	2.30
23.00	0.22	0.45	5.00	2.06	0.22	2.29
23.05	0.22	0.45	5.00	2.06	0.21	2.28
23.10	0.21	0.45	5.00	2.06	0.20	2.26
23.15	0.21	0.45	5.00	2.06	0.19	2.25
23.20	0.21	0.45	5.00	2.06	0.17	2.24
23.25	0.21	0.45	5.00	2.06	0.16	2.22
23.30	0.21	0.45	5.00	2.06	0.16	2.22
23.35	0.21	0.45	5.00	2.06	0.15	2.22
23.40	0.21	0.45	5.00	2.06	0.15	2.22
23.45	0.20	0.45	5.00	2.06	0.15	2.21
23.50	0.20	0.45	5.00	2.06	0.14	2.21
23.55	0.20	0.45	5.00	2.06	0.14	2.21
23.60	0.20	0.45	5.00	2.06	0.14	2.20
23.65	0.20	0.45	5.00	2.06	0.13	2.20
23.70	0.20	0.45	5.00	2.06	0.13	2.20
23.75	0.20	0.45	5.00	2.06	0.13	2.19

23.80	0.20	0.45	5.00	2.06	0.12	2.19
23.85	0.19	0.45	5.00	2.06	0.12	2.18
23.90	0.19	0.45	5.00	2.06	0.12	2.18
23.95	0.19	0.45	5.00	2.06	0.11	2.18
24.00	0.19	0.45	5.00	2.06	0.11	2.17
24.05	0.19	0.45	5.00	2.06	0.10	2.17
24.10	0.19	0.45	5.00	2.06	0.10	2.16
24.15	0.19	0.45	5.00	2.06	0.10	2.16
24.20	0.18	0.45	5.00	2.06	0.09	2.16
24.25	0.18	0.45	5.00	2.06	0.09	2.15
24.30	0.18	0.45	5.00	2.06	0.08	2.15
24.35	0.18	0.45	5.00	2.06	0.08	2.14
24.40	0.18	0.45	5.00	2.06	0.07	2.14
24.45	0.18	0.45	5.00	2.06	0.07	2.13
24.50	0.18	0.45	5.00	2.06	0.06	2.13
24.55	0.18	0.45	5.00	2.06	0.06	2.12
24.60	0.17	0.45	5.00	2.06	0.05	2.12
24.65	0.17	0.45	5.00	2.06	0.05	2.11
24.70	0.17	0.45	5.00	2.06	0.04	2.11
24.75	0.17	0.45	5.00	2.06	0.04	2.10
24.80	0.17	0.45	5.00	2.06	0.03	2.10
24.85	0.17	0.45	5.00	2.06	0.02	2.09
24.90	0.17	0.45	5.00	2.06	0.02	2.08
24.95	0.17	0.45	5.00	2.06	0.01	2.08
25.00	0.16	0.45	5.00	2.06	0.01	2.07
25.05	0.17	0.45	0.37*	2.06	0.00	2.06
25.10	0.17	0.45	0.37*	2.05	0.00	2.05
25.15	0.17	0.45	0.38*	2.03	0.00	2.03
25.20	0.17	0.45	0.38*	2.02	0.00	2.02
25.25	0.17	0.45	0.38*	2.00	0.00	2.00
25.30	0.18	0.45	0.39*	1.98	0.00	1.98
25.35	0.18	0.46	0.39*	1.97	0.00	1.97
25.40	0.18	0.46	0.39*	1.95	0.00	1.95
25.45	0.18	0.46	0.40*	1.94	0.00	1.94
25.50	0.18	0.46	0.40*	1.92	0.00	1.92
25.55	0.19	0.46	0.41*	1.91	0.00	1.91
25.60	0.19	0.46	0.41*	1.89	0.00	1.89
25.65	0.19	0.46	0.41*	1.88	0.00	1.88
25.70	0.19	0.46	0.42*	1.86	0.00	1.86
25.75	0.19	0.46	0.42*	1.85	0.00	1.85
25.80	0.19	0.46	0.42*	1.83	0.00	1.83
25.85	0.20	0.46	0.43*	1.82	0.00	1.82
25.90	0.20	0.46	0.43*	1.80	0.00	1.80
25.95	0.20	0.46	0.43*	1.79	0.00	1.79
26.00	0.20	0.46	0.44*	1.78	0.00	1.78
26.05	0.20	0.46	0.44*	1.76	0.00	1.76
26.10	0.21	0.46	0.45*	1.75	0.00	1.75
26.15	0.21	0.46	0.45*	1.73	0.00	1.73
26.20	0.21	0.46	0.45*	1.72	0.00	1.72
26.25	0.21	0.46	0.46*	1.71	0.00	1.71

26.30	0.21	0.46	0.46*	1.69	0.00	1.69
26.35	0.22	0.46	0.46*	1.68	0.00	1.68
26.40	0.22	0.46	0.47*	1.67	0.00	1.67
26.45	0.22	0.47	0.47*	1.65	0.00	1.65
26.50	0.22	0.47	0.48*	1.64	0.00	1.64
26.55	0.22	0.47	0.48*	1.63	0.00	1.63
26.60	0.23	0.47	0.48*	1.62	0.00	1.62
26.65	0.23	0.47	0.49*	1.60	0.00	1.60
26.70	0.23	0.47	0.49*	1.59	0.00	1.59
26.75	0.23	0.47	0.49*	1.58	0.00	1.58
26.80	0.23	0.47	0.50*	1.56	0.00	1.56
26.85	0.24	0.47	0.50*	1.55	0.00	1.55
26.90	0.24	0.47	0.51*	1.54	0.00	1.54
26.95	0.24	0.47	0.51*	1.53	0.00	1.53
27.00	0.24	0.47	0.51*	1.52	0.00	1.52
27.05	0.24	0.47	0.52*	1.50	0.00	1.50
27.10	0.25	0.47	0.52*	1.49	0.00	1.49
27.15	0.25	0.47	0.53*	1.48	0.00	1.48
27.20	0.25	0.47	0.53*	1.47	0.00	1.47
27.25	0.25	0.47	0.53*	1.46	0.00	1.46
27.30	0.25	0.47	0.54*	1.44	0.00	1.44
27.35	0.26	0.47	0.54*	1.43	0.00	1.43
27.40	0.26	0.47	0.55*	1.42	0.00	1.42
27.45	0.26	0.47	0.55*	1.41	0.00	1.41
27.50	0.26	0.47	0.55*	1.40	0.00	1.40
27.55	0.27	0.47	0.56*	1.39	0.00	1.39
27.60	0.27	0.48	0.56*	1.38	0.00	1.38
27.65	0.27	0.48	0.57*	1.36	0.00	1.36
27.70	0.27	0.48	0.57*	1.35	0.00	1.35
27.75	0.27	0.48	0.58*	1.34	0.00	1.34
27.80	0.28	0.48	0.58*	1.33	0.00	1.33
27.85	0.28	0.48	0.59*	1.32	0.00	1.32
27.90	0.30	0.48	0.63*	1.31	0.00	1.31
27.95	0.30	0.48	0.63*	1.30	0.00	1.30
28.00	0.31	0.48	0.64*	1.29	0.00	1.29
28.05	0.31	0.48	0.65*	1.28	0.00	1.28
28.10	0.31	0.48	0.65*	1.28	0.00	1.28
28.15	0.32	0.48	0.66*	1.27	0.00	1.27
28.20	0.32	0.48	0.67*	1.26	0.00	1.26
28.25	0.32	0.48	0.67*	1.25	0.00	1.25
28.30	0.33	0.48	0.68*	1.24	0.00	1.24
28.35	0.33	0.48	0.69*	1.24	0.00	1.24
28.40	0.33	0.48	0.69*	1.23	0.00	1.23
28.45	0.34	0.48	0.70*	1.22	0.00	1.22
28.50	0.34	0.48	0.71*	1.21	0.00	1.21
28.55	0.35	0.48	0.72*	1.21	0.00	1.21
28.60	0.35	0.48	0.73*	1.20	0.00	1.20
28.65	0.36	0.48	0.73*	1.19	0.00	1.19
28.70	0.36	0.48	0.74*	1.19	0.00	1.19
28.75	0.37	0.49	0.75*	1.18	0.00	1.18

28.80	0.37	0.49	0.77*	1.17	0.00	1.17
28.85	0.38	0.49	0.78*	1.17	0.00	1.17
28.90	0.38	0.49	0.79*	1.16	0.00	1.16
28.95	0.39	0.49	0.80*	1.16	0.00	1.16
29.00	0.40	0.49	0.82*	1.15	0.00	1.15
29.05	0.41	0.49	0.84*	1.15	0.00	1.15
29.10	0.42	0.49	0.87*	1.14	0.00	1.14
29.15	0.44	0.49	0.91*	1.14	0.00	1.14
29.20	0.48	0.49	0.98*	1.14	0.00	1.14
29.25	0.51	0.49	1.04	1.13	0.00	1.13
29.30	0.51	0.49	1.04	1.13	0.00	1.13
29.35	0.51	0.49	1.04	1.13	0.00	1.13
29.40	0.51	0.49	1.04	1.13	0.00	1.13
29.45	0.51	0.49	1.04	1.12	0.00	1.12
29.50	0.51	0.49	1.04	1.12	0.00	1.12
29.55	0.51	0.49	1.03	1.12	0.00	1.12
29.60	0.51	0.49	1.03	1.12	0.00	1.12
29.65	0.51	0.49	1.03	1.12	0.00	1.12
29.70	0.51	0.49	1.03	1.12	0.00	1.12
29.75	0.51	0.49	1.03	1.11	0.00	1.11
29.80	0.51	0.49	1.03	1.11	0.00	1.11
29.85	0.51	0.49	1.03	1.11	0.00	1.11
29.90	0.51	0.49	1.03	1.11	0.00	1.11
29.95	0.51	0.49	1.03	1.11	0.00	1.11
30.00	0.51	0.50	1.03	1.11	0.00	1.11
30.05	0.51	0.50	1.03	1.11	0.00	1.11
30.10	0.51	0.50	1.03	1.11	0.00	1.11
30.15	0.51	0.50	1.03	1.10	0.00	1.10
30.20	0.51	0.50	1.03	1.10	0.00	1.10
30.25	0.51	0.50	1.02	1.10	0.00	1.10
30.30	0.51	0.50	1.02	1.10	0.00	1.10
30.35	0.51	0.50	1.02	1.10	0.00	1.10
30.40	0.51	0.50	1.02	1.10	0.00	1.10
30.45	0.51	0.50	1.02	1.10	0.00	1.10
30.50	0.51	0.50	1.02	1.10	0.00	1.10
30.55	0.51	0.50	1.02	1.09	0.00	1.09
30.60	0.51	0.50	1.02	1.09	0.00	1.09
30.65	0.51	0.50	1.02	1.09	0.00	1.09
30.70	0.51	0.50	1.02	1.09	0.00	1.09
30.75	0.51	0.50	1.02	1.09	0.00	1.09
30.80	0.51	0.50	1.02	1.08	0.00	1.08
30.85	0.51	0.50	1.02	1.08	0.00	1.08
30.90	0.51	0.50	1.03	1.08	0.00	1.08
30.95	0.51	0.50	1.02	1.08	0.00	1.08
31.00	0.51	0.50	1.02	1.08	0.00	1.08
31.05	0.51	0.50	1.02	1.07	0.00	1.07
31.10	0.51	0.50	1.02	1.07	0.00	1.07
31.15	0.51	0.50	1.02	1.07	0.00	1.07
31.20	0.51	0.50	1.02	1.07	0.00	1.07
31.25	0.48	0.50	0.97*	1.06	0.00	1.06

31.30	0.46	0.50	0.92*	1.06	0.00	1.06
31.35	0.44	0.50	0.88*	1.06	0.00	1.06
31.40	0.43	0.50	0.86*	1.05	0.00	1.05
31.45	0.42	0.50	0.84*	1.05	0.00	1.05
31.50	0.41	0.50	0.82*	1.05	0.00	1.05
31.55	0.41	0.50	0.81*	1.04	0.00	1.04
31.60	0.40	0.50	0.80*	1.04	0.00	1.04
31.65	0.39	0.50	0.78*	1.03	0.00	1.03
31.70	0.39	0.50	0.77*	1.03	0.00	1.03
31.75	0.38	0.50	0.76*	1.02	0.00	1.02
31.80	0.38	0.50	0.76*	1.02	0.00	1.02
31.85	0.38	0.50	0.75*	1.01	0.00	1.01
31.90	0.37	0.50	0.74*	1.00	0.00	1.00
31.95	0.37	0.50	0.73*	1.00	0.00	1.00
32.00	0.37	0.50	0.73*	0.99	0.00	0.99
32.05	0.36	0.50	0.72*	0.99	0.00	0.99
32.10	0.36	0.50	0.71*	0.98	0.00	0.98
32.15	0.36	0.50	0.71*	0.97	0.00	0.97
32.20	0.35	0.50	0.70*	0.97	0.00	0.97
32.25	0.35	0.50	0.69*	0.96	0.00	0.96
32.30	0.35	0.50	0.69*	0.95	0.00	0.95
32.35	0.35	0.51	0.68*	0.94	0.00	0.94
32.40	0.34	0.51	0.68*	0.94	0.00	0.94
32.45	0.34	0.51	0.67*	0.93	0.00	0.93
32.50	0.34	0.51	0.67*	0.92	0.00	0.92
32.55	0.34	0.51	0.66*	0.92	0.00	0.92
32.60	0.33	0.51	0.66*	0.91	0.00	0.91
32.65	0.33	0.51	0.65*	0.90	0.00	0.90
32.70	0.33	0.51	0.65*	0.89	0.00	0.89
32.75	0.33	0.51	0.64*	0.88	0.00	0.88
32.80	0.32	0.51	0.64*	0.88	0.00	0.88
32.85	0.32	0.51	0.63*	0.87	0.00	0.87
32.90	0.32	0.51	0.63*	0.86	0.00	0.86
32.95	0.32	0.51	0.63*	0.85	0.00	0.85
33.00	0.32	0.51	0.62*	0.84	0.00	0.84
33.05	0.31	0.51	0.62*	0.83	0.00	0.83
33.10	0.31	0.51	0.61*	0.82	0.00	0.82
33.15	0.31	0.51	0.61*	0.81	0.00	0.81
33.20	0.31	0.51	0.61*	0.81	0.00	0.81
33.25	0.31	0.51	0.60*	0.80	0.00	0.80
33.30	0.30	0.51	0.60*	0.79	0.00	0.79
33.35	0.30	0.51	0.59*	0.78	0.00	0.78
33.40	0.30	0.51	0.59*	0.77	0.00	0.77
33.45	0.30	0.51	0.59*	0.76	0.00	0.76
33.50	0.30	0.51	0.58*	0.75	0.00	0.75
33.55	0.29	0.51	0.58*	0.74	0.00	0.74
33.60	0.29	0.51	0.58*	0.73	0.00	0.73
33.65	0.29	0.51	0.57*	0.72	0.00	0.72
33.70	0.29	0.51	0.57*	0.71	0.00	0.71
33.75	0.29	0.51	0.56*	0.70	0.00	0.70

33.80	0.29	0.51	0.56*	0.69	0.00	0.69
33.85	0.28	0.51	0.56*	0.68	0.00	0.68
33.90	0.28	0.51	0.55*	0.67	0.00	0.67
33.95	0.28	0.51	0.55*	0.66	0.00	0.66
34.00	0.28	0.51	0.55*	0.65	0.00	0.65
34.05	0.28	0.51	0.54*	0.64	0.00	0.64
34.10	0.28	0.51	0.54*	0.63	0.00	0.63
34.15	0.28	0.51	0.54*	0.62	0.00	0.62
34.20	0.27	0.51	0.54*	0.61	0.00	0.61
34.25	0.27	0.51	0.53*	0.59	0.00	0.59
34.30	0.27	0.51	0.53*	0.58	0.00	0.58
34.35	0.27	0.51	0.53*	0.57	0.00	0.57
34.40	0.27	0.51	0.52*	0.56	0.00	0.56
34.45	0.27	0.51	0.52*	0.55	0.00	0.55
34.50	0.27	0.51	0.52*	0.54	0.00	0.54
34.55	0.26	0.51	0.51*	0.53	0.00	0.53
34.60	0.26	0.51	0.51*	0.52	0.00	0.52
34.65	0.26	0.51	0.51*	0.51	0.00	0.51
34.70	0.26	0.51	0.51*	0.50	0.00	0.50
34.75	0.26	0.51	0.50*	0.48	0.00	0.48
34.80	0.26	0.51	0.50*	0.47	0.00	0.47
34.85	0.26	0.51	0.50*	0.46	0.00	0.46
34.90	0.25	0.51	0.49*	0.45	0.00	0.45
34.95	0.25	0.51	0.49*	0.44	0.00	0.44
35.00	0.25	0.51	0.49*	0.43	0.00	0.43
35.05	0.25	0.51	0.50*	0.41	0.00	0.41
35.10	0.26	0.51	0.50*	0.40	0.00	0.40
35.15	0.26	0.51	0.51*	0.39	0.00	0.39
35.20	0.27	0.51	0.52*	0.38	0.00	0.38
35.25	0.27	0.51	0.52*	0.37	0.00	0.37
35.30	0.27	0.51	0.53*	0.36	0.00	0.36
35.35	0.28	0.51	0.54*	0.35	0.00	0.35
35.40	0.28	0.52	0.55*	0.34	0.00	0.34
35.45	0.28	0.52	0.55*	0.33	0.00	0.33
35.50	0.29	0.52	0.56*	0.32	0.00	0.32
35.55	0.29	0.52	0.57*	0.31	0.00	0.31
35.60	0.30	0.52	0.58*	0.30	0.00	0.30
35.65	0.30	0.52	0.59*	0.29	0.00	0.29
35.70	0.31	0.52	0.60*	0.28	0.00	0.28
35.75	0.31	0.52	0.60*	0.27	0.00	0.27
35.80	0.32	0.52	0.61*	0.26	0.00	0.26
35.85	0.32	0.52	0.62*	0.25	0.00	0.25
35.90	0.33	0.52	0.64*	0.24	0.00	0.24
35.95	0.33	0.52	0.65*	0.23	0.00	0.23
36.00	0.34	0.52	0.66*	0.23	0.00	0.23
36.05	0.35	0.52	0.67*	0.22	0.00	0.22
36.10	0.35	0.52	0.69*	0.21	0.00	0.21
36.15	0.36	0.52	0.70*	0.21	0.00	0.21
36.20	0.37	0.52	0.72*	0.20	0.00	0.20
36.25	0.38	0.52	0.74*	0.19	0.00	0.19

36.30	0.40	0.52	0.77*	0.19	0.00	0.19
36.35	0.42	0.52	0.80*	0.18	0.00	0.18
36.40	0.45	0.52	0.87*	0.18	0.00	0.18
36.45	0.50	0.52	0.96*	0.17	0.00	0.17
36.50	0.50	0.52	0.96*	0.17	0.00	0.17
36.55	0.50	0.52	0.96*	0.17	0.00	0.17
36.60	0.50	0.52	0.96*	0.16	0.00	0.16
36.65	0.50	0.52	0.96*	0.16	0.00	0.16
36.70	0.50	0.52	0.96*	0.16	0.00	0.16
36.75	0.50	0.52	0.96*	0.16	0.00	0.16
36.80	0.50	0.52	0.96*	0.16	0.00	0.16
36.85	0.50	0.52	0.96*	0.15	0.00	0.15
36.90	0.50	0.52	0.96*	0.15	0.00	0.15
36.95	0.50	0.52	0.96*	0.15	0.00	0.15
37.00	0.50	0.52	0.96*	0.15	0.00	0.15
37.05	0.50	0.52	0.96*	0.15	0.00	0.15
37.10	0.50	0.52	0.96*	0.15	0.00	0.15
37.15	0.50	0.52	0.96*	0.15	0.00	0.15
37.20	0.50	0.52	0.95*	0.15	0.00	0.15
37.25	0.50	0.52	0.95*	0.15	0.00	0.15
37.30	0.50	0.52	0.95*	0.15	0.00	0.15
37.35	0.50	0.52	0.95*	0.15	0.00	0.15
37.40	0.50	0.52	0.95*	0.15	0.00	0.15
37.45	0.50	0.52	0.95*	0.15	0.00	0.15
37.50	0.50	0.52	0.95*	0.15	0.00	0.15
37.55	0.50	0.52	0.95*	0.15	0.00	0.15
37.60	0.49	0.52	0.95*	0.15	0.00	0.15
37.65	0.49	0.52	0.95*	0.15	0.00	0.15
37.70	0.49	0.52	0.95*	0.15	0.00	0.15
37.75	0.49	0.52	0.95*	0.15	0.00	0.15
37.80	0.49	0.52	0.95*	0.15	0.00	0.15
37.85	0.49	0.52	0.95*	0.15	0.00	0.15
37.90	0.49	0.52	0.95*	0.15	0.00	0.15
37.95	0.49	0.52	0.95*	0.15	0.00	0.15
38.00	0.49	0.52	0.95*	0.15	0.00	0.15
38.05	0.49	0.52	0.95*	0.15	0.00	0.15
38.10	0.49	0.52	0.95*	0.15	0.00	0.15
38.15	0.49	0.52	0.95*	0.15	0.00	0.15
38.20	0.49	0.52	0.95*	0.15	0.00	0.15
38.25	0.49	0.52	0.95*	0.15	0.00	0.15
38.30	0.49	0.52	0.95*	0.15	0.00	0.15
38.35	0.49	0.52	0.95*	0.15	0.00	0.15
38.40	0.49	0.52	0.95*	0.15	0.00	0.15
38.45	0.49	0.52	0.94*	0.15	0.00	0.15
38.50	0.49	0.52	0.94*	0.15	0.00	0.15
38.55	0.49	0.52	0.94*	0.15	0.00	0.15
38.60	0.49	0.52	0.94*	0.15	0.00	0.15
38.65	0.49	0.52	0.94*	0.15	0.00	0.15
38.70	0.49	0.52	0.94*	0.15	0.00	0.15
38.75	0.49	0.52	0.94*	0.15	0.00	0.15

38.80	0.49	0.52	0.94*	0.15	0.00	0.15
38.85	0.49	0.52	0.94*	0.15	0.00	0.15
38.90	0.49	0.52	0.94*	0.15	0.00	0.15
38.95	0.49	0.52	0.94*	0.15	0.00	0.15
39.00	0.49	0.52	0.94*	0.15	0.00	0.15
39.05	0.49	0.52	0.94*	0.15	0.00	0.15
39.10	0.49	0.52	0.94*	0.15	0.00	0.15
39.15	0.49	0.52	0.94*	0.15	0.00	0.15
39.20	0.49	0.52	0.94*	0.15	0.00	0.15
39.25	0.49	0.52	0.94*	0.15	0.00	0.15
39.30	0.49	0.52	0.94*	0.15	0.00	0.15
39.35	0.49	0.52	0.94*	0.15	0.00	0.15
39.40	0.49	0.52	0.94*	0.15	0.00	0.15
39.45	0.49	0.52	0.94*	0.15	0.00	0.15
39.50	0.49	0.52	0.94*	0.15	0.00	0.15
39.55	0.49	0.52	0.94*	0.15	0.00	0.15
39.60	0.49	0.52	0.94*	0.15	0.00	0.15
39.65	0.49	0.52	0.94*	0.15	0.00	0.15
39.70	0.49	0.52	0.94*	0.15	0.00	0.15
39.75	0.49	0.52	0.94*	0.15	0.00	0.15
39.80	0.49	0.52	0.94*	0.15	0.00	0.15
39.85	0.49	0.52	0.93*	0.15	0.00	0.15
39.90	0.49	0.52	0.93*	0.15	0.00	0.15
39.95	0.49	0.52	0.93*	0.15	0.00	0.15
40.00	0.49	0.52	0.93*	0.15	0.00	0.15
40.05	0.49	0.52	0.93*	0.15	0.00	0.15
40.10	0.49	0.52	0.93*	0.15	0.00	0.15
40.15	0.49	0.52	0.93*	0.15	0.00	0.15
40.20	0.49	0.52	0.93*	0.15	0.00	0.15
40.25	0.49	0.52	0.93*	0.15	0.00	0.15
40.30	0.49	0.52	0.93*	0.15	0.00	0.15
40.35	0.49	0.52	0.93*	0.15	0.00	0.15
40.40	0.49	0.52	0.93*	0.15	0.00	0.15
40.45	0.49	0.52	0.93*	0.15	0.00	0.15
40.50	0.49	0.52	0.93*	0.15	0.00	0.15
40.55	0.49	0.52	0.93*	0.15	0.00	0.15
40.60	0.49	0.52	0.93*	0.15	0.00	0.15
40.65	0.49	0.52	0.93*	0.15	0.00	0.15
40.70	0.49	0.52	0.93*	0.15	0.00	0.15
40.75	0.49	0.52	0.93*	0.15	0.00	0.15
40.80	0.49	0.52	0.93*	0.15	0.00	0.15
40.85	0.49	0.52	0.93*	0.15	0.00	0.15
40.90	0.49	0.52	0.93*	0.15	0.00	0.15
40.95	0.49	0.52	0.93*	0.15	0.00	0.15
41.00	0.49	0.52	0.93*	0.15	0.00	0.15
41.05	0.49	0.52	0.93*	0.15	0.00	0.15
41.10	0.49	0.52	0.93*	0.15	0.00	0.15
41.15	0.49	0.52	0.93*	0.15	0.00	0.15
41.20	0.49	0.52	0.93*	0.15	0.00	0.15
41.25	0.49	0.52	0.93*	0.15	0.00	0.15

41.30	0.49	0.52	0.93*	0.15	0.00	0.15
41.35	0.49	0.52	0.93*	0.15	0.00	0.15
41.40	0.49	0.52	0.93*	0.15	0.00	0.15
41.45	0.49	0.52	0.92*	0.15	0.00	0.15
41.50	0.49	0.52	0.92*	0.15	0.00	0.15
41.55	0.49	0.52	0.92*	0.15	0.00	0.15
41.60	0.49	0.52	0.92*	0.15	0.00	0.15
41.65	0.48	0.52	0.92*	0.15	0.00	0.15
41.70	0.48	0.53	0.92*	0.15	0.00	0.15
41.75	0.48	0.53	0.92*	0.15	0.00	0.15
41.80	0.48	0.53	0.92*	0.15	0.00	0.15
41.85	0.48	0.53	0.92*	0.15	0.00	0.15
41.90	0.48	0.53	0.92*	0.15	0.00	0.15
41.95	0.48	0.53	0.92*	0.15	0.00	0.15
42.00	0.48	0.53	0.92*	0.15	0.00	0.15
42.05	0.48	0.53	0.92*	0.15	0.00	0.15
42.10	0.48	0.53	0.92*	0.15	0.00	0.15
42.15	0.48	0.53	0.92*	0.15	0.00	0.15
42.20	0.48	0.53	0.92*	0.15	0.00	0.15
42.25	0.48	0.53	0.92*	0.15	0.00	0.15
42.30	0.48	0.53	0.92*	0.15	0.00	0.15
42.35	0.48	0.53	0.92*	0.15	0.00	0.15
42.40	0.48	0.53	0.92*	0.15	0.00	0.15
42.45	0.48	0.53	0.92*	0.15	0.00	0.15
42.50	0.48	0.53	0.92*	0.15	0.00	0.15
42.55	0.48	0.53	0.92*	0.15	0.00	0.15
42.60	0.48	0.53	0.92*	0.15	0.00	0.15
42.65	0.48	0.53	0.92*	0.15	0.00	0.15
42.70	0.48	0.53	0.92*	0.15	0.00	0.15
42.75	0.48	0.53	0.92*	0.15	0.00	0.15
42.80	0.48	0.53	0.92*	0.15	0.00	0.15
42.85	0.48	0.53	0.92*	0.15	0.00	0.15
42.90	0.48	0.53	0.92*	0.15	0.00	0.15
42.95	0.48	0.53	0.92*	0.15	0.00	0.15
43.00	0.48	0.53	0.92*	0.15	0.00	0.15
43.05	0.48	0.53	0.92*	0.15	0.00	0.15
43.10	0.48	0.53	0.92*	0.15	0.00	0.15
43.15	0.48	0.53	0.92*	0.15	0.00	0.15
43.20	0.48	0.53	0.92*	0.15	0.00	0.15
43.25	0.48	0.53	0.92*	0.15	0.00	0.15
43.30	0.48	0.53	0.92*	0.15	0.00	0.15
43.35	0.48	0.53	0.91*	0.15	0.00	0.15
43.40	0.48	0.53	0.91*	0.15	0.00	0.15
43.45	0.48	0.53	0.91*	0.15	0.00	0.15
43.50	0.48	0.53	0.91*	0.15	0.00	0.15
43.55	0.48	0.53	0.91*	0.15	0.00	0.15
43.60	0.48	0.53	0.91*	0.15	0.00	0.15
43.65	0.48	0.53	0.91*	0.15	0.00	0.15
43.70	0.48	0.53	0.91*	0.15	0.00	0.15
43.75	0.48	0.53	0.91*	0.15	0.00	0.15

43.80	0.48	0.53	0.91*	0.15	0.00	0.15
43.85	0.48	0.53	0.91*	0.15	0.00	0.15
43.90	0.48	0.53	0.91*	0.15	0.00	0.15
43.95	0.48	0.53	0.91*	0.15	0.00	0.15
44.00	0.48	0.53	0.91*	0.14	0.00	0.14
44.05	0.48	0.53	0.91*	0.14	0.00	0.14
44.10	0.48	0.53	0.91*	0.14	0.00	0.14
44.15	0.48	0.53	0.91*	0.14	0.00	0.14
44.20	0.48	0.53	0.91*	0.14	0.00	0.14
44.25	0.48	0.53	0.91*	0.14	0.00	0.14
44.30	0.48	0.53	0.91*	0.13	0.00	0.13
44.35	0.48	0.53	0.91*	0.13	0.00	0.13
44.40	0.48	0.53	0.91*	0.13	0.00	0.13
44.45	0.48	0.53	0.91*	0.13	0.00	0.13
44.50	0.48	0.53	0.91*	0.12	0.00	0.12
44.55	0.48	0.53	0.91*	0.12	0.00	0.12
44.60	0.48	0.53	0.91*	0.12	0.00	0.12
44.65	0.48	0.53	0.91*	0.11	0.00	0.11
44.70	0.43	0.53	0.81*	0.11	0.00	0.11
44.75	0.40	0.53	0.76*	0.10	0.00	0.10
44.80	0.39	0.53	0.73*	0.10	0.00	0.10
44.85	0.37	0.53	0.71*	0.09	0.00	0.09
44.90	0.36	0.53	0.69*	0.09	0.00	0.09
44.95	0.36	0.53	0.68*	0.08	0.00	0.08
45.00	0.35	0.53	0.67*	0.07	0.00	0.07
45.05	0.36	0.53	0.68*	0.07	0.00	0.07
45.10	0.37	0.53	0.70*	0.06	0.00	0.06
45.15	0.38	0.53	0.72*	0.06	0.00	0.06
45.20	0.39	0.53	0.74*	0.05	0.00	0.05
45.25	0.41	0.53	0.78*	0.04	0.00	0.04
45.30	0.45	0.53	0.85*	0.04	0.00	0.04
45.35	0.48	0.53	0.91*	0.03	0.00	0.03
45.40	0.48	0.53	0.91*	0.03	0.00	0.03
45.45	0.48	0.53	0.91*	0.03	0.00	0.03
45.50	0.48	0.53	0.91*	0.02	0.00	0.02
45.55	0.48	0.53	0.91*	0.02	0.00	0.02
45.60	0.48	0.53	0.91*	0.02	0.00	0.02
45.65	0.48	0.53	0.91*	0.02	0.00	0.02
45.70	0.48	0.53	0.90*	0.01	0.00	0.01
45.75	0.48	0.53	0.90*	0.01	0.00	0.01
45.80	0.47	0.53	0.90*	0.01	0.00	0.01
45.85	0.47	0.53	0.90*	0.01	0.00	0.01
45.90	0.47	0.53	0.90*	0.01	0.00	0.01
45.95	0.47	0.53	0.90*	0.00	0.00	0.00
46.00	0.47	0.52	0.90*	0.00	0.00	0.00
46.05	0.47	0.52	0.90*	0.00	0.00	0.00
46.10	0.47	0.52	0.90*	0.00	0.00	0.00
46.15	0.47	0.52	0.90*	0.00	0.00	0.00
46.20	0.47	0.52	0.90*	0.00	0.00	0.00
46.25	0.47	0.52	0.90*	0.00	0.00	0.00

[illegible]

48.80	0.47	0.52	0.90*	0.00	0.00	0.00
48.85	0.47	0.52	0.90*	0.00	0.00	0.00
48.90	0.47	0.52	0.90*	0.00	0.00	0.00
48.95	0.47	0.52	0.90*	0.00	0.00	0.00
49.00	0.47	0.52	0.90*	0.00	0.00	0.00
49.05	0.47	0.52	0.90*	0.00	0.00	0.00
49.10	0.47	0.52	0.90*	0.00	0.00	0.00
49.15	0.47	0.52	0.90*	0.00	0.00	0.00
49.20	0.47	0.52	0.90*	0.00	0.00	0.00
49.25	0.47	0.52	0.90*	0.00	0.00	0.00
49.30	0.47	0.52	0.89*	0.00	0.00	0.00
49.35	0.47	0.52	0.89*	0.00	0.00	0.00
49.40	0.47	0.52	0.89*	0.00	0.00	0.00
49.45	0.47	0.52	0.89*	0.00	0.00	0.00
49.50	0.47	0.52	0.89*	0.00	0.00	0.00
49.55	0.47	0.52	0.89*	0.00	0.00	0.00
49.60	0.47	0.52	0.89*	0.00	0.00	0.00
49.65	0.47	0.52	0.89*	0.00	0.00	0.00
49.70	0.47	0.52	0.89*	0.00	0.00	0.00
49.75	0.47	0.52	0.89*	0.00	0.00	0.00
49.80	0.47	0.52	0.89*	0.00	0.00	0.00
49.85	0.47	0.52	0.89*	0.00	0.00	0.00
49.90	0.47	0.52	0.89*	0.00	0.00	0.00
49.95	0.47	0.52	0.89*	0.00	0.00	0.00
50.00	0.47	0.52	0.89*	0.00	0.00	0.00
50.05	0.47	0.52	0.89*	0.00	0.00	0.00
50.10	0.46	0.52	0.89*	0.00	0.00	0.00
50.15	0.46	0.52	0.89*	0.00	0.00	0.00
50.20	0.46	0.52	0.89*	0.00	0.00	0.00
50.25	0.46	0.52	0.89*	0.00	0.00	0.00
50.30	0.46	0.52	0.89*	0.00	0.00	0.00
50.35	0.46	0.52	0.89*	0.00	0.00	0.00
50.40	0.46	0.52	0.89*	0.00	0.00	0.00
50.45	0.46	0.52	0.89*	0.00	0.00	0.00
50.50	0.46	0.52	0.89*	0.00	0.00	0.00
50.55	0.46	0.52	0.89*	0.00	0.00	0.00
50.60	0.46	0.52	0.89*	0.00	0.00	0.00
50.65	0.46	0.52	0.89*	0.00	0.00	0.00
50.70	0.46	0.52	0.89*	0.00	0.00	0.00
50.75	0.46	0.52	0.89*	0.00	0.00	0.00
50.80	0.46	0.52	0.89*	0.00	0.00	0.00
50.85	0.46	0.52	0.89*	0.00	0.00	0.00
50.90	0.46	0.52	0.89*	0.00	0.00	0.00
50.95	0.46	0.52	0.89*	0.00	0.00	0.00
51.00	0.46	0.52	0.89*	0.00	0.00	0.00

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

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight =

pcf; Depth = ft; Settlement = in.

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

APPENDIX E

TENTATIVE TRACT MAP 39179 – GRADING PLAN

LOT AREA TABLE		LOT AREA TABLE		LOT AREA TABLE	
LOT NO.	LOT AREA (SQ.FT.)	LOT NO.	LOT AREA (SQ.FT.)	LOT NO.	LOT AREA (SQ.FT.)
1	33,419	34	13,288	"A"	185,400
2	32,662	35	13,329	"B"	251,599
3	32,875	36	14,079	"D"	682,587
4	32,272	37	16,970	"E"	15,137
5	32,843	38	17,059	"F"	155,689
6	33,968	39	16,695	"G"	386,652
7	32,313	40	14,849	"H"	103,917
8	34,765	41	14,616	"I"	1,809,669
9	40,160	42	14,333	"J"	12,858
10	35,286	43	13,129	"K"	7,366
11	34,768	44	12,907	"L"	3,498
12	33,831	45	14,326	"M"	12,367
13	35,943	46	13,274	"N"	493,530
14	33,419	47	13,482	"O"	51,860
15	32,644	48	14,244	"P"	64,784
16	32,781	49	14,551	"Q"	102,176
17	32,662	50	16,124	"R"	74,023
18	39,110	51	14,343	"S"	102,268
19	40,287	52	17,030	"T"	51,626
20	34,385	53	16,795	"U"	7,500
21	32,812	54	14,167	"V"	6,617
22	33,112	55	13,677	DRIVE A	103,195
23	33,910	56	14,224	DRIVE B	84,657
24	29,663	57	14,431	DRIVE C	31,249
25	31,529	58	14,030	DRIVE D	115,522
26	31,894	59	13,359	DRIVE E	41,727
27	32,591	60	13,275	DRIVE F	62,889
28	32,368	61	12,925		
29	32,765	62	14,422		
30	48,440	63	17,059		
31	53,534	64	16,755		
32	14,398	65	16,082		
33	13,990				

TENTATIVE TRACT MAP NO. 39179

COUNTY OF RIVERSIDE

SCHEDULE "A" MAP

LEGAL DESCRIPTION:

APN:780-010-12
THE SOUTHWEST 1/4 OF THE NORTHWEST 1/4 OF SECTION 11, TOWNSHIP 6 SOUTH, RANGE 7 EAST, SAN BERNARDINO BASE AND MERIDIAN, AS SHOWN BY UNITED STATES GOVERNMENT SURVEY, EXCEPTING THEREFROM THE SOUTH 30.00 FEET CONVEYED TO THE COUNTY OF RIVERSIDE, BY DEED RECORDED AUGUST 29, 1950, AS INSTRUMENT NO. 4583 OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

APN:780-010-13

PARCEL A:
PARCEL 1 OF PARCEL MAP 9350, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 48, PAGES 99 AND 100 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
PARCEL B:
AN EASEMENT OVER PARCEL 2 OF SAID PARCEL MAP 9350 FOR THE RIGHT TO USE AND MAINTAIN IRRIGATION PIPELINES LOCATED THEREON AND FOR THE RIGHT OF INGRESS AND EGRESS OVER SAID PARCEL 2, ALL A RESERVED IN GRANT DEED RECORDED JULY 13, 1983 AS INSTRUMENT NO. 1983-139805 OFFICIAL RECORDS.

APN:780-010-014

PARCEL 2 OF PARCEL MAP 9350, COUNTY OF RIVERSIDE, CALIFORNIA, AS PER MAP RECORDED IN BOOK 48, PAGES 99 AND 100 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

APN:780-020-001

THE NORTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 11, TOWNSHIP 6 SOUTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, IN THE COACHELLA VALLEY COUNTY WATER DISTRICT, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THEREFROM THE NORTH 30 FEET.

APN:780-020-002

THE NORTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 11, TOWNSHIP 6 SOUTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, IN THE COACHELLA VALLEY COUNTY WATER DISTRICT ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THE NORTH 30 FEET.

APN:780-020-003

THE WEST 20 ACRES OF THE NORTH 1/2 OF THE SOUTHEAST 1/4 OF SECTION 11, TOWNSHIP 6 SOUTH, RANGE 7 EAST, SAN BERNARDINO BASE AND MERIDIAN. EXCEPTING THE NORTH 30 FEET.

ASSESSORS PARCEL NUMBERS:

780-010-12 / 780-010-013 / 780-010-014 / 780-020-001 / 780-020-002 / 780-020-003

OWNER/APPLICANT:

NAME: DISCOVERY MM CLUB, LLC

ADDRESS: 80-955 AVENUE 52
LA QUINTA, CA 92253

E-MAIL: ATRAYLOR@MADISONCLUBCA.COM
JGAMLIN@DISCOVERYLANDCO.COM

CIVIL ENGINEER:

RTM ENGINEERING CONSULTANTS
1ADA
SUITE 1000
IRVINE, CA 92618
(949) 453-0111
VICTORIA.WHITAKER@RTMEC.COM

EXISTING ZONING AND LAND USE:

ZONE A-1 LIGHT AGRICULTURE	AG	780-010-012, 780-010-013, 780-010-014
ZONE R-1 SINGLE-FAMILY DWELLING	RC-LDR	780-020-001, 780-020-002, 780-020-003
ZONE R-5 OPEN AREA COMBINING ZONE-RESIDENTIAL DEVELOPMENT		
ZONE R-A RESIDENTIAL-AGRICULTURAL		

PROPOSED ZONING AND LAND USE:

ZONE R-1 SINGLE-FAMILY DWELLING	RURAL COMMUNITY - LOW DENSITY RESIDENTIAL
---------------------------------	---

GROSS ACREAGE:

177.08 AC

NET ACREAGE:

173.38 AC

FEMA MAP REFERENCE:

ZONE X - AREA OF MINIMAL FLOOD HAZARD

PROJECT NOTES:

- | | |
|-------------------------------|---------------------------------|
| 1. MAPPING SOURCE | TOPOGRAPHY SURVEY |
| 2. WATER QUALITY | XXXXXXXX |
| 3. STORM WATER MANAGEMENT | XXXXXXXX |
| 4. PARTIAL VACATION AVENUE 53 | XXXXXXXX |
| 5. SEWER AND WATER SERVICE | COACHELLA VALLEY WATER DISTRICT |
| 6. CANAL WATER | XXXXXXXX |
| 7. FINAL MAP SCHEDULE | XXXXXXXX |

UTILITY PROVIDERS:

COACHELLA VALLEY WATER DISTRICT	760-398-2651
IMPERIAL IRRIGATION DISTRICT (IID)	800-303-7756
SOCAL GAS	909-335-3986
FRONTIER	951-723-0736
SPECTRUM	951-406-1690
UNDERGROUND SERVICE ALERT	800-227-2600
BURRTEC WASTE & RECYCLING SERVICES, LLC	760-340-2113

PROJECT AREA:

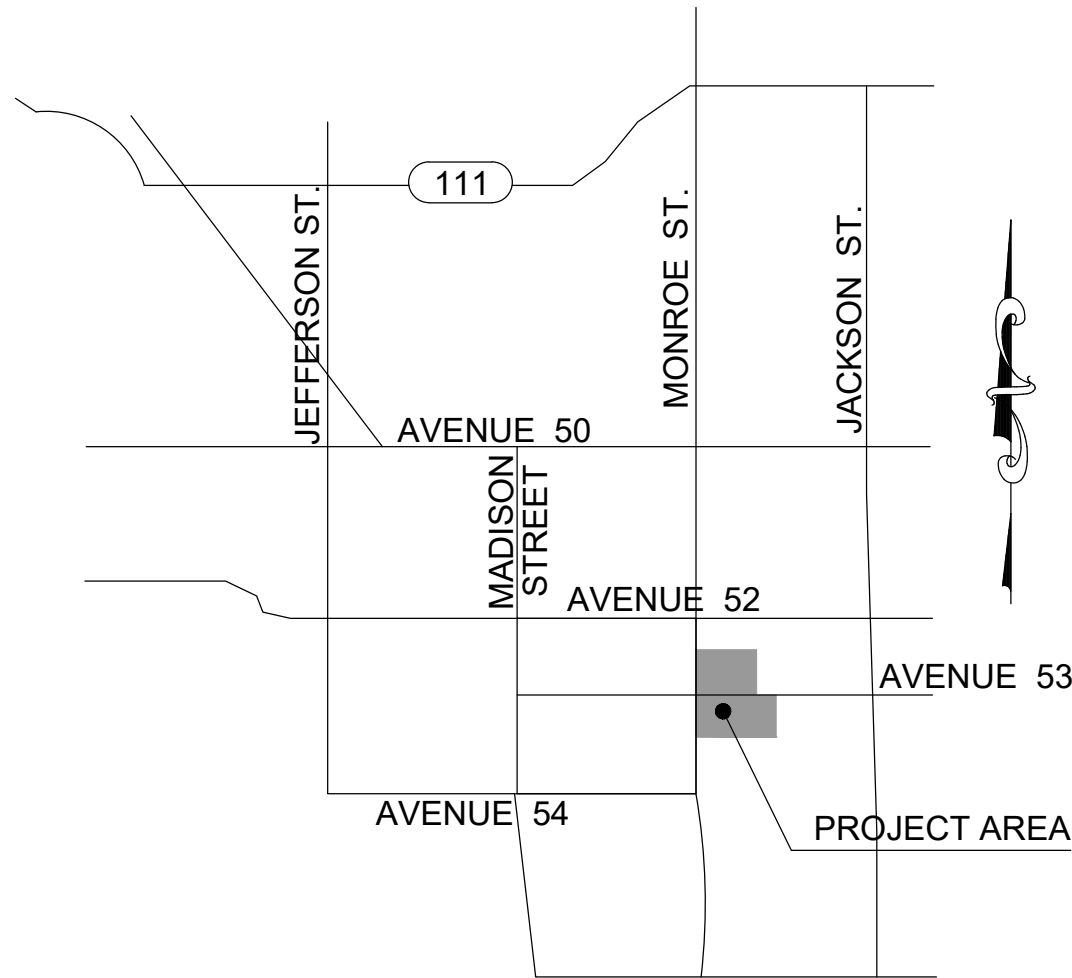
±175.08 AC

SCHOOL DISTRICT:

COACHELLA VALLEY UNIFIED SCHOOL DISTRICT

ADJACENT LAND USE:

NORTH:	VACANT/RESIDENTIAL
SOUTH:	VACANT/RESIDENTIAL
EAST:	VACANT
WEST:	RESIDENTIAL



VICINITY MAP

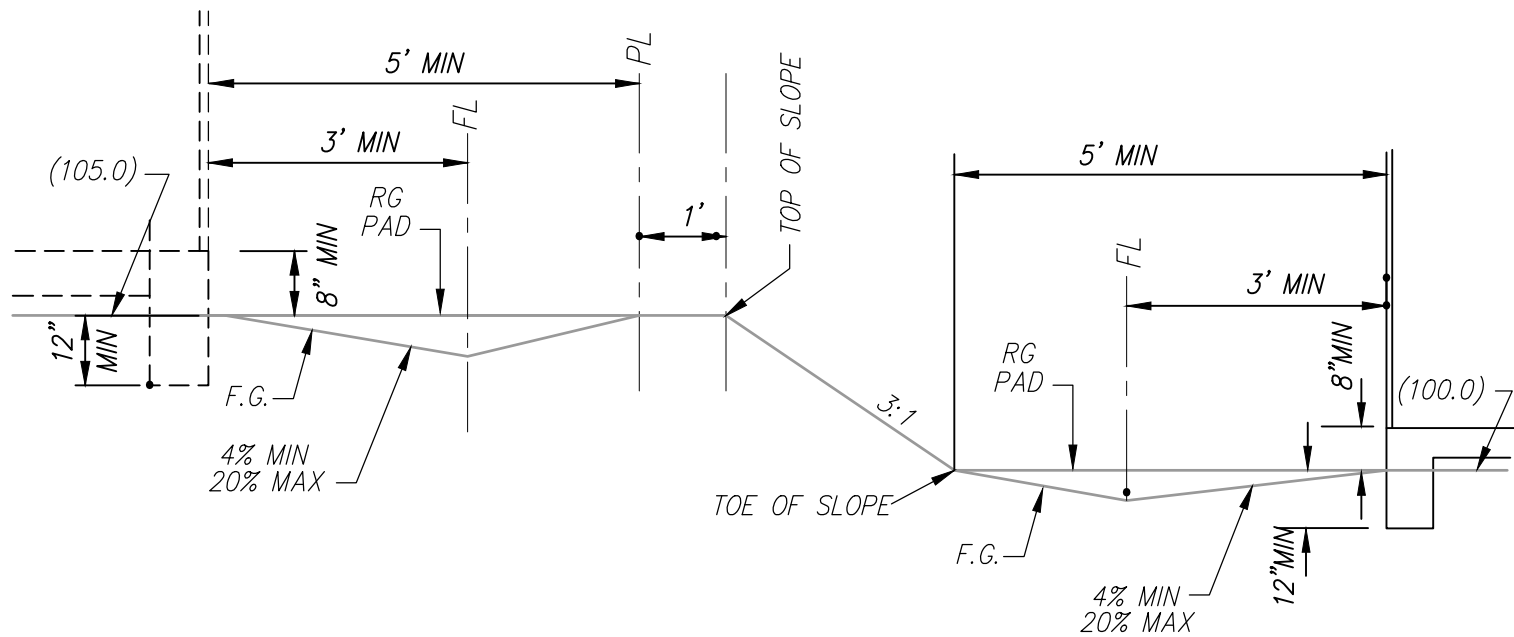
N.T.S.

SHEET INDEX

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	INDEX MAP
3	GRADING PLAN
4	GRADING PLAN
5	CROSS SECTIONS

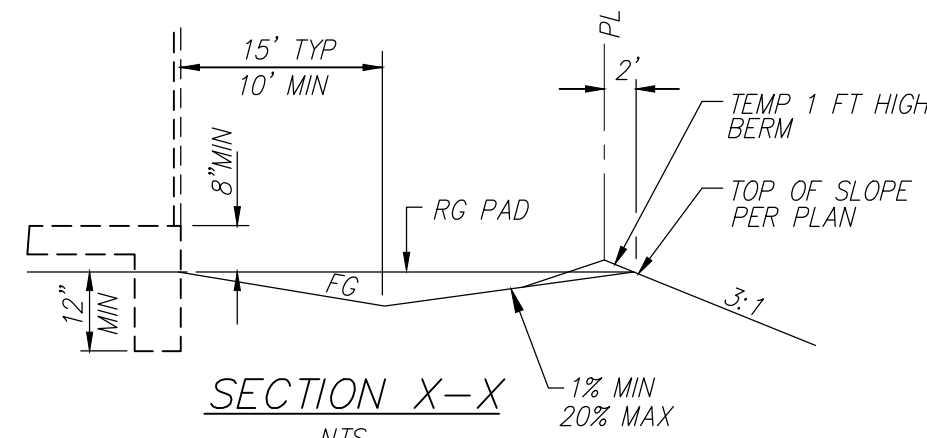
LEGEND

TRACT BOUNDARY	_____
PROPOSED RIGHT-OF-WAY	_____
PROPOSED LOT	_____
PROPOSED EASEMENT	-----
PROPOSED SLOPE	----- 2:1 MAX -----
LOT NUMBER	1

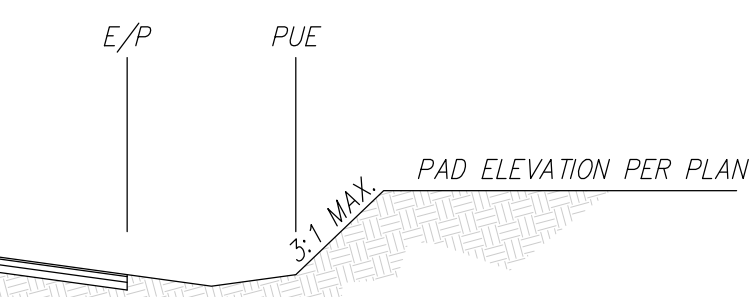


SECTION V-V
NTS

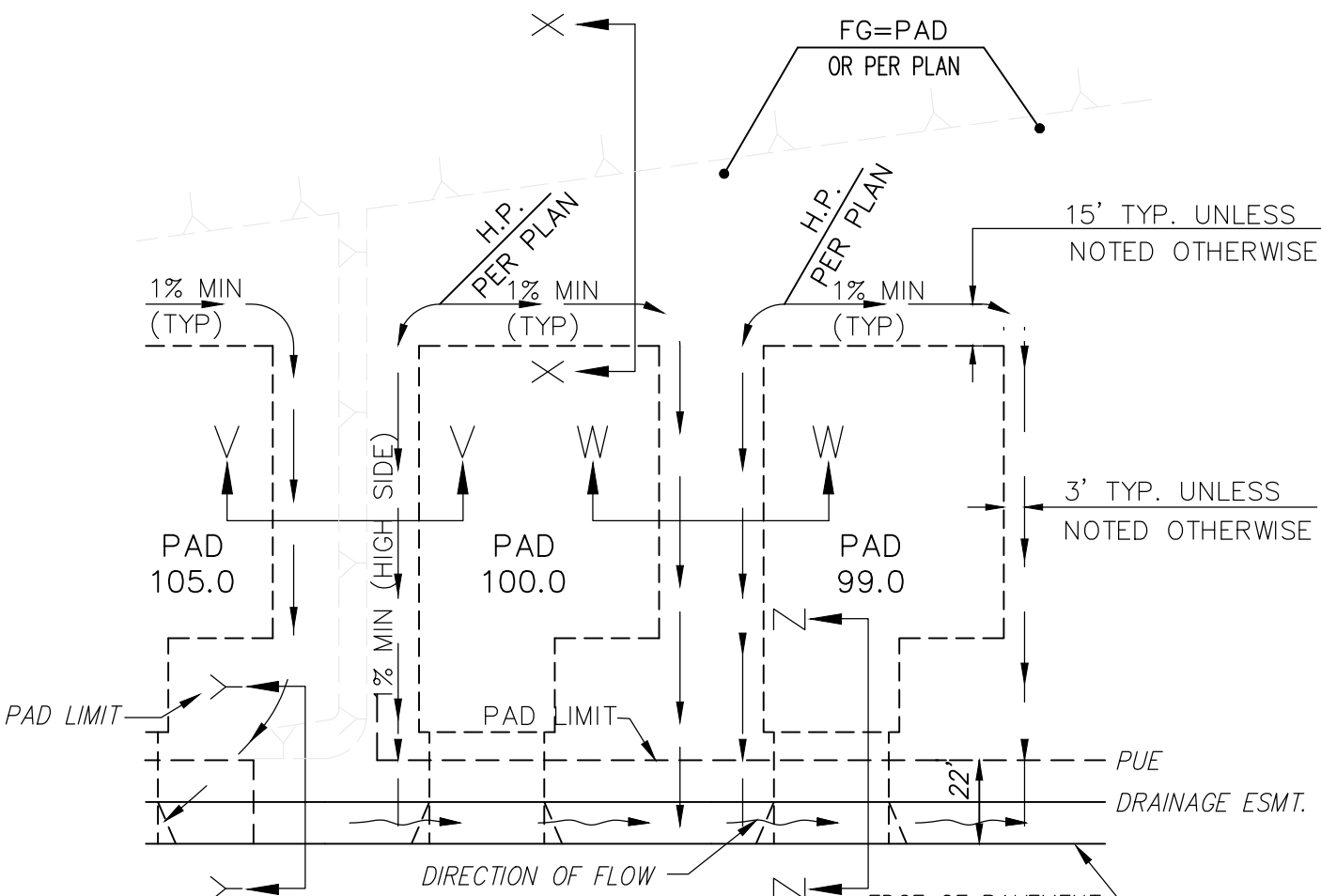
FOR SIDYARD GRADING WHERE PAD DIFFERENCE IS GREATER THAN 1.0'



SECTION X-X
NTS

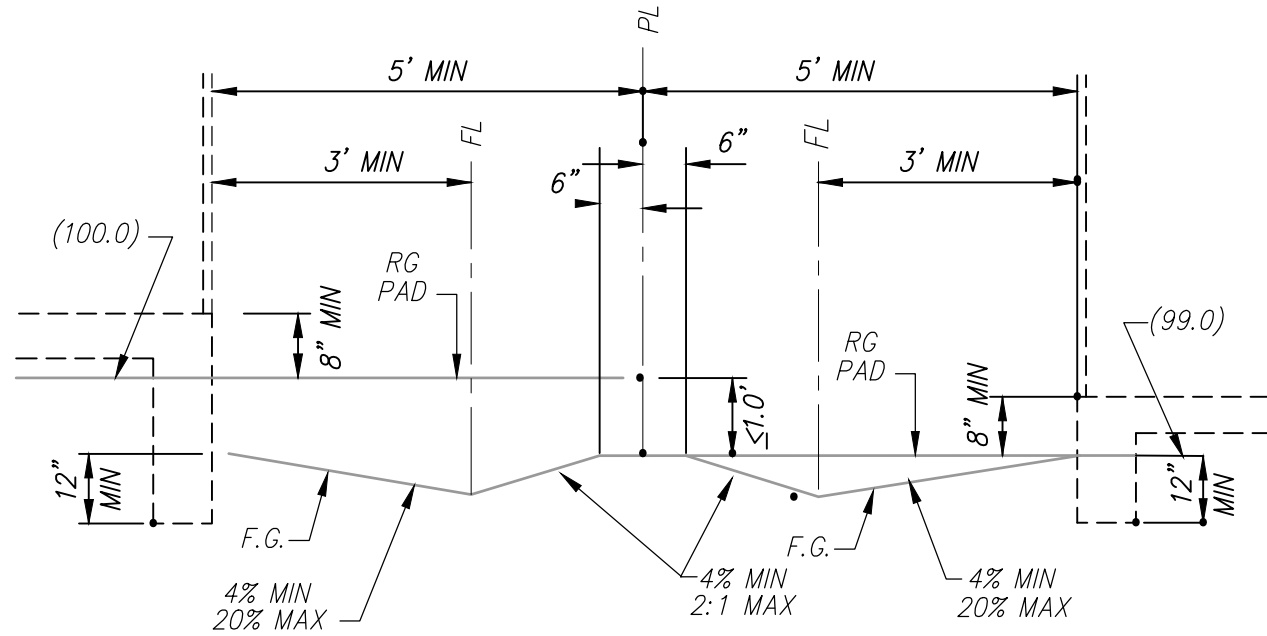


SECTION Y-Y
NTS



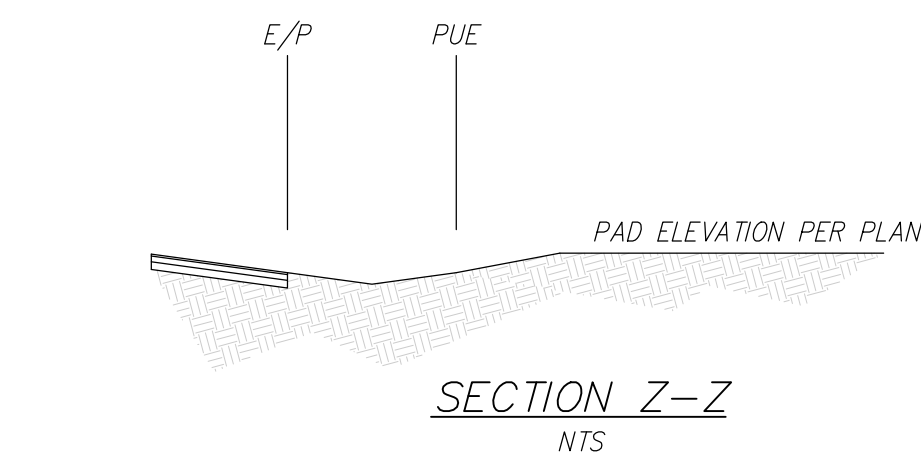
PLAN VIEW
NTS

TYPICAL LOT GRADING
PER PRECISE GRADING PLANS



SECTION W-W
NTS

FOR SIDYARD GRADING WHERE PAD DIFFERENCE IS LESS THAN OR EQUAL TO 1.0'



SECTION Z-Z
NTS

REVISIONS			
DESCRIPTION	APD	REV	DATE

SURVEY BY:
VERTEX SURVEY
28348 Constellation Rd
SUITE 800
SANTA CLARITA, CA 91355
(661) 254-1928



1 Ada, Suite 100
Irvine, CA 92618
Phone: 949.453.0111

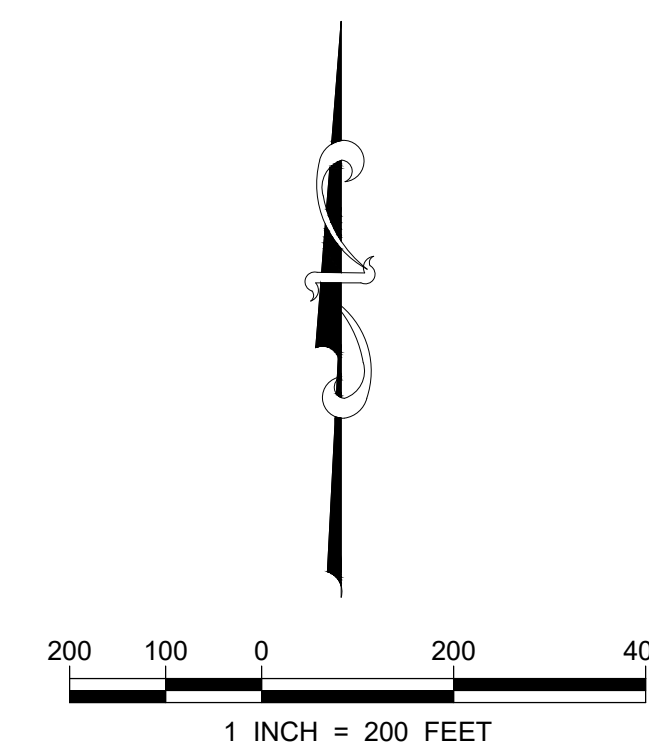
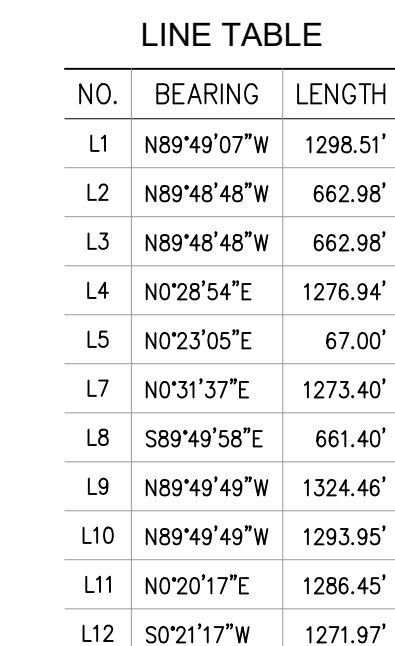
COUNTY OF RIVERSIDE

TENTATIVE TRACT MAP NO. 39179

Drawn By: SM
Checked By: YW
Scale:

COVER SHEET

SHEET 1
OF 5 SHEETS



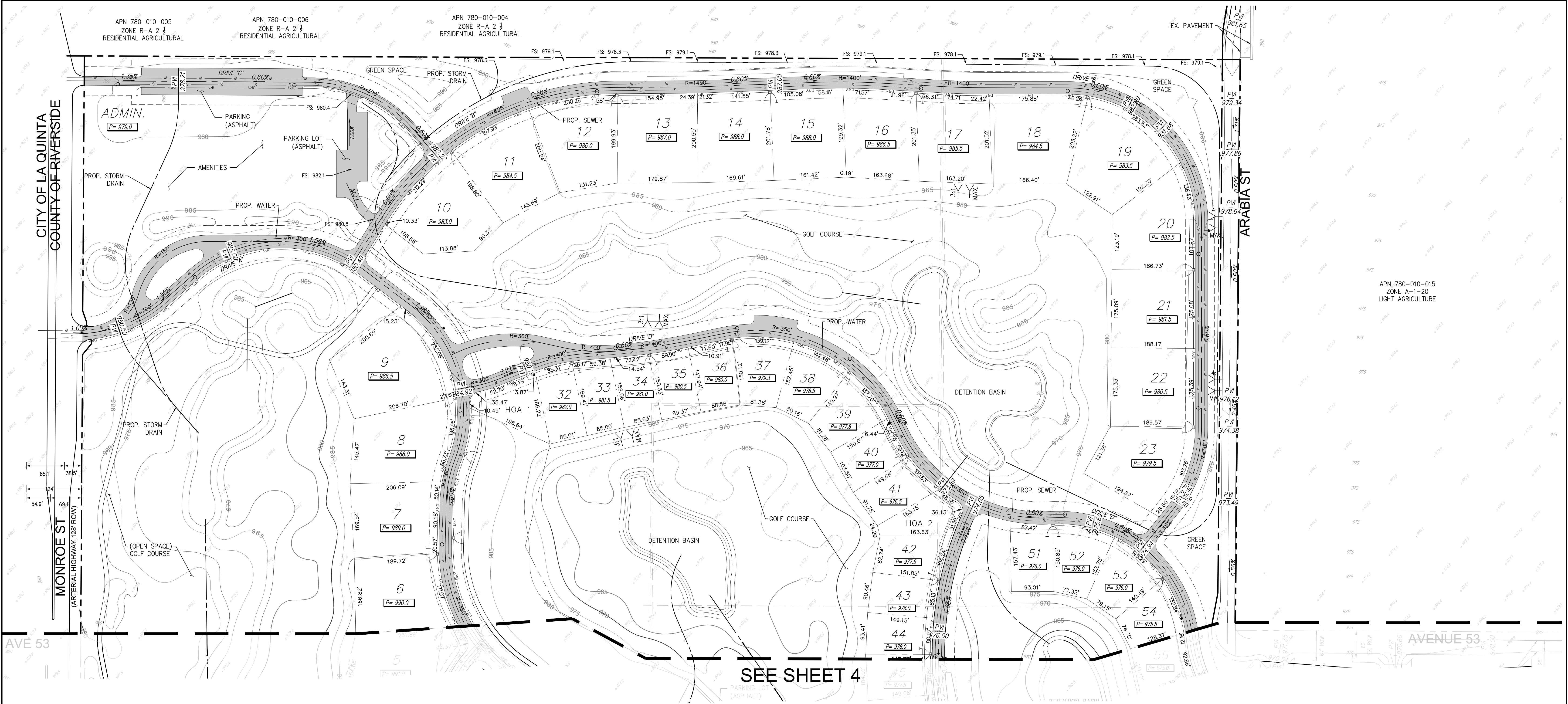
SURVEY BY:
VERTEX SURVEY
28348 Constellation Rd
SUITE 800
SANTA CLARITA, CA 91355
(661) 254-1928



1 Ada, Suite 100
Irvine, CA 92618
Phone: 949.453.0111

COUNTY OF RIVERSIDE
TENTATIVE TRACT MAP NO. 39179

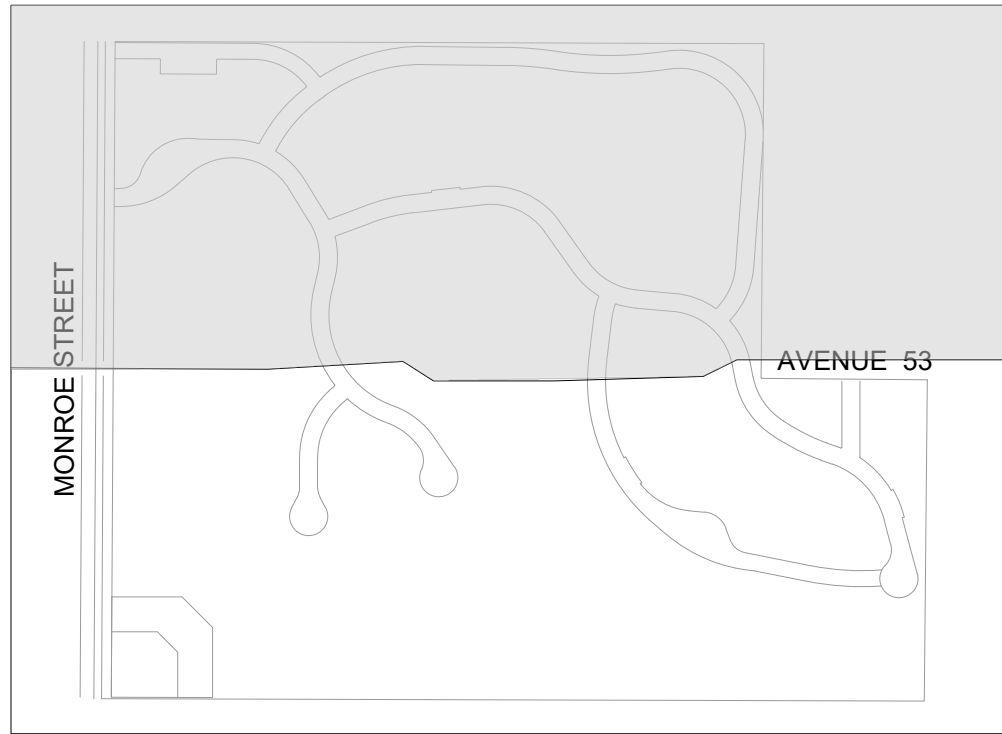
Drawn By: SM	INDEX SHEET	SHEET 2
Checked By: VW		OF 5 SHEETS
Scale:		



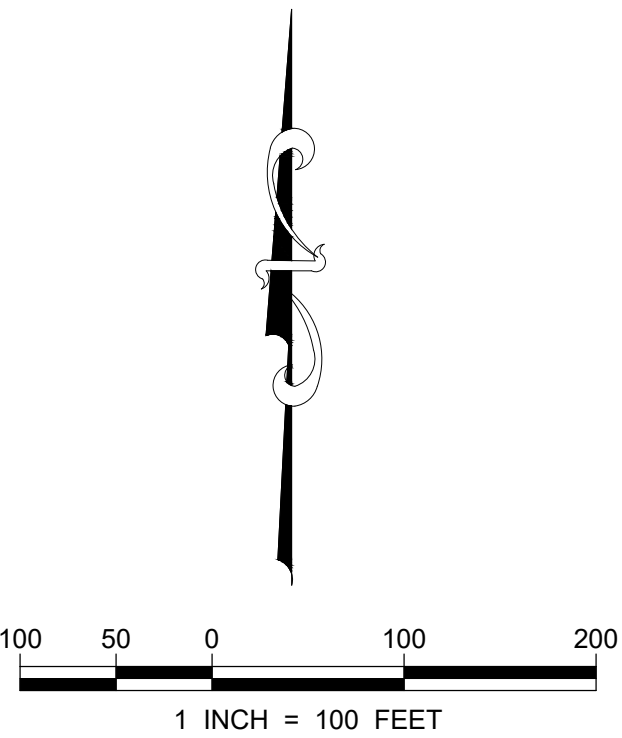
SEE SHEET 4

LEGEND

SYMBOL	DESCRIPTION
	MAJOR CONTOUR
	STANDARD ASPHALT PAVEMENT
RAW CUT: 578,000 CY	
RAW FILL: 583,000 CY	
RAW IMPORT: 5,000 CY	



VICINITY MAP
N.T.S.



REVISIONS			
DESCRIPTION	APD	REV	DATE

SURVEY BY:
VERTEX SURVEY
28348 Constellation Rd
SUITE 800
SANTA CLARITA, CA 91355
(661) 254-1928



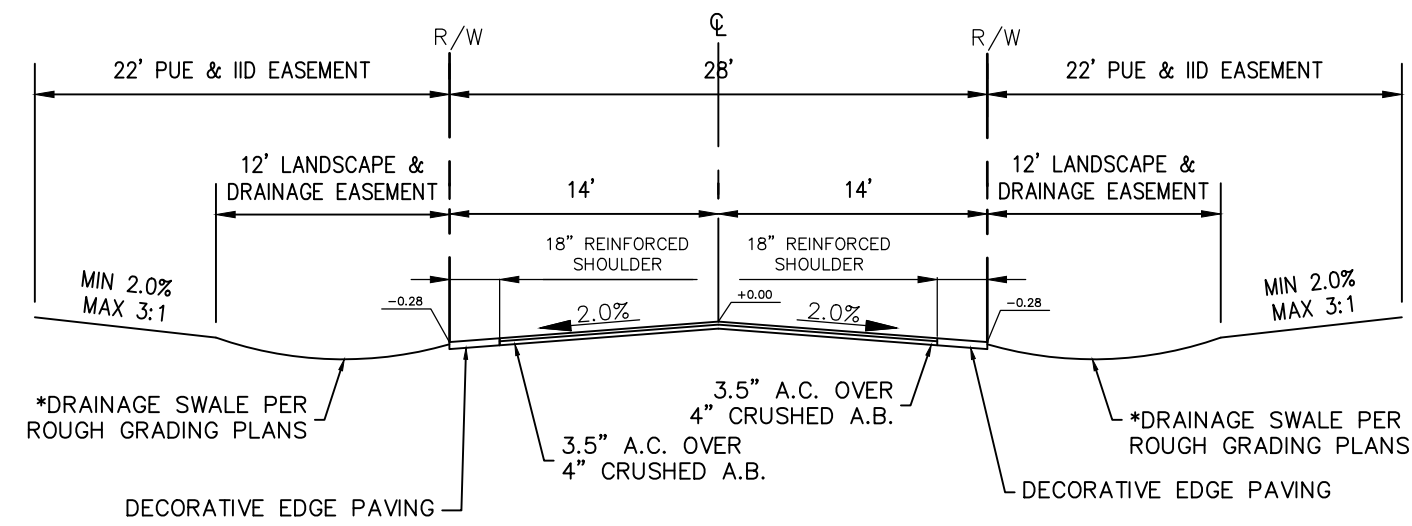
1 Ada, Suite 100
Irvine, CA 92618
Phone: 949.453.0111

COUNTY OF RIVERSIDE
TENTATIVE TRACT MAP NO. 39179

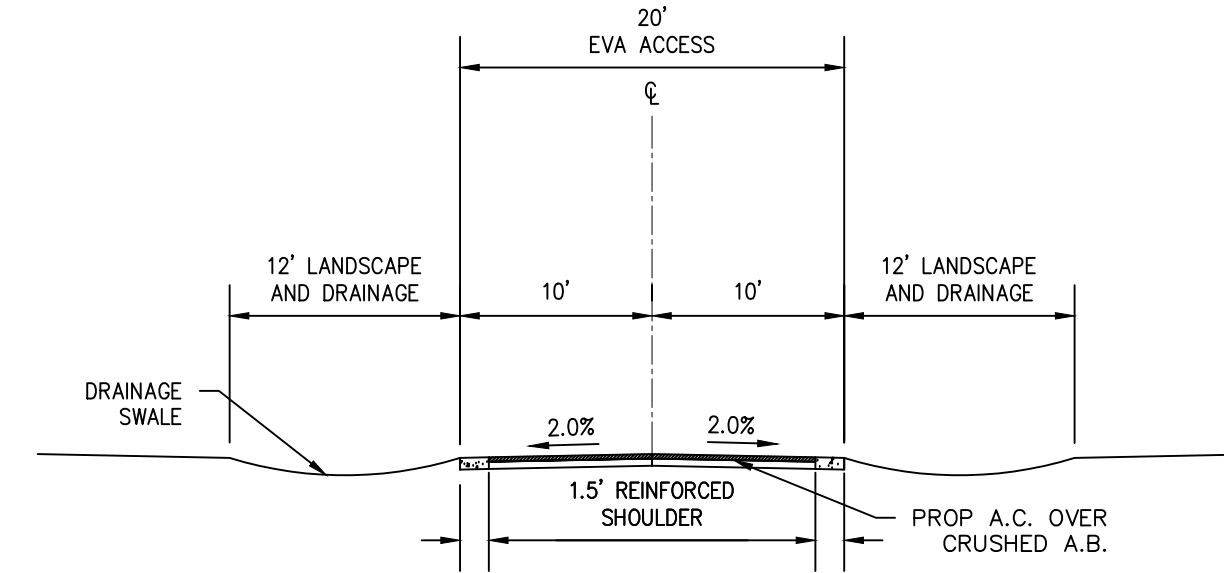
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Scale: 1"=100'

GRADING PLAN

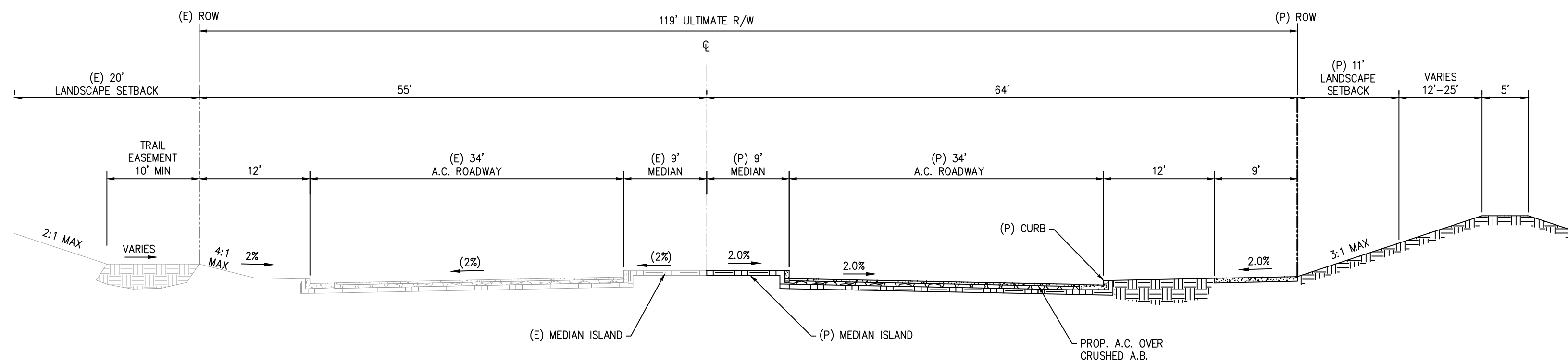
SHEET 3
OF 5 SHEETS



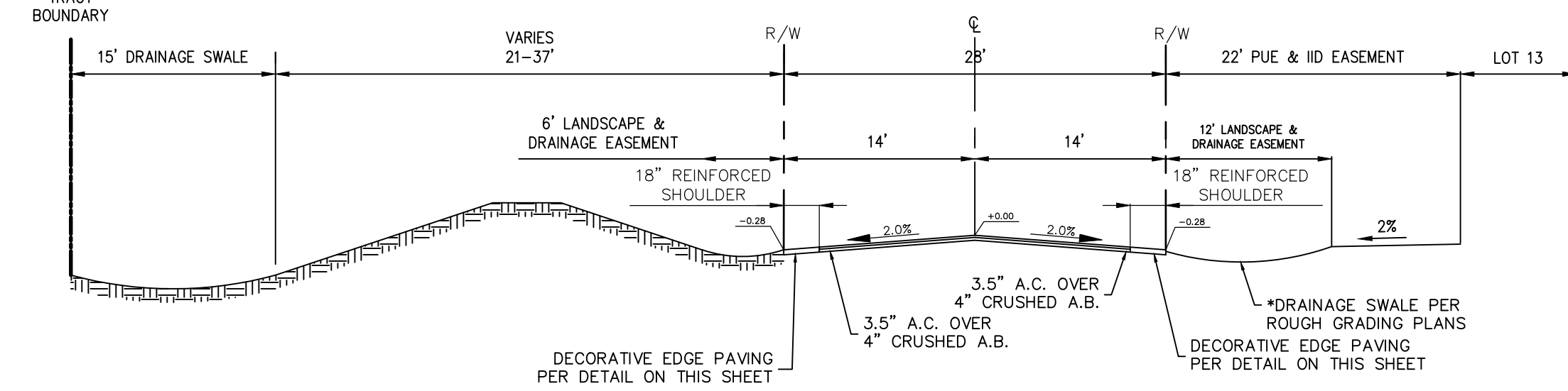
CROSS SECTION "A-A"
PRIVATE STREET
NTS



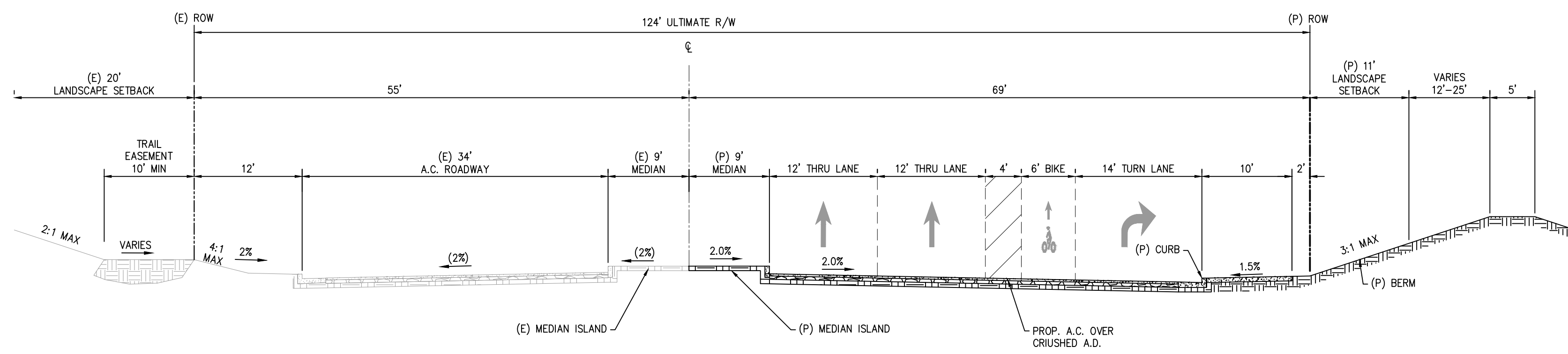
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PRIVATE STREET
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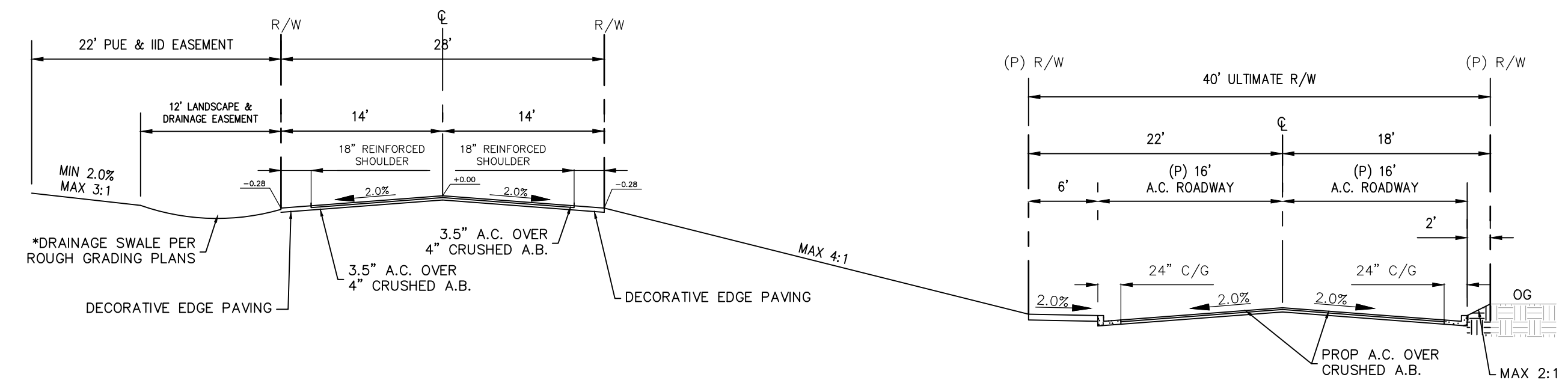
CROSS SECTION "B-B"
MONROE STREET
NTS
STA: 37+83.70



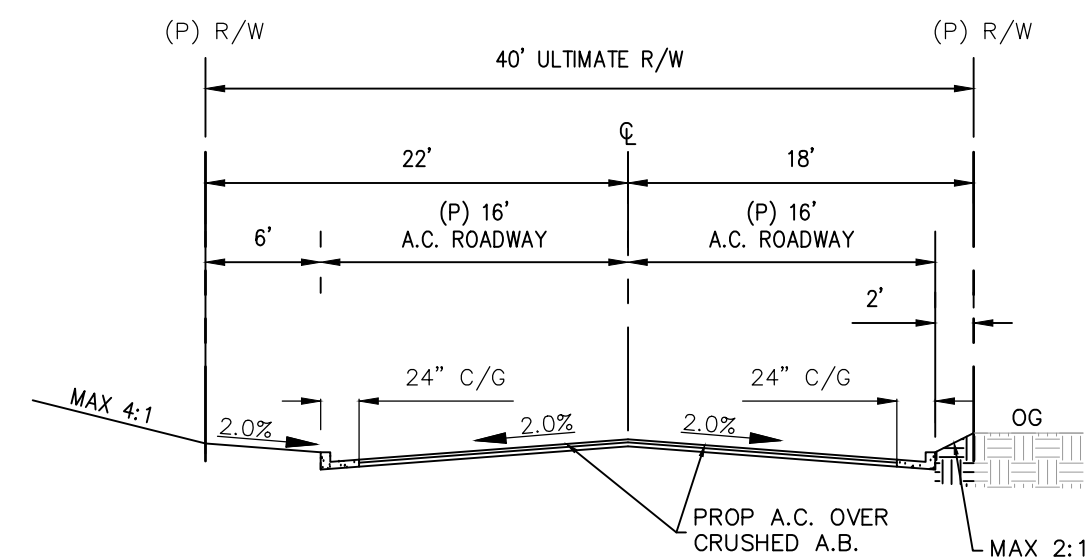
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PRIVATE STREET
NTS



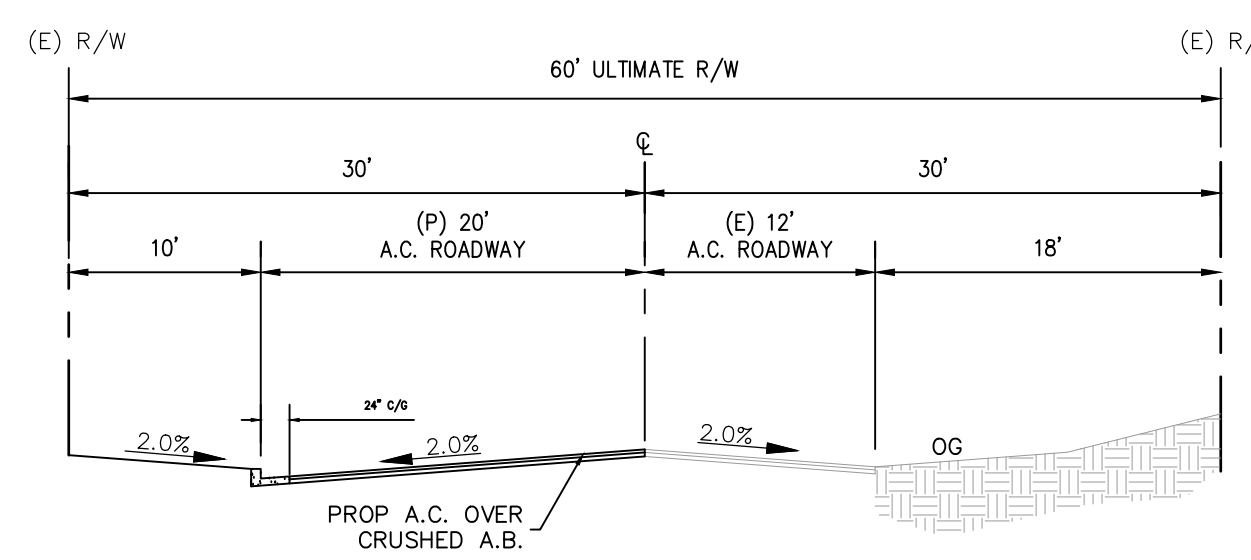
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MONROE STREET (W/ TURN LANE)
NTS
STA: 41+87.31



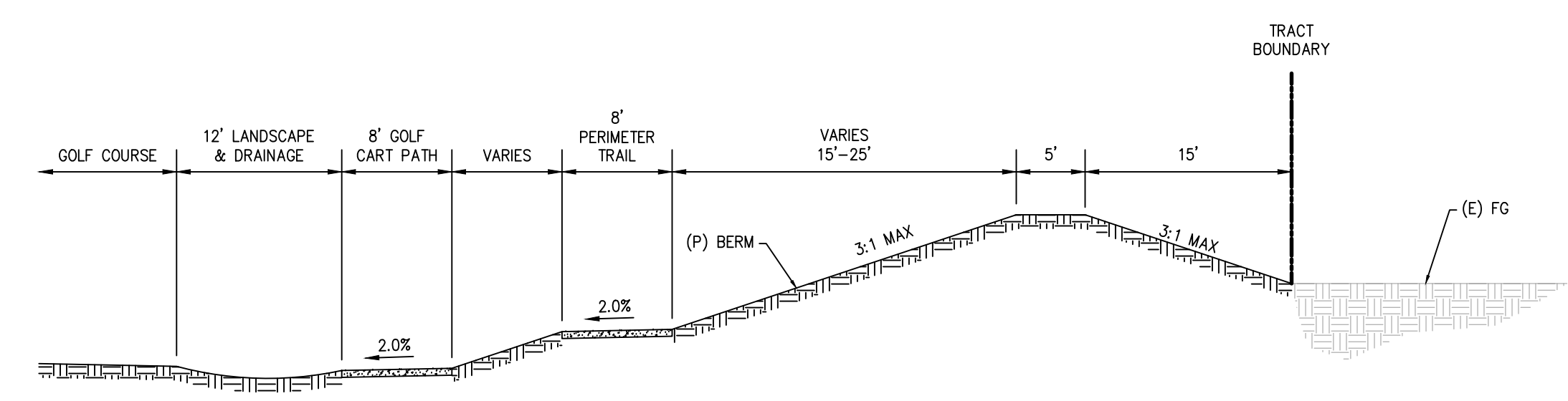
CROSS SECTION "H-H"
ARABIA STREET
NTS



CROSS SECTION "D-D"
ARABIA STREET
NTS



CROSS SECTION "E-E"
AVENUE 53
NTS



CROSS SECTION "I-I"
SOUTHERN BOUNDARY
NTS

****NOTE:** NO PARKING OR OTHER OBSTRUCTIONS (E.G. TRASH RECEPTACLES) ARE PERMITTED ON ROADS THAT ARE NARROWER THAN 32 FEET IN WIDTH.

REVISIONS			
DESCRIPTION	APD	REV	DATE

SURVEY BY:
VERTEX SURVEY
28348 Constellation Rd
SUITE 800
SANTA CLARITA, CA 91355
(661) 254-1928



1 Ada, Suite 100
Irvine, CA 92618
Phone: 949.453.0111

COUNTY OF RIVERSIDE
TENTATIVE TRACT MAP NO. 39179

Drawn By: SM
Checked By: YW
Scale:

CROSS SECTIONS SHEET 5 OF 5 SHEETS

APPENDIX F
CONCEPTUAL MASTER PLAN

LEGEND

- ① **Main Entry**
 - Guard House (± 800 SF)
- ② **Racquet Courts**
 - (1) Entry Pavilion (± 2500 SF)
 - (2) Tennis
 - (3) Padel
 - (12) Pickleball
- ③ **Kids Playground**
- ④ **Farm to Table**
 - (1) Greenhouse (± 3000 SF)
 - (1) Kitchen (± 1500 SF)
 - (1) Bar (± 300 SF)
 - (2) Restrooms (± 120 SF)
 - (1) Storage (± 150 SF)
- ⑤ **Event Barn (± 10000 SF)**
 - Golf Simulator
 - Bar
 - F&B / Grill
 - Kid's Club
- ⑥ **Conceptual Village Units (20 unit)**
- ⑦ **Event Lawn**
- ⑧ **Activity Lagoon**
 - (9) Cabanas (± 120 SF)
 - (1) Beach Club (± 850 SF)
- ⑨ **Fitness**
- ⑩ **Wellness /SPA**
- ⑪ **Starter Shack (± 1000 SF)**
- ⑫ **Short Game Area**
- ⑬ **Back of House**
 - (1) Commissary (± 2000 SF)
 - (1) Golf Course Maintenance Facility
- ⑭ **Emergency Vehicular Access (EVA)**
- ⑮ **Service Access**
- ⑯ **Secondary Entry**
- ⑰ **Community Maintenance Access**
- ⑱ **Recirculating Water Feature & Irrigation Ponds**
- ⑲ **Golf Cart Tunnel**

The Ranch At Madison		
Development Summary		
August 14, 2025		
LAND USE	PRODUCT DESCRIPTION	
Estate Lots	±0.75 AC (160' X 200')	31
Golf Cottages	± 0.30 AC (85' X 150')	34
Village Units	± 2,500 SF	20
TOTAL		85

Master Plan - Concept 10.0

THE RANCH AT MADISON

La Quinta, CA

AUGUST 14, 2025

1" = 100'-0"
 NORTH
 0 50' 100' 200'



APPENDIX G

SLADDEN (2022)

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
APN'S 780-020-001, 002, 003 & 780-010-012
MONROE STREET
LA QUINTA AREA
RIVERSIDE COUNTY, CALIFORNIA

-Prepared By-

Sladden Engineering

45090 Golf Center Parkway, Suite F
Indio, California 92201
(760) 863-0713



Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, California 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

October 17, 2022

Project No. 544-22319
22-10-613

Discovery Land Company
P.O. Box 1482
La Quinta, California 92247
Attn: Mr. Scott Birdwell

Subject: Geotechnical Investigation

Project: Proposed Residential Development
APN's 780-020-001 to 003 & 780-010-012
Monroe Street
La Quinta Area, Riverside County, California

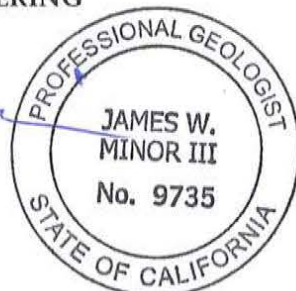
Sladden Engineering is pleased to present the results of the geotechnical investigation performed for the new residential development to be constructed on the currently vacant parcels located on the east side of Monroe Street and on the north and south side of Avenue 53 (APN's 780-020-001, 002, 003 & 780-010-012) in the La Quinta area of Riverside County, California. Our services were completed in accordance with our proposal for geotechnical engineering services dated July 1, 2022 and your authorization to proceed with the work. The purpose of our investigation was to explore the subsurface conditions at the site in order to provide recommendations for foundation design and the design of the various site improvements. Evaluation of environmental issues and hazardous wastes was not included within the scope of services provided.

The opinions, recommendations and design criteria presented in this report are based on our field exploration program, laboratory testing and engineering analyses. Based on the results of our investigation, it is our professional opinion that the proposed project should be feasible from a geotechnical perspective provided that the recommendations presented in this report are implemented in design and carried out through construction.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this report, please contact the undersigned.

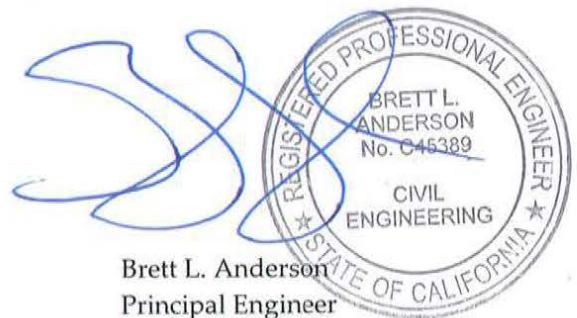
Respectfully submitted,
SLADDEN ENGINEERING

James W. Minor III
Senior Geologist



SER/jm

Copies: 2/Addressee



Brett L. Anderson
Principal Engineer

GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
APN'S 780-020-001, 002, 003 & 780-010-012
MONROE STREET
LA QUINTA AREA
RIVERSIDE COUNTY, CALIFORNIA

TABLE OF CONTENTS

INTRODUCTION.....	1
PROJECT DESCRIPTION.....	1
SCOPE OF SERVICES.....	2
SITE CONDITIONS.....	2
GEOLOGIC SETTING	3
SUBSURFACE CONDITIONS.....	3
SEISMICITY AND FAULTING	4
SITE-SPECIFIC GROUND MOTION PARAMETERS	5
GEOLOGIC HAZARDS	5
CONCLUSIONS	7
EARTHWORK AND GRADING	7
Site Clearing	7
Preparation of Building Areas.....	8
Compaction	8
Shrinkage and Subsidence	9
CONVENTIONAL SHALLOW SPREAD FOOTINGS	9
SLABS-ON-GRADE	9
RETAINING WALLS.....	10
CORROSION SERIES.....	10
UTILITY TRENCH BACKFILL.....	11
EXTERIOR CONCRETE FLATWORK	11
DRAINAGE.....	11
LIMITATIONS	12
ADDITIONAL SERVICES.....	12
REFERENCES	13

FIGURES -	Site Location Map
	Regional Geologic Map
	Borehole Location Photograph
	Conceptual Master Plan

APPENDIX A -	Field Exploration
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APPENDIX B-	Laboratory Testing
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APPENDIX C-	Site-Specific Ground Motion Parameters
	Seismic Design Maps

INTRODUCTION

This report presents the results of the geotechnical investigation performed by Sladden Engineering (Sladden) for the new residential development to be constructed on the currently vacant parcels located on the east side of Monroe Street and on the north and south side of Avenue 53 (APN's 780-020-001, 002, 003 & 780-010-012) in the La Quinta area of Riverside County, California. The site is located at approximately 33.6626 degrees north longitude and 116.2296 degrees west longitude. The approximate location of the site is indicated on the Site Location Map (Figure 1).

Our investigation was conducted in order to evaluate the engineering properties of the subsurface materials, to evaluate their *in-situ* characteristics, and to provide engineering recommendations and design criteria for site preparation, foundation design and the design of various site improvements. This study also includes a review of published and unpublished geotechnical and geological literature regarding seismicity at and near the subject site.

PROJECT DESCRIPTION

Based on the provided Conceptual Master Plan, it is our understanding that the proposed project will consist of constructing 31 new residences on the subject property. In addition, the proposed project will also include a lagoon with a beach, a barn, a racquet club and a golf practice range. For our analyses we expect that the proposed residences will be of relatively lightweight wood-frame construction supported on conventional shallow spread footings and concrete slabs-on-grade.

Based on the relatively level nature of the site, Sladden expects that grading will be limited to minor cuts and fills in order to accomplish the desired elevations and to provide adequate gradients for site drainage. This does not include the removal and re-compaction of the loose compressible near surface soil within the proposed building pad areas. Upon completion of precise grading plans, Sladden should be retained in order to verify that the recommendations presented within in this report are properly incorporated into the design of the proposed project.

Structural foundation loads were not available at the time of this report. Based on our experience with relatively lightweight structures, we expect that isolated column loads will be less than 20 kips and continuous wall loads will be less than 2.0 kips per linear foot. If these assumed loads vary significantly from the actual loads, we should be consulted to verify the applicability of the recommendations provided.

SCOPE OF SERVICES

The purpose of our investigation was to determine specific engineering characteristics of the surface and near surface soil in order to develop foundation design criteria and recommendations for site preparation. Specifically, our site characterization consisted of the following tasks:

- Site reconnaissance to assess the existing surface conditions on and adjacent to the site.
- Drilling ten (10) exploratory boreholes to depths of approximately 5 to 51 feet bgs in order to characterize the subsurface soil conditions. Representative samples of the soil were classified in the field and retained for laboratory testing and engineering analyses.
- Performing laboratory testing on selected samples to evaluate their engineering characteristics.
- Reviewing geologic literature and discussing geologic hazards.
- Performing site-specific ground motion procedures for the subject property.
- Performing engineering analyses to develop recommendations for foundation design and site preparation.
- The preparation of this report summarizing our work at the site.

SITE CONDITIONS

The subject property is located on the east side of Monroe Street between Avenue 52 and Avenue 54 in the La Quinta area of Riverside County, California. The property is formally identified by the County of Riverside as APN's 780-020-001, 780-020-002, 780-020-003 and 780-010-012 and occupies a total area of approximately 135.04 acres. At the time of our investigation, the ground surface appeared to have been recently disked. A concrete slab was observed within the southern portion of the property. Three (3) irrigation ponds were observed near the northwest corner, the southern side and the northeast corner of the property. CVWD irrigation standpipes were observed along the northern side of the property. Ongoing farming operations were evident within the eastern portion of the property. Avenue 53 transects the subject property in the east to west direction. The site is generally level throughout and near the elevation of the adjacent properties and streets. The site is bounded by a date palm tree orchard on the north, by agricultural property on the east, by residential property on the south and by Monroe Street on the west.

Based on our review of the La Quinta 7.5-Minute Quadrangle Map (USGS, 2018), the site is situated at an approximate elevation of 30 feet below mean sea level (MSL).

No natural ponding of water or surface seeps were observed at or near the sites during our investigation conducted on August 9, 2022. Site drainage appears to be controlled via sheet flow and surface infiltration. Regional drainage is provided by the Whitewater River to the north of the project site.

GEOLOGIC SETTING

The project site is located within the Colorado Desert Physiographic Province (also referred to as the Salton Trough) that is characterized as a northwest-southeast trending structural depression extending from the Gulf of California to the Banning Pass. The Salton Trough is dominated by several northwest trending faults, most notably the San Andreas Fault system. The Salton Trough is bounded by the Santa Rosa – San Jacinto Mountains on the southwest, the San Bernardino Mountains on the north, the Little San Bernardino - Chocolate – Orocochia Mountains on the east and extends through the Imperial Valley into the Gulf of California on the south.

A relatively thick sequence (20,000 feet) of sediment has been deposited in the Coachella Valley portion of the Salton Trough from Miocene to present times. These sediments are predominately terrestrial in nature with some lacustrine (lake) and minor marine deposits. The major contributor of these sediments has been the Colorado River. The mountains surrounding the Coachella Valley are composed primarily of Precambrian metamorphic and Mesozoic “granitic” rock.

The Salton Trough is an internally draining area with no readily available outlet to Gulf of California and with portions well below sea level (-253’ msl). The region is intermittently blocked from the Gulf of California by the damming effects of the Colorado River delta (current elevation +30’msl). Between about 300AD and 1600 AD (to 1700) the Salton Trough has been inundated by the River’s water, forming ancient Lake Cahuilla (max. elevation +58’ msl). Since that time the floor of the Trough has been repeatedly flooded with other “fresh” water lakes (1849, 1861, and 1891), the most recent and historically long lived being the current Salton Sea (1905). The sole outlet for these waters is evaporation, leaving behind vast amounts of terrestrial sediment materials and evaporite minerals.

The site has been mapped by Rogers (1965) to be immediately underlain by Quaternary-age alluvium (Qal) and lake deposits (Ql). The regional geologic setting for the site vicinity is presented on the Regional Geologic Map (Figure 2).

SUBSURFACE CONDITIONS

The subsurface conditions at the site were investigated by drilling ten (10) exploratory boreholes on the property to depths between approximately 5 to 51 feet bgs. The approximate locations of the boreholes are illustrated on the Borehole Location Photograph (Figure 3). The boreholes were advanced using a truck-mounted Mobile B-61 drill-rig equipped with 8-inch outside diameter hollow stem augers. A representative of Sladden was on-site to log the materials encountered and retrieve samples for laboratory testing and engineering analysis.

During our field investigation, a thin mantle of artificial fill/disturbed soil was encountered to a depth of approximately three (3) feet bgs. Underlying the fill soil and extending to the maximum depths explored, native alluvium was encountered. The native soil throughout the site consists primarily of fine-grained sand/silty sand (SP/SM) and sandy clay (CL/CH) encountered throughout the depth of our bores. Generally, granular soil was found to be slightly moist to moist, loose to dense and grayish brown in in-situ color. Cohesive layers was found to be moist to wet, soft to stiff, olive brown in in-situ color and exhibited medium to high plasticity characteristics.

The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and tests of the field samples. The final logs are included in Appendix A of this report. The stratification lines represent the approximate boundaries between soil types although the transitions may be gradual and variable across the site.

Groundwater was not encountered at the maximum explored depth of 51 feet bgs during our field investigation. Based upon the depth to groundwater in the project vicinity (CDWR, 2022), it is our opinion that groundwater should not be a factor in the design or construction of the proposed project.

SEISMICITY AND FAULTING

The southwestern United States is a tectonically active and structurally complex region, dominated by northwest trending dextral faults. The faults of the region are often part of complex fault systems, composed of numerous subparallel faults which splay or step from main fault traces. Strong seismic shaking could be produced by any of these faults during the design life of the proposed project.

We consider the most significant geologic hazard to the project to be the potential for moderate to strong seismic shaking that is likely to occur during the design life of the project. The proposed project is located in the highly seismic Southern California region within the influence of several fault systems that are considered to be active or potentially active. An active fault is defined by the State of California as a "sufficiently active and well defined fault" that has exhibited surface displacement within the Holocene epoch (about the last 11,000 years). A potentially active fault is defined by the State as a fault with a history of movement within Pleistocene time (between 11,000 and 1.6 million years ago).

As previously stated, the site has been subjected to strong seismic shaking related to active faults that traverse through the region. Some of the more significant seismic events near the subject site within recent times include: M6.0 North Palm Springs (1986), M6.1 Joshua Tree (1992), M7.3 Landers (1992), M6.2 Big Bear (1992), M7.1 Hector Mine (1999), and M7.1 Ridgecrest (2019).

Table 2 lists the closest known potentially active faults that was generated in part using fault parameters from The Revised 2002 California Probabilistic Seismic Hazard Maps (Cao et al, 2003) and the Fault and Fold Database of the United States (USGS, 2021a). This table does not identify the probability of reactivation or the on-site effects from earthquakes occurring on any faults in the region.

TABLE 1
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance (Km)	Maximum Event
San Andreas - Coachella	8.9	7.2
San Andreas - Southern	8.9	7.2
San Jacinto - Anza	32.5	6.5
Burnt Mountain	34.2	6.4
San Jacinto - Coyote Creek	34.4	7.2
Eureka Peak	35.3	7.5
San Andreas - San Bernardino	37.0	6.8

SITE SPECIFIC GROUND MOTION PARAMETERS

Sladden has reviewed the 2019 California Building Code (CBC) and ASCE7-16 and developed site specific ground motion parameters for the subject site. The project Seismic Design Maps and site-specific ground motion parameters are summarized in the following table and included within Appendix C. The project Structural Engineer should verify that all design parameters provided are applicable for the subject project.

TABLE 2
GROUND MOTION PARAMETERS

Latitude / Longitude	33.6626/ -116.2296
Risk Category	II
Site Class	D
Code Reference Documents	ASCE 7-16; Chapter 11 & 21

Description	Type	Map Based	Site-Specific
MCE _R Ground Motion (0.2 second period)	S _s	1.595	---
MCE _R Ground Motion (1.0 second period)	S ₁	0.656	---
Site-Modified Spectral Acceleration Value	S _{MS}	1.595	1.786
Site-Modified Spectral Acceleration Value	S _{M1}	null	1.549
Numeric Seismic Design Value at 0.2 second SA	S _{DS}	1.063	1.190
Numeric Seismic Design Value at 1.0 second SA	S _{D1}	null	1.033
Site Amplification Factor at 0.2 second	F _a	1.0	1.0
Site Amplification Factor at 1.0 second	F _v	null	2.5
Site Peak Ground Acceleration	PGAM	0.767	0.689

GEOLOGIC HAZARDS

The subject site is located in an active seismic zone and will likely experience strong seismic shaking during the design life of the proposed project. In general, the intensity of ground shaking will depend on several factors including; the distance to the earthquake focus, the earthquake magnitude, the response characteristics of the underlying materials, and the quality and type of construction. Geologic hazards and their relationship to the site are discussed below.

- I. Surface Rupture. Surface rupture is expected to occur along preexisting, known active fault traces. However, surface rupture could potentially splay or step from known active faults or rupture along unidentified traces. Based on our review of Rogers (1965), Jennings (1994), and CDOC (2022) known active faults are not mapped on the site. In addition, no signs of active surface faulting were observed during our review of non-stereo digitized photographs of the site and site vicinity (Google Earth, 2022). Finally, no signs of active surface fault rupture or secondary seismic effects (lateral spreading, lurching etc.) were identified during our field investigation. Therefore, it is our opinion that risks associated with primary surface ground rupture should be considered "low".

- II. Ground Shaking. The site has been subjected to past ground shaking by faults that traverse through the region. Strong seismic shaking from nearby active faults is expected to produce strong seismic shaking during the design life of the proposed project. Based on site-specific ground motion parameters developed for the property (Appendix C), the site modified peak ground acceleration (PGAm) is estimated to be 0.689g.
- III. Liquefaction. Liquefaction is the process in which loose, saturated granular soil loses strength as a result of cyclic loading. The strength loss is a result of a decrease in granular sand volume and a positive increase in pore pressures. Generally, liquefaction can occur if all of the following conditions apply; liquefaction-susceptible soil, groundwater within a depth of 50 feet or less, and strong seismic shaking. Based on the depth to groundwater in the project vicinity, risks associated with liquefaction are considered "negligible".
- IV. Tsunamis and Seiches. Because the site is situated at an inland location and is not immediately adjacent to any impounded bodies of water, risks associated with tsunamis and seiches are considered "negligible".
- V. Slope Failure, Landsliding, Rock Falls. Slope instability in the form of landslides and rock falls were not observed at or near the subject site. The site is situated on relatively flat ground and is not located immediately adjacent to any slopes. As such, risks associated with slope instability (landslides, mass wasting and rock falls) are considered "negligible".
- VI. Expansive Soil. Generally, the near surface soil consists of silty sand (SM). Based on the results of our laboratory testing (EI=0 & EI=1 for BH-1 & BH-8, respectively), the materials underlying the site are considered to be "Non Expansive".
- VII. Static Settlement. Static settlement resulting from the anticipated foundation loads should be tolerable provided that the recommendations included in this report are considered in foundation design and construction. The ultimate static settlement is expected to be less than 1 inch when using the recommended allowable bearing pressures. As a practical matter, differential static settlement between footings can be assumed as one-half of the total static settlement.
- VIII. Subsidence. Land subsidence can occur in valleys where aquifer systems have been subjected to extensive groundwater pumping, such that groundwater pumping exceeds groundwater recharge. Generally, pore water reduction can result in a rearrangement of skeletal grains and could result in elastic (recoverable) or inelastic (unrecoverable) deformation of an aquifer system. Locally, no fissures or other surficial evidence of subsidence were observed at or near the subject site.
- IX. Debris Flows. Debris flows are viscous flows consisting of poorly sorted mixtures of sediment and water and are generally initiated on slopes steeper than approximately six horizontal to one vertical (6H:1V) (Boggs, 2001). Based on the flat nature of the site and the composition of the surface soil, we judge that risks associated with debris flows should be considered "negligible".

- X. Flooding and Erosion. No signs of flooding or erosion were observed during our field investigation. Risks associated with flooding and erosion should be evaluated and mitigated by the project design Civil Engineer.

CONCLUSIONS

Based on the results of our investigation, it is our professional opinion that the project should be feasible from a geotechnical perspective provided that the recommendations included in this report are incorporated into design and carried out through construction. The main geotechnical concerns are the presence of artificial fill soil and the loose and potentially compressible near surface native soil throughout the project site.

We recommend that remedial work within the proposed building areas include over-excavation and re-compaction of the primary foundation bearing soil to provide uniform foundation support and to help mitigate potential differential settlements. Specific recommendations for foundation area preparation are presented in the Earthwork and Grading section of this report.

Caving did occur to varying degrees within each of our exploratory bores and the surface soil may be susceptible to caving within deeper excavations. All excavations should be constructed in accordance with the normal CalOSHA excavation criteria. Based on our observations of the materials encountered, we anticipate that the subsoil will conform to that described by CalOSHA as Type C. Soil conditions should be verified in the field by a "Competent person" employed by the Contractor.

The following recommendations present more detailed design criteria that have been developed based on our field and laboratory investigation.

EARTHWORK AND GRADING

All earthwork including excavation, backfill and preparation of the primary foundation and/or slab bearing soil should be performed in accordance with the geotechnical recommendations presented in this report and portions of the local regulatory requirements, as applicable. All earthwork should be performed under the observation and testing of a qualified soil engineer. The following geotechnical engineering recommendations for the proposed project are based on observations from the field investigation program, laboratory testing and geotechnical engineering analyses.

- a. Site Clearing: Areas to be graded should be cleared of vegetation, associated root systems, underground utilities and debris. All areas scheduled to receive fill should be cleared of old fills and any irreducible matter. The strippings should be removed off-site, or stockpiled for later use in landscape areas. Voids left by obstructions should be properly backfilled in accordance with the compaction recommendations of this report.

- b. Preparation of the Building Areas. In order to provide firm and uniform foundation bearing conditions, we recommend over-excavation and re-compaction throughout the proposed building areas. All artificial fill soil and native low density near surface native soil should be removed to a depth of at least 5 feet below existing grade or 4 feet below the bottom of the footings, whichever is deeper. Remedial grading should extend laterally, a minimum of five feet beyond the building limits. The native soil exposed by over-excavation should be scarified, moisture conditioned to near optimum moisture content and compacted to at least 90 percent relative compaction prior to fill placement. The previously removed soil may then be replaced as compacted engineered soil in accordance with the recommendations below.
- c. Compaction: Soil to be used as engineered fill should be free of organic material, debris, and other deleterious substances. All fill material should be placed in thin lifts, not exceeding six inches in a loose condition. If import fill is required, the material should be of a low to non-expansive nature and should meet the following criteria:

Plastic Index	Less than 12
Liquid Limit	Less than 35
Percent Soil Passing #200 Sieve	Between 15% and 35%
Maximum Aggregate Size	3 inches

The subgrade and all fill should be compacted with acceptable compaction equipment, to at least 90 percent relative compaction. The bottom of the exposed subgrade should be observed by a representative of Sladden Engineering prior to fill placement. Compaction testing should be performed on all lifts in order to ensure proper placement of the fill materials. Table 3 provides a summary of the excavation and compaction recommendations.

TABLE 3
SUMMARY OF RECOMMENDATIONS

*Remedial Grading	Over-excavation and re-compaction within the building envelope and extending laterally for 5 feet beyond the building limits and to a minimum of 5 feet below existing grade or 4 feet below the bottom of the footings, whichever is deeper.
Native / Import Engineered Fill	Place in thin lifts not exceeding 6 inches in a loose condition, at near optimum moisture content and compact to a minimum of 90 percent relative compaction.
Asphalt Concrete Sections	Compact the top 12 inches to at least 95 percent compaction at near optimum moisture content.

*Actual depth may vary and should be determined by a representative of Sladden Engineering in the field during construction.

- d. Shrinkage and Subsidence: Volumetric shrinkage of the material that is excavated and replaced as controlled compacted fill should be anticipated. We estimate that this shrinkage should be between 10 and 20 percent. Subsidence of the surfaces that are scarified and compacted should be between 1 tenth and 3 tenths of a foot. This will vary depending upon the type of equipment used, the moisture content of the soil at the time of grading and the actual degree of compaction attained.

CONVENTIONAL SHALLOW SPREAD FOOTINGS

Conventional shallow spread footings are expected to provide adequate support for the proposed residential structures. All footings should be founded upon properly compacted engineered fill soil and should have a minimum embedment depth of 12 inches measured from the lowest adjacent finished grade. Continuous and isolated footings should have minimum widths of 12 inches and 24 inches, respectively. Continuous and isolated footings supported upon properly compacted engineered fill soil may be designed using allowable (net) bearing pressures of 1800 and 2000 pounds per square foot (psf), respectively. Allowable increases of 200 psf for each additional 1 foot of width and 250 psf for each additional 6 inches of depth may be used if desired. The maximum allowable bearing pressure should be 3000 psf. The allowable bearing pressures apply to combined dead and sustained live loads. The allowable bearing pressures may be increased by one-third when considering transient live loads, including seismic and wind forces.

Based on the recommended allowable bearing pressures, the total static settlement of the shallow footings is anticipated to be less than one-inch provided foundation preparations conform to the recommendations described in this report. Static differential settlement is anticipated to be approximately one-half of the total settlement for similarly loaded footings spaced up to approximately 40 feet apart.

Lateral load resistance for the spread footings will be developed by passive pressure against the sides of the footings below grade and by friction acting at the base of the footings. An allowable passive pressure of 250 psf per foot of depth may be used for design purposes. An allowable coefficient of friction 0.45 may be used for dead and sustained live loads to compute the frictional resistance of the footing placed directly on compacted fill. Under seismic and wind loading conditions, the passive pressure and frictional resistance may be increased by one-third.

All footing excavations should be observed by a representative of the project geotechnical consultant to verify adequate embedment depths prior to placement of forms, steel reinforcement or concrete. The excavations should be trimmed neat, level and square. All loose, disturbed, sloughed or moisture-softened soils and/or any construction debris should be removed prior to concrete placement. All footings should be reinforced in accordance with the project Structural Engineer's recommendations.

SLABS-ON-GRADE

In order to provide uniform and adequate support, concrete slabs-on-grade must be placed on properly compacted engineered fill soil as outlined in the previous sections of this report. The slab subgrade should remain near optimum moisture content and should not be permitted to dry prior to concrete placement. Slab subgrade should be firm and unyielding. Disturbed soil should be removed and replaced with engineered fill soil compacted to a minimum of 90 percent relative compaction.

Slab thickness and reinforcement should be determined by the Structural Engineer. We recommend a minimum slab thickness of 4.0 inches and minimum reinforcement of #3 bars at 18 inches on center in both directions. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height. Final floor slab design and reinforcement should be determined by the Structural Engineer.

Slabs with moisture sensitive surfaces should be underlain with a moisture vapor retarder consisting of a polyvinyl chloride membrane such as 10-mil visqueen, or equivalent. All laps within the membrane should be sealed and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface can not be achieved by grading, consideration should be given to placing a 1-inch thick leveling course of sand across the pad surface prior to placement of the membrane.

RETAINING WALLS

Minor retaining walls may be necessary to complete the proposed construction. Cantilever retaining walls may be designed using "active" pressures. Active pressures may be estimated using an equivalent fluid weight of 35 pcf for level native backfill soil acting in a triangular pressure distribution with drained backfill conditions. "At Rest" pressures should be utilized for restrained walls. At rest pressures may be estimated using an equivalent fluid weight of 55 pcf for native backfill soil with level drained backfill conditions.

We recommend that a back drain system be provided behind all retaining walls or that the walls be designed for full hydrostatic pressures. The back drains should consist of a heavy walled, four inch diameter, perforated pipe sloped to drain to outlets by gravity, and of clean, free-draining, three-quarter to one and one-half inch crushed rock or gravel. The crushed rock or gravel should extend to within one foot of the surface. The upper one foot should be backfilled with compacted, fine-grained soil to exclude surface water. A Mirafi 140N (or equivalent) filter cloth should be placed between the on-site native material and the drain rock.

We recommend that the ground surface behind retaining walls be sloped to drain. Under no circumstances should the surface water be diverted into back drains. Where migration of moisture through walls would be detrimental, the walls should be waterproofed.

CORROSION SERIES

The soluble sulfate concentrations of the surface soil were determined to be 80 & 40 parts per million (ppm) for BH-1 & BH-8, respectively. The soil is considered to have a "negligible-S0" corrosion potential with respect to concrete. The use of Type V cement and special sulfate resistant concrete mixes may not be necessary. The soluble sulfate content of the surface soil should be reevaluated after grading and appropriate concrete mix designs should be established based upon post-grading test results.

The pH level of the surface soil was 8.7 & 9.1 for BH-1 & BH-8, respectively. Based on soluble chloride concentration testing (80 & 50 ppm for BH-1 & BH-8, respectively) the soil is considered to have "negligible" corrosive potential with respect to normal grade steel. The minimum resistivity of the surface soil was found to be 3,600 & 4,600 ohm-cm for BH-1 & BH-8, respectively that suggests the site soil is considered to have "moderate" corrosion potential with respect to ferrous metal installations. A corrosion expert should be consulted regarding appropriate corrosion protection measures for corrosion sensitive installations.

UTILITY TRENCH BACKFILL

All utility trench backfill should be compacted to a minimum of 90 percent relative compaction. Trench backfill materials should be placed in lifts no greater than six inches in a loose condition, moisture conditioned (or air-dried) as necessary to achieve near optimum moisture content, and mechanically compacted to a minimum of 90 percent relative compaction. A representative of the project soil engineer should test the backfill to verify adequate compaction.

EXTERIOR CONCRETE FLATWORK

In order to provide uniform support and minimize settlement related cracking of concrete flatwork, the subgrade soil within concrete flatwork areas should be compacted to a minimum of 90 percent relative compaction. A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soil prior to concrete placement.

DRAINAGE

All final grades should be provided with positive gradients away from foundations to provide rapid removal of surface water runoff to an adequate discharge point. No water should be allowed to be pond on or immediately adjacent to foundation elements. In order to reduce water infiltration into the subgrade soil, surface water should be directed away from building foundations to an adequate discharge point. Subgrade drainage should be evaluated upon completion of the precise grading plans and in the field during grading.

LIMITATIONS

The findings and recommendations presented in this report are based upon an interpolation of the soil conditions between the exploratory bore locations and extrapolation of these conditions throughout the proposed building areas. Should conditions encountered during grading appear different than those indicated in this report, this office should be notified.

The use of this report by other parties or for other projects is not authorized. The recommendations of this report are contingent upon monitoring of the grading operation by a representative of Sladden Engineering. All recommendations are considered to be tentative pending our review of the grading operation and additional testing, if indicated. If others are employed to perform any soil testing, this office should be notified prior to such testing in order to coordinate any required site visits by our representative and to assure indemnification of Sladden Engineering.

We recommend that a pre-job conference be held on the site prior to the initiation of site grading. The purpose of this meeting will be to ensure a complete understanding of the recommendations presented in this report as they apply to the actual grading performed.

ADDITIONAL SERVICES

Once completed, final project plans and specifications should be reviewed by use prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. Following review of plans and specifications, observation should be performed by the Soil Engineer during construction to document that foundation elements are founded on/or extend into the properly compacted soil, and that suitable backfill soil is placed upon competent materials and properly compacted at the recommended moisture content.

Tests and observations should be performed during grading by the Soil Engineer or his representative in order to verify that the grading is being performed in accordance with the project specifications. Field density testing shall be performed in accordance with acceptable ASTM test methods. The minimum acceptable degree of compaction should be 90 percent for engineered fill soil and 95 percent for Class II aggregate base as obtained by ASTM Test Method D1557. Where testing indicates insufficient density, additional compactive effort shall be applied until retesting indicates satisfactory compaction.

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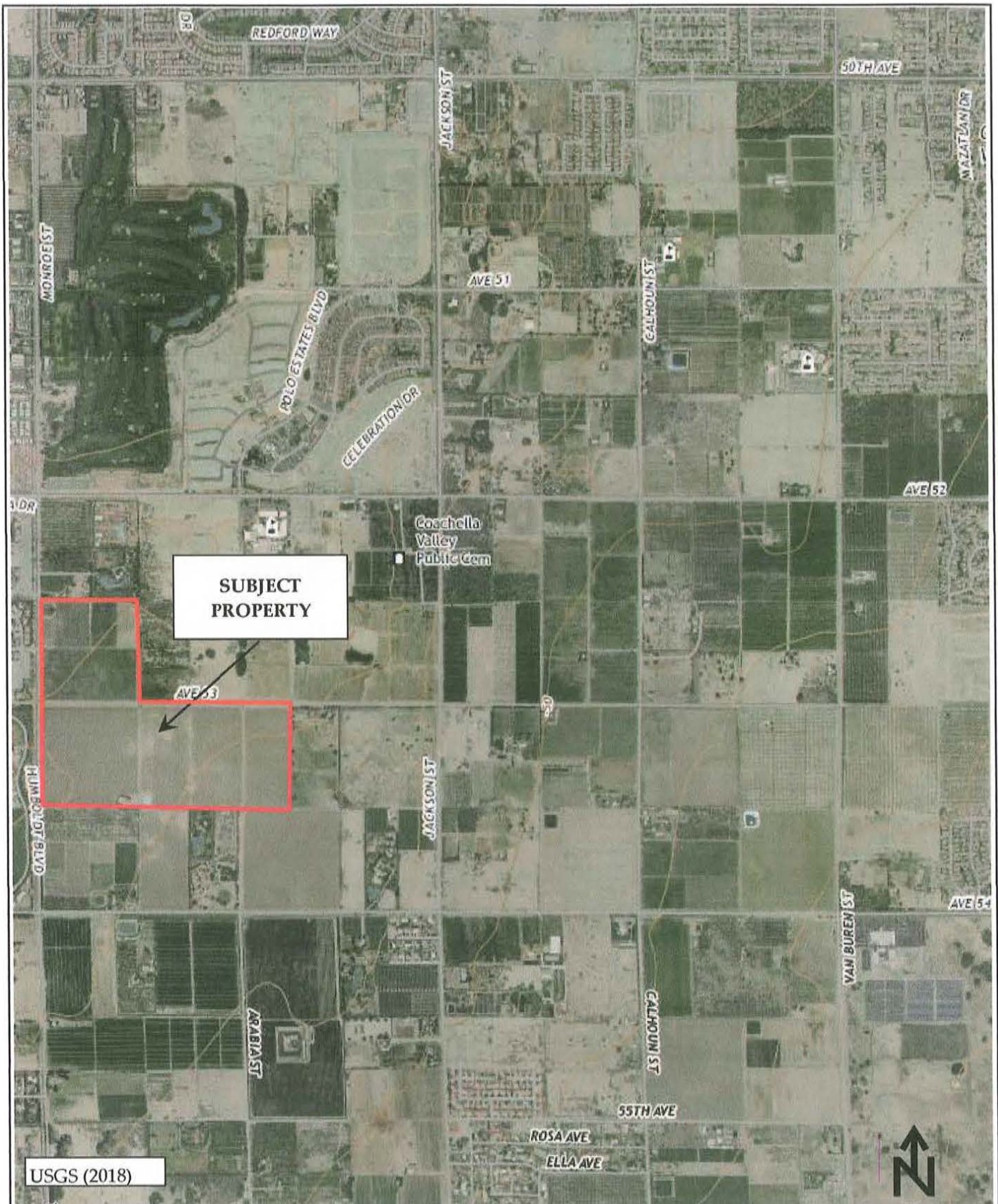
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FIGURES

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
BOREHOLE LOCATION PHOTOGRAPH
CONCEPTUAL MASTER PLAN



SITE LOCATION MAP

FIGURE

1



Sladden Engineering

Project Number:

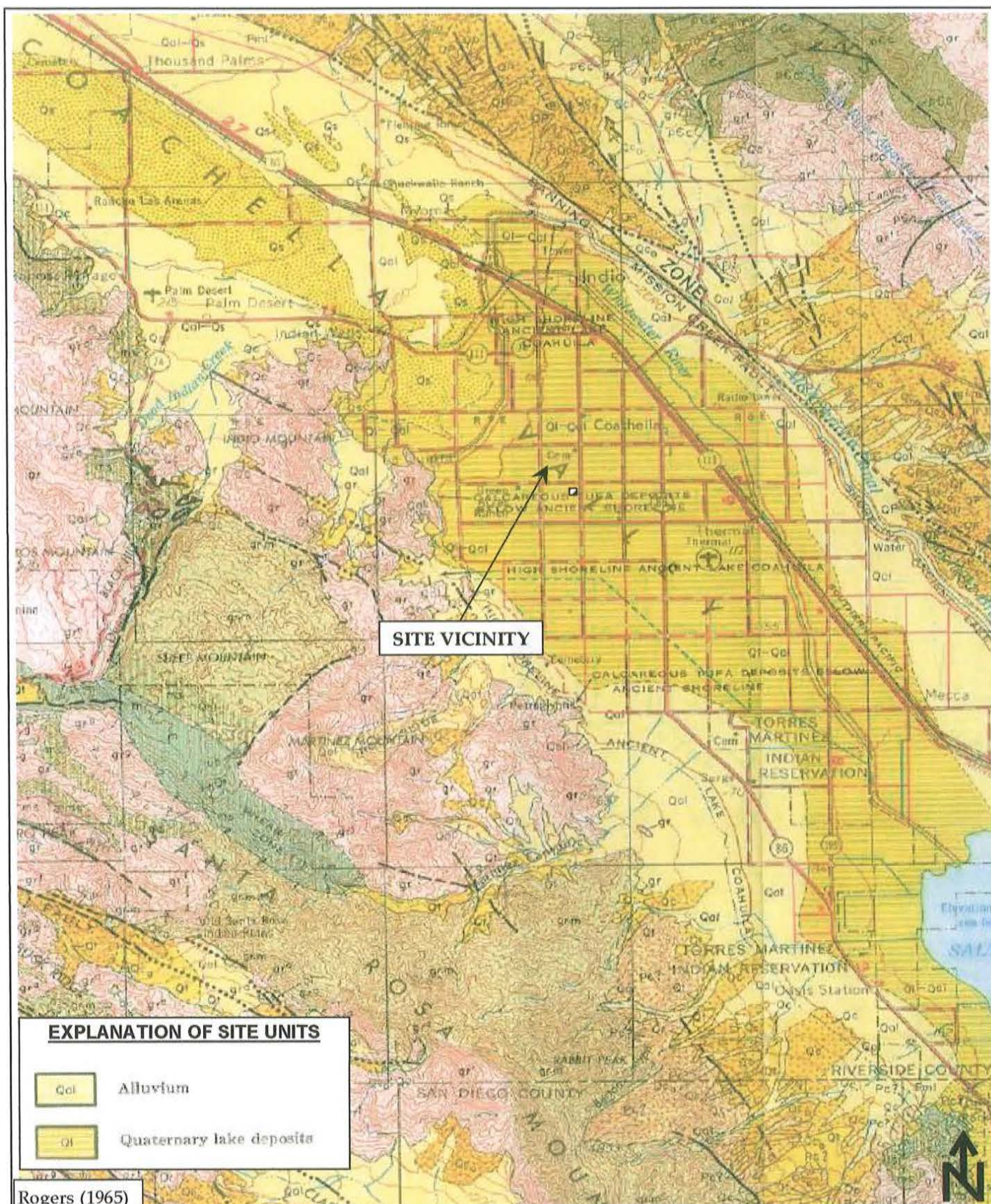
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Report Number:

22-10-613

Date:

October 18, 2022



REGIONAL GEOLOGIC MAP

FIGURE

2



Sladden Engineering

Project Number:

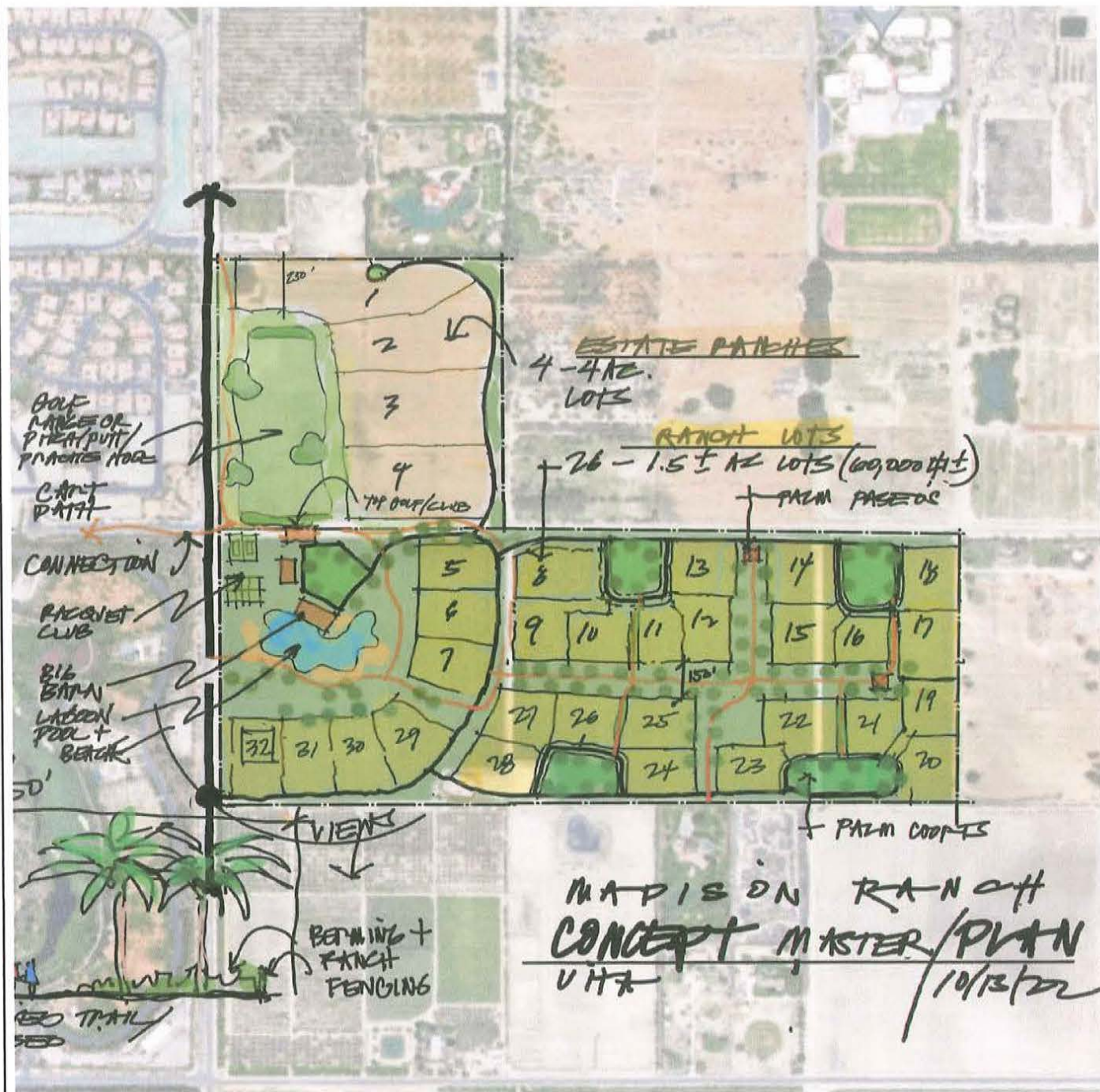
544-22319

Report Number:

22-10-613

Date:

October 18, 2022



CONCEPT MASTER PLAN

FIGURE

4



Sladden Engineering

Project Number:

544-22319

Report Number:

22-10-613

Date:

October 18, 2022

APPENDIX A
FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

For our field investigation ten (10) exploratory boreholes were excavated on August 9, 2022 utilizing a truck mounted hollow stem auger rig (Mobile B-61). Continuous logs of the materials encountered were made by a representative of Sladden Engineering. Materials encountered in the boreholes were classified in accordance with the Unified Soil Classification System which is presented in this appendix.

Representative undisturbed samples were obtained within our borings by driving a thin-walled steel penetration sampler (California split spoon sampler) or a Standard Penetration Test (SPT) sampler with a 140 pound automatic-trip hammer dropping approximately 30 inches (ASTM D1586). The number of blows required to drive the samplers 18 inches was recorded in 6-inch increments and blowcounts are indicated on the boring logs.

The California samplers are 3.0 inches in diameter, carrying brass sample rings having inner diameters of 2.5 inches. The standard penetration samplers are 2.0 inches in diameter with an inner diameter of 1.5 inches. Undisturbed samples were removed from the sampler and placed in moisture sealed containers in order to preserve the natural soil moisture content. Bulk samples were obtained from the excavation spoils and samples were then transported to our laboratory for further observations and testing.

**SLADDEN ENGINEERING****BORE LOG**

Drill Rig: Mobile B-61

Date Drilled: 8/9/2022

Elevation: -30 Ft (MSL)

Boring No: BH-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
	4/5/9	1	0	26.0	7.5	110.3	2		Silty Sand (SM); grayish brown, slightly moist, loose, fine-grained (Fill/Disturbed).
	5/6/8			12.1	4.0	96.5	4		Silty Sand (SM); grayish brown, slightly moist, loose, fine-grained (Qal/Ql).
							6		
	4/6/7			10.0	6.1		10		
							12		Sand (SP/SM); grayish brown, moist, loose, fine-grained (Qal/Ql).
							14		
	8/9/11			46.0	10.6	96.8	16		Silty Sand (SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							18		
							20		
	2/2/2			91.5	40.0		22		Sandy Clay (CL/CH); olive brown, very moist to wet, soft, medium to high plasticity (Qal/Ql).
							24		
	5/8/11			56.6	17.0	105.9	26		
							28		
	8/10/10			10.4	3.9		30		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							32		
	6/10/16			49.2	12.2	97.3	34		Clayey Sand (SC); grayish brown, moist, medium dense, fine-grained (Qal/Ql).
							36		
							38		
	7/9/12			15.8	6.2		40		Clayey Sand (SC); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							42		
	11/19/30			16.5	5.6	110.9	44		Clayey Sand (SC); grayish brown, slightly moist, dense, fine-grained (Qal/Ql).
							46		
							48		Clayey Sand (SC); grayish brown, slightly moist to moist, medium dense, fine-grained (Qal/Ql).
							50		
	9/9/10			26.2	8.9				

Completion Notes:

Terminated at ~51.5 Feet bgs.

No Bedrock Encountered.

No Groundwater Encountered.

PROPOSED RESIDENTIAL DEVELOPMENT

APNS 780-020-001, 002, 003 & 780-010-012

Project No: 544-22319

Report No: 22-10-613

Page

1



SLADDEN ENGINEERING

BORE LOG

Drill Rig:	Mobile B-61	Date Drilled:	8/9/2022
Elevation:	-30 Ft (MSL)	Boring No:	BH-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).
	3/4/6			64.1	16.3		4		Sandy Clay (CL/CH); olive brown, very moist, stiff, medium to high plasticity (Qal/Ql).
	6/9/13			10.4	4.1	101.3	10		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
	4/5/6			49.3	9.0		14		Silty Sand (SM); grayish brown, moist, medium dense, fine-grained (Qal/Ql).
	4/7/10			39.5	10.6	105.0	20		Silty Sand (SM); grayish brown, moist, medium dense, fine-grained (Qal/Ql).
							22		
							24		Terminated at ~ 21.5 Feet bgs.
							26		No Bedrock Encountered.
							28		No Groundwater or Seepage Encountered.
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED RESIDENTIAL DEVELOPMENT
APNS 780-020-001, 002, 003 & 780-010-012

Project No: 544-22319

Report No: 22-10-613

Page

2

**BORE LOG**

Drill Rig: Mobile B-61

Date Drilled: 8/9/2022

Elevation: -30 Ft (MSL)

Boring No: BH-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).
	3/4/5			71.3	10.0	86.1	4		Sandy Clay (CL/CH); olive brown, moist, medium stiff, medium to high plasticity (Qal/Ql).
	3/4/5			97.4	32.5		6		Sandy Clay (CL/CH); olive brown, very moist, stiff, medium to high plasticity (Qal/Ql).
	5/8/15			38.9	6.1	101.4	14		Clayey Sand (SC); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
	7/9/12			20.7	2.8		20		Clayey Sand (SC); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							22		
							24		Terminated at ~ 21.5 Feet bgs.
							26		No Bedrock Encountered.
							28		No Groundwater or Seepage Encountered.
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT	
								APNS 780-020-001, 002, 003 & 780-010-012	
								Project No: 544-22319	
								Report No: 22-10-613	Page 3

**SLADDEN ENGINEERING****BORE LOG**

Drill Rig:	Mobile B-61	Date Drilled:	8/9/2022
Elevation:	-30 Ft (MSL)	Boring No:	BH-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).
	2/3/3			96.3	34.5		4		Sandy Clay (CL/CH); olive brown, very moist, medium stiff, medium to high plasticity (Qal/Ql).
	7/13/18			7.1	2.7	99.9	10		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
	4/5/5			40.1	11.0		16		Silty Sand (SM); grayish brown, moist, loose, fine-grained (Qal/Ql).
	3/4/7			91.7	32.5	85.9	20		Sandy Clay (CL/CH); olive brown, very moist, medium stiff, medium to high plasticity (Qal/Ql).
							24		Terminated at ~ 21.5 Feet bgs.
							26		No Bedrock Encountered.
							28		No Groundwater or Seepage Encountered.
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED RESIDENTIAL DEVELOPMENT
APNS 780-020-001, 002, 003 & 780-010-012

Project No: 544-22319

Report No: 22-10-613

Page 4



Drill Rig:	Mobile B-61	Date Drilled:	8/9/2022
Elevation:	-30 Ft (MSL)	Boring No:	BH-5

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description	
	2/3/4			97.5	29.0		2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).	
							4		Sandy Clay (CL/CH); olive brown, very moist, medium stiff, medium to high plasticity (Qal/QI).	
							6			
							8		Terminated at ~ 6.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.	
							10			
							12			
							14			
							16			
							18			
							20			
							22			
							24			
							26			
							28			
							30			
							32			
							34			
							36			
							38			
							40			
							42			
							44			
							46			
							48			
							50			
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT		
								APNS 780-020-001, 002, 003 & 780-010-012		
								Project No: 544-22319		Page
Report No: 22-10-613										

**BORE LOG**

Drill Rig:	Mobile B-61	Date Drilled:	8/9/2022
Elevation:	-30 Ft (MSL)	Boring No:	BH-6

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).
	7/8/9			11.0	3.1	101.5	4		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							6		
	4/5/7			12.7	3.4		8		
							10		
							12		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							14		
	4/7/9			83.5	20.1	88.7	16		Sandy Clay (CL/CH); olive brown, very moist, stiff, medium to high plasticity (Qal/Ql).
							18		Terminated at ~ 16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT	
								APNS 780-020-001, 002, 003 & 780-010-012	
								Project No: 544-22319	
								Report No: 22-10-613	
								Page	6

**BORE LOG**

Drill Rig: Mobile B-61

Date Drilled: 8/9/2022

Elevation: -30 Ft (MSL)

Boring No: BH-7

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description	
							2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).	
							4			
5/6/7				7.8	3.9		6		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/QI).	
							8			
5/7/11				24.4	7.3	96.3	10			
							12		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/QI).	
							14			
3/5/6				67.3	22.5		16		Sandy Clay (CL/CH); olive brown, very moist, stiff, medium to high plasticity (Qal/QI).	
							18		Terminated at ~ 16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.	
							20			
							22			
							24			
							26			
							28			
							30			
							32			
							34			
							36			
							38			
							40			
							42			
							44			
							46			
							48			
							50			
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT		
								APNS 780-020-001, 002, 003 & 780-010-012		
								Project No: 544-22319		
								Report No: 22-10-613		
								Page	7	

**SLADDEN ENGINEERING****BORE LOG**

Drill Rig:	Mobile B-61	Date Drilled:	8/9/2022
Elevation:	-30 Ft (MSL)	Boring No:	BH-8

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description		
		2	1				2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).		
							4		Sand (SP/SM); grayish brown, slightly moist, fine-grained (Qal/Ql).		
							6		Terminated at ~ 5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.		
							8				
							10				
							12				
							14				
							16				
							18				
							20				
							22				
							24				
							26				
							28				
							30				
							32				
							34				
							36				
							38				
							40				
							42				
							44				
							46				
							48				
							50				
Completion Notes:										PROPOSED RESIDENTIAL DEVELOPMENT	
										APNS 780-020-001, 002, 003 & 780-010-012	
								Project No: 544-22319			
								Report No: 22-10-613			
								Page	8		

**SLADDEN ENGINEERING****BORE LOG**

Drill Rig: Mobile B-61

Date Drilled: 8/9/2022

Elevation: -30 Ft (MSL)

Boring No: BH-9

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).
	3/3/4			24.4	7.9		4		
							6		Silty Sand (SM); grayish brown, slightly moist, loose, fine-grained (Qal/Ql).
	5/8/8			19.1	8.4	102.7	10		Silty Sand (SM); grayish brown, slightly moist, loose, fine-grained (Qal/Ql).
							12		
	4/6/8			10.4	4.6		14		
							16		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							18		
	11/16/22			9.6	3.8	108.5	20		Sand (SP/SM); grayish brown, slightly moist, medium dense, fine-grained (Qal/Ql).
							22		
							24		Terminated at ~ 21.5 Feet bgs.
							26		No Bedrock Encountered.
							28		No Groundwater or Seepage Encountered.
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT	
								APNS 780-020-001, 002, 003 & 780-010-012	
								Project No: 544-22319	
								Report No: 22-10-613	Page 9

BORE LOG

Drill Rig: Mobile B-61

Date Drilled: 8/9/2022

Elevation: -30 Ft (MSL)

Boring No: BH-10

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Dry Density	Depth (feet)	Graphic Lithology	Description		
	2/3/3			14.9	5.0		2		Silty Sand (SM); grayish brown, slightly moist, fine-grained (Fill/Disturbed).		
							4		Silty Sand (SM); grayish brown, slightly moist, loose, fine-grained (Qal/Ql).		
							6				
							8				
							10		Terminated at ~ 6.5 Feet bgs.		
							12		No Bedrock Encountered.		
							14		No Groundwater or Seepage Encountered.		
							16				
							18				
							20				
							22				
							24				
							26				
							28				
							30				
							32				
							34				
							36				
							38				
							40				
							42				
							44				
							46				
							48				
							50				
Completion Notes:								PROPOSED RESIDENTIAL DEVELOPMENT			
								APNS 780-020-001, 002, 003 & 780-010-012			
								Project No: 544-22319			
								Report No: 22-10-613		Page	10

APPENDIX B
LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Representative bulk and relatively undisturbed soil samples were obtained in the field and returned to our laboratory for additional observations and testing. Laboratory testing was generally performed in two phases. The first phase consisted of testing in order to determine the compaction of the existing natural soil and the general engineering classifications of the soils underlying the site. This testing was performed in order to estimate the engineering characteristics of the soil and to serve as a basis for selecting samples for the second phase of testing. The second phase consisted of soil mechanics testing. This testing including consolidation, shear strength and expansion testing was performed in order to provide a means of developing specific design recommendations based on the mechanical properties of the soil.

CLASSIFICATION AND COMPACTION TESTING

Unit Weight and Moisture Content Determinations: Each undisturbed sample was weighed and measured in order to determine its unit weight. A small portion of each sample was then subjected to testing in order to determine its moisture content. This was used in order to determine the dry density of the soil in its natural condition. The results of this testing are shown on the Boring Logs.

Maximum Density-Optimum Moisture Determinations: Representative soil types were selected for maximum density determinations. This testing was performed in accordance with the ASTM Standard D1557-91, Test Method A. Graphic representations of the results of this testing are presented in this appendix. The maximum densities are compared to the field densities of the soil in order to determine the existing relative compaction to the soil.

Classification Testing: Soil samples were selected for classification testing. This testing consists of mechanical grain size analyses. This provides information for developing classifications for the soil in accordance with the Unified Soil Classification System which is presented in the preceding appendix. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing is very useful in detecting variations in the soil and in selecting samples for further testing.

SOIL MECHANIC'S TESTING

Expansion Testing: Two (2) bulk sample was selected for Expansion testing. Expansion testing was performed in accordance with the UBC Standard 18-2. This testing consists of remolding 4-inch diameter by 1-inch thick test specimens to a moisture content and dry density corresponding to approximately 50 percent saturation. The samples are subjected to a surcharge of 144 pounds per square foot and allowed to reach equilibrium. At that point the specimens are inundated with distilled water. The linear expansion is then measured until complete.

Direct Shear Testing: Two (2) bulk sample was selected for Direct Shear testing. This test measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation design and lateral design. Tests were performed using a recompacted test specimen that was saturated prior to tests. Tests were performed using a strain controlled test apparatus with normal pressures ranging from 800 to 2300 pounds per square foot.

Consolidation/Hydro-Collapse Testing: Two (2) relatively undisturbed sample was selected for consolidation testing. For this test, a one-inch thick test specimen was subjected to vertical loads varying from 575 psf to 11520 psf applied progressively. The consolidation at each load increment was recorded prior to placement of each subsequent load.

Corrosion Series Testing: The soluble sulfate concentrations of the surface soil were determined in accordance with California Test Method Number (CA) 417. The pH and Minimum Resistivity were determined in accordance with CA 643. The soluble chloride concentrations were determined in accordance with CA 422.



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Maximum Density/Optimum Moisture

ASTM D698/D1557

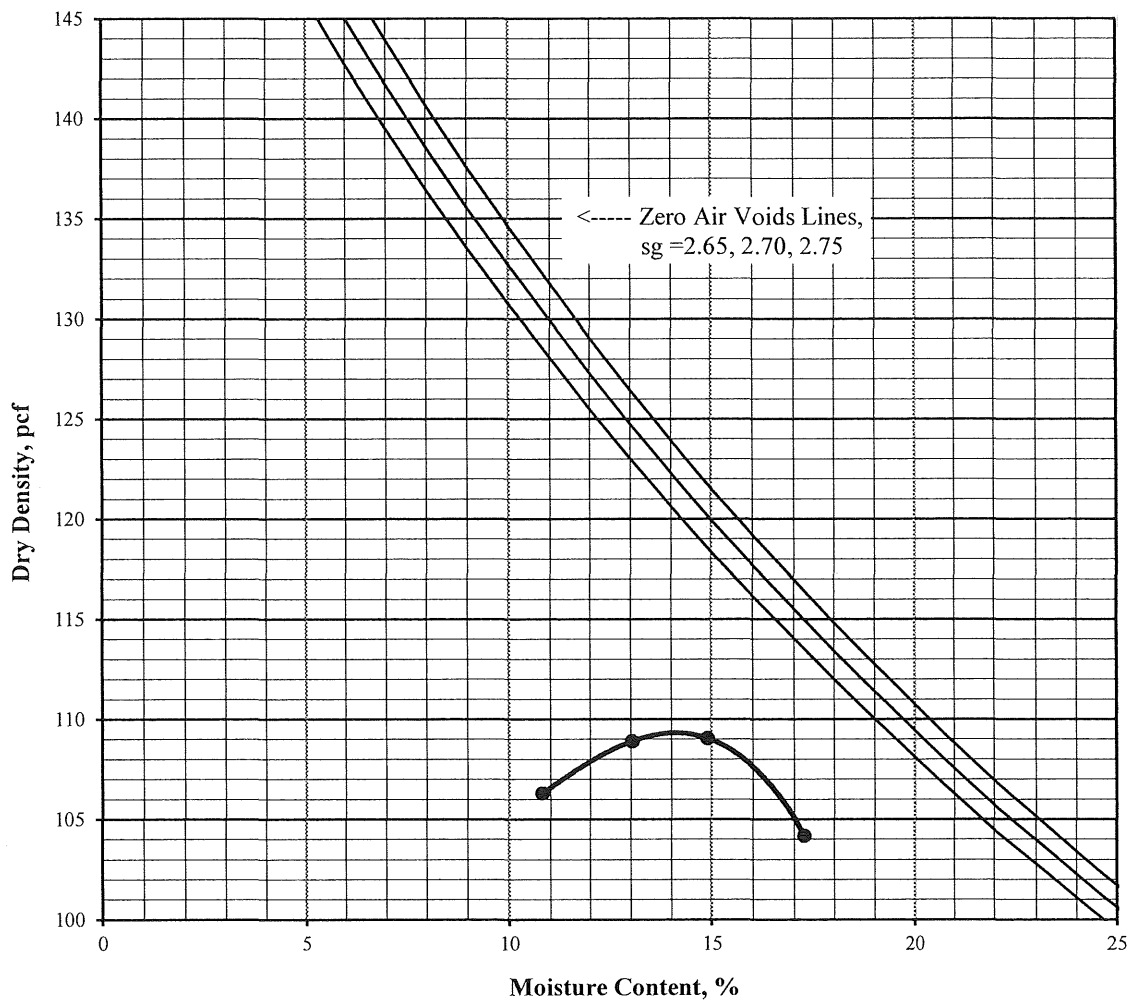
Project Number: 544-22319
Project Name: Monroe Street
Lab ID Number: LN6-22370
Sample Location: BH-1 Bulk 1 @ 0-5'
Description: Olive Brown Silty Sand (SM)

September 7, 2022

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 110 pcf
Optimum Moisture: 14%

Sieve Size	% Retained
3/4"	
3/8"	
#4	0.2





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Maximum Density/Optimum Moisture

ASTM D698/D1557

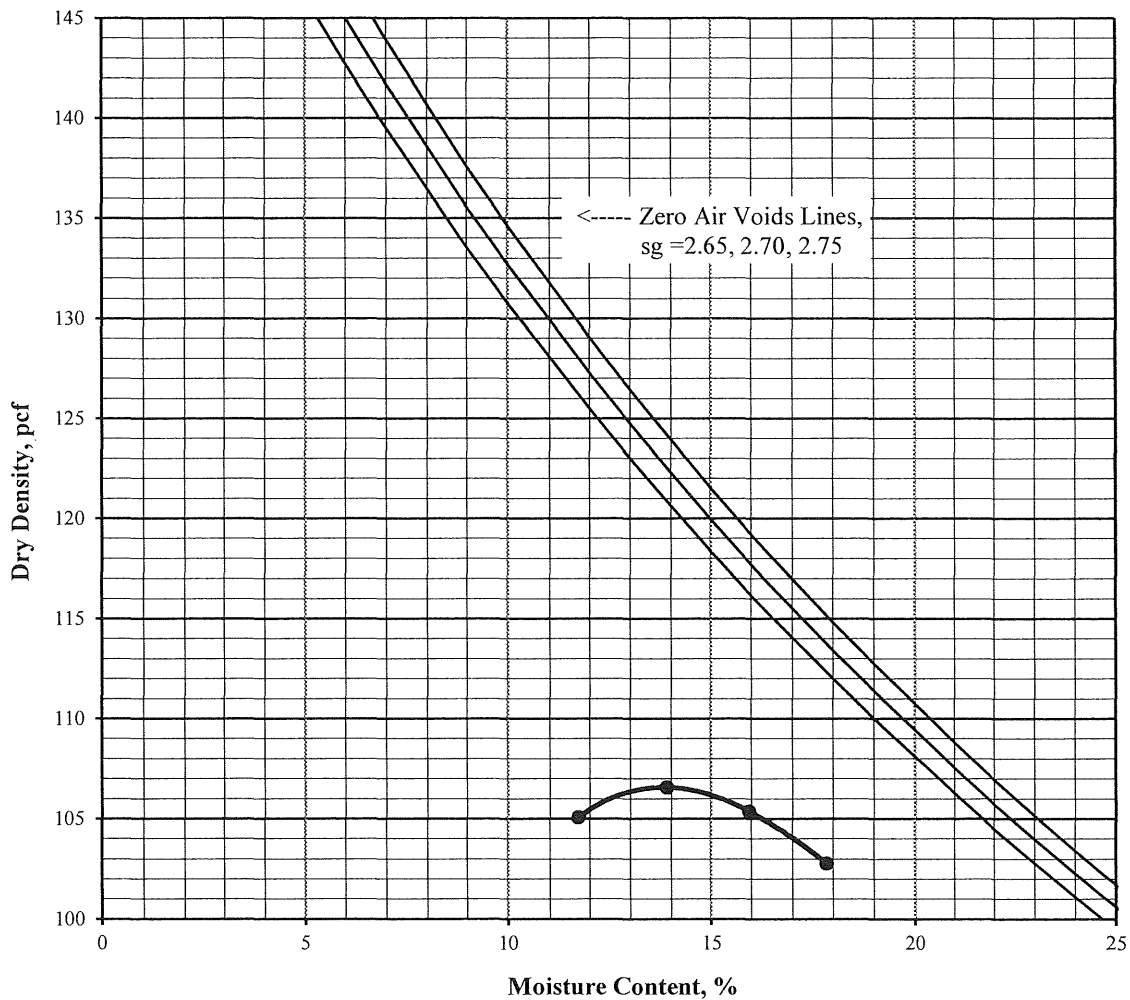
Project Number: 544-22319
Project Name: Monroe Street
Lab ID Number: LN6-22370
Sample Location: BH-8 Bulk 2 @ 0-5'
Description: Olive Brown Silty Sand (SM)

September 7, 2022

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 107 pcf
Optimum Moisture: 14.5%

Sieve Size	% Retained
3/4"	
3/8"	
#4	0.0





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Expansion Index

ASTM D 4829

Job Number: 544-22319
Job Name: Monroe Street
Lab ID Number: LN6-22370
Sample ID: BH-1 Bulk 1 @ 0-5'
Soil Description: Olive Brown Silty Sand (SM)

September 7, 2022

Wt of Soil + Ring:	560.7
Weight of Ring:	191.0
Wt of Wet Soil:	369.7
Percent Moisture:	11.2%
Sample Height, in	0.95
Wet Density, pcf:	118.3
Dry Denstiy, pcf:	106.4

% Saturation:	51.8
---------------	------

Expansion

Rack # 3

Date/Time	8/30/2022	11:09 AM
Initial Reading	0.0000	
Final Reading	0.0004	

Expansion Index

0

(Final - Initial) x 1000



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Expansion Index

ASTM D 4829

Job Number: 544-22319
Job Name: Monroe Street
Lab ID Number: LN6-22370
Sample ID: BH-8 Bulk 2 @ 0-5'
Soil Description: Olive Brown Silty Sand (SM)

September 7, 2022

Wt of Soil + Ring:	542.7
Weight of Ring:	191.0
Wt of Wet Soil:	351.7
Percent Moisture:	12.3%
Sample Height, in	0.95
Wet Density, pcf:	112.5
Dry Density, pcf:	100.2

% Saturation:	48.7
---------------	------

Expansion

Rack # 3

Date/Time	9/1/2022	2:10 PM
Initial Reading	0.0000	
Final Reading	0.0005	

Expansion Index

1

(Final - Initial) x 1000



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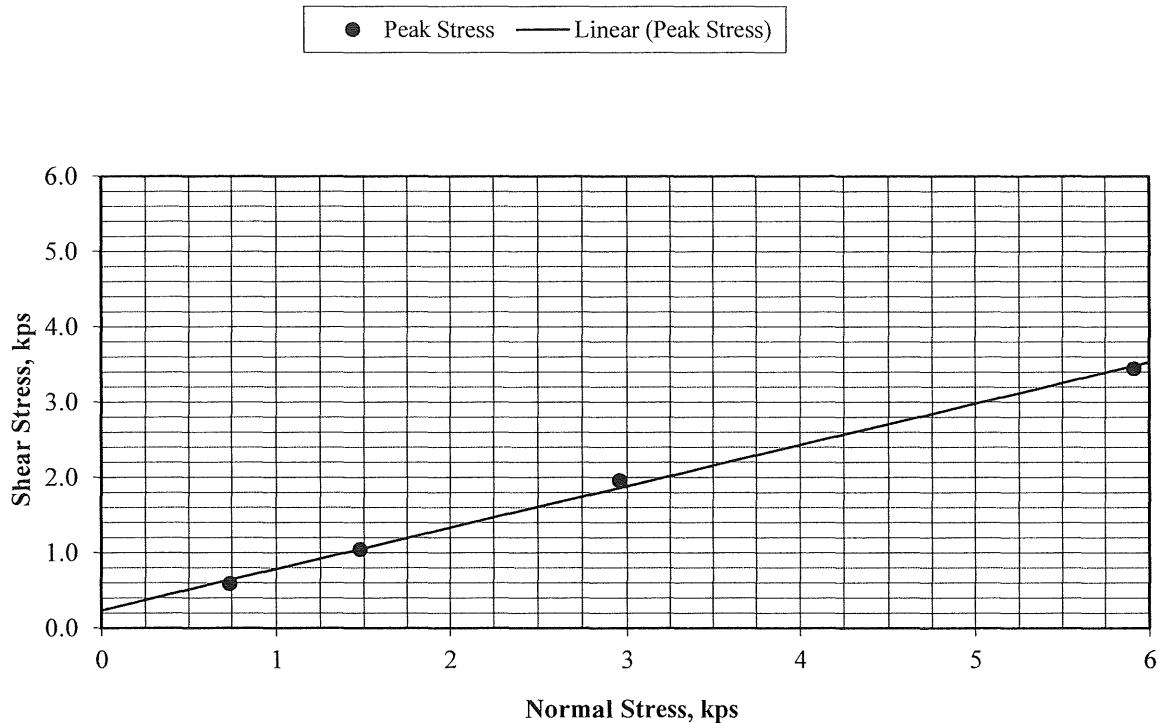
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Direct Shear ASTM D 3080-04 (modified for unconsolidated condition)

Job Number: 544-22319
Job Name: Monroe Street
Lab ID No. LN6-22370
Sample ID: BH-1 Bulk 1 @ 0-5'
Classification: Olive Brown Silty Sand (SM)
Sample Type: Remolded @ 90% of Maximum Density

September 7, 2022
Initial Dry Density: 99.1 pcf
Initial Moisture Content: 13.7 %
Peak Friction Angle (ϕ): 29°
Cohesion (c): 240 psf

Test Results	1	2	3	4	Average
Moisture Content, %	21.8	21.8	21.8	21.8	21.8
Saturation, %	83.9	83.9	83.9	83.9	83.9
Normal Stress, kps	0.739	1.479	2.958	5.916	
Peak Stress, kps	0.589	1.046	1.962	3.444	





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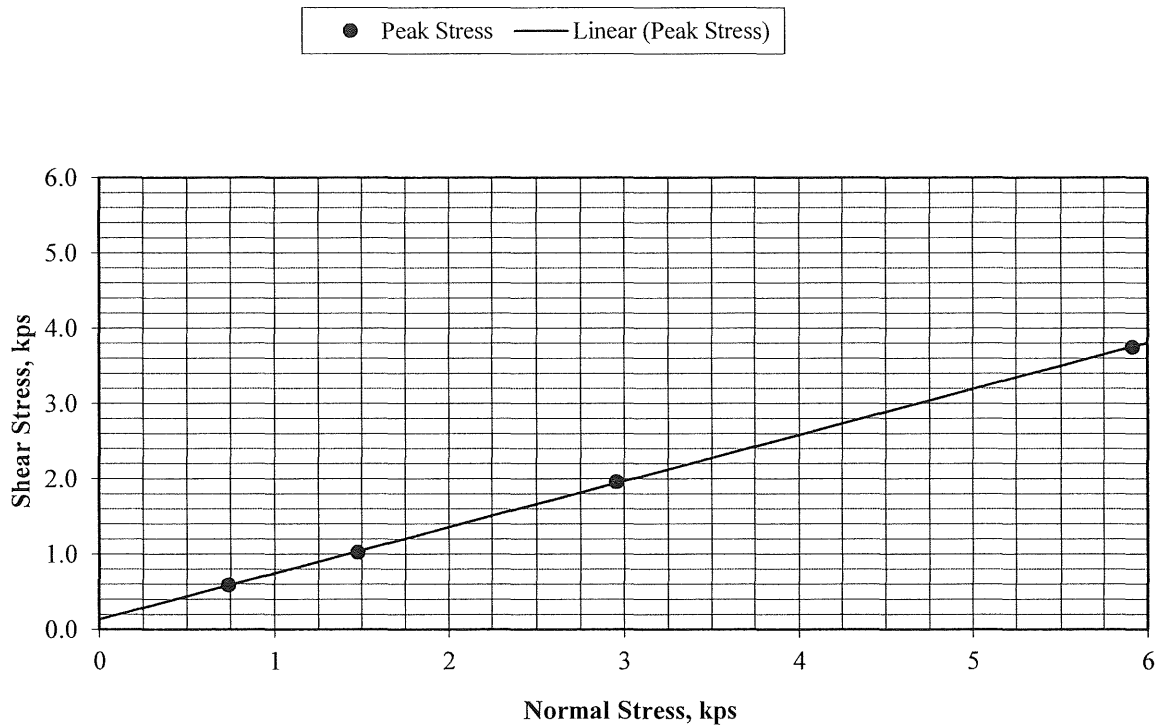
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Direct Shear ASTM D 3080-04 (modified for unconsolidated condition)

Job Number: 544-22319
Job Name Monroe Street
Lab ID No. LN6-22370
Sample ID BH-8 Bulk 2 @ 0-5'
Classification Olive Brown Silty Sand (SM)
Sample Type Remolded @ 90% of Maximum Density

September 7, 2022
Initial Dry Density: 96.3 pcf
Initial Moisture Content: 14.6 %
Peak Friction Angle (ϕ): 31°
Cohesion (c): 130 psf

Test Results	1	2	3	4	Average
Moisture Content, %	24.9	24.9	24.9	24.9	24.9
Saturation, %	89.6	89.6	89.6	89.6	89.6
Normal Stress, kps	0.739	1.479	2.958	5.916	
Peak Stress, kps	0.589	1.025	1.962	3.750	



Job Number: 544-22319
Job Name: Monroe Street
Date: 9/7/2022

Moisture Adjustment	
Wt of Soil:	<u>1,000</u>
Moist As Is:	<u>6.5</u>
Moist Wanted:	<u>14.0</u>

ml of Water to Add: 70.4

Remolded Shear Weight	
Max Dry Density:	110.0
Optimum Moisture:	14.0

Wt Soil per Ring, g: 135.7

UBC



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Gradation

ASTM C117 & C136

Project Number: 544-22319

September 7, 2022

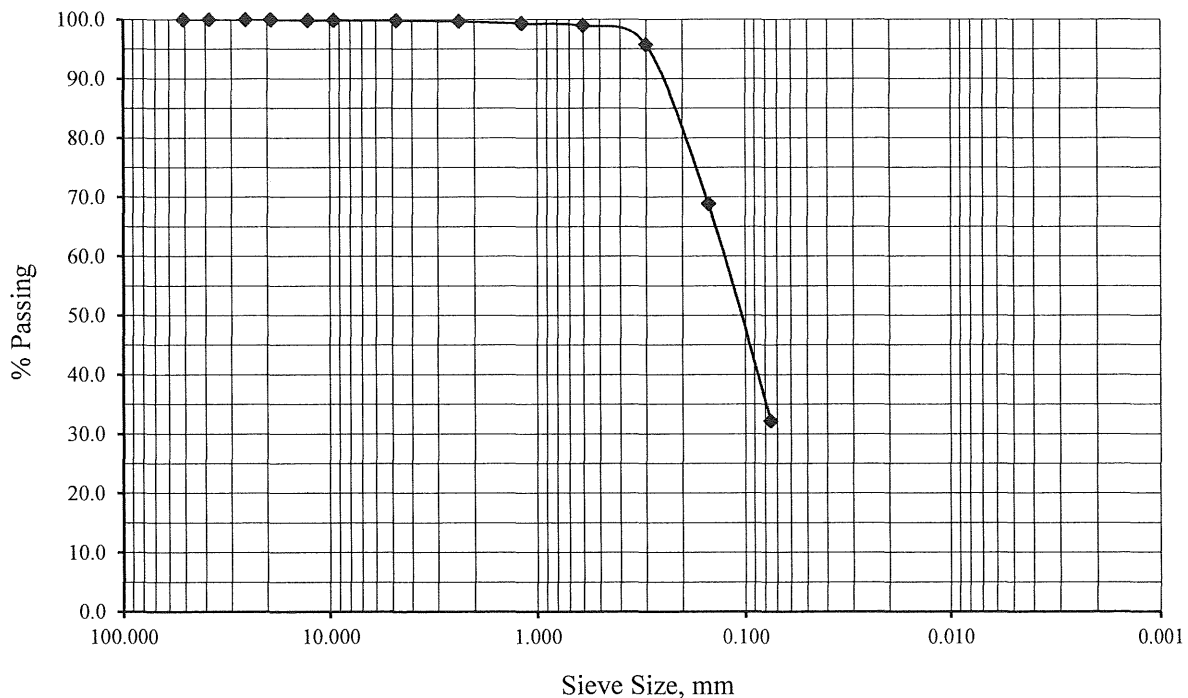
Project Name: Monroe Street

Lab ID Number: LN6-22370

Sample ID: BH-1 Bulk 1 @ 0-5'

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	99.9
3/8"	9.53	99.9
#4	4.75	99.8
#8	2.36	99.7
#16	1.18	99.3
#30	0.60	99.0
#50	0.30	95.8
#100	0.15	68.9
#200	0.075	32.2





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Gradation

ASTM C117 & C136

Project Number: 544-22319

September 7, 2022

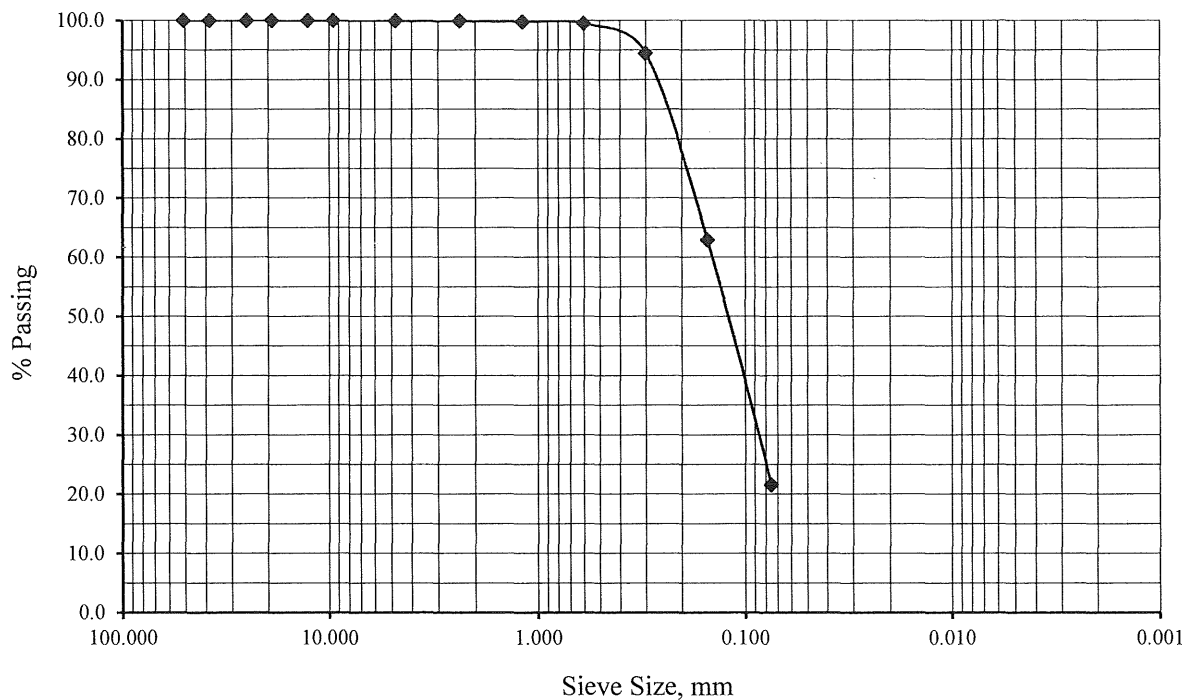
Project Name: Monroe Street

Lab ID Number: LN6-22370

Sample ID: BH-8 Bulk 2 @ 0-5'

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	99.9
#16	1.18	99.8
#30	0.60	99.5
#50	0.30	94.5
#100	0.15	63.0
#200	0.075	21.6





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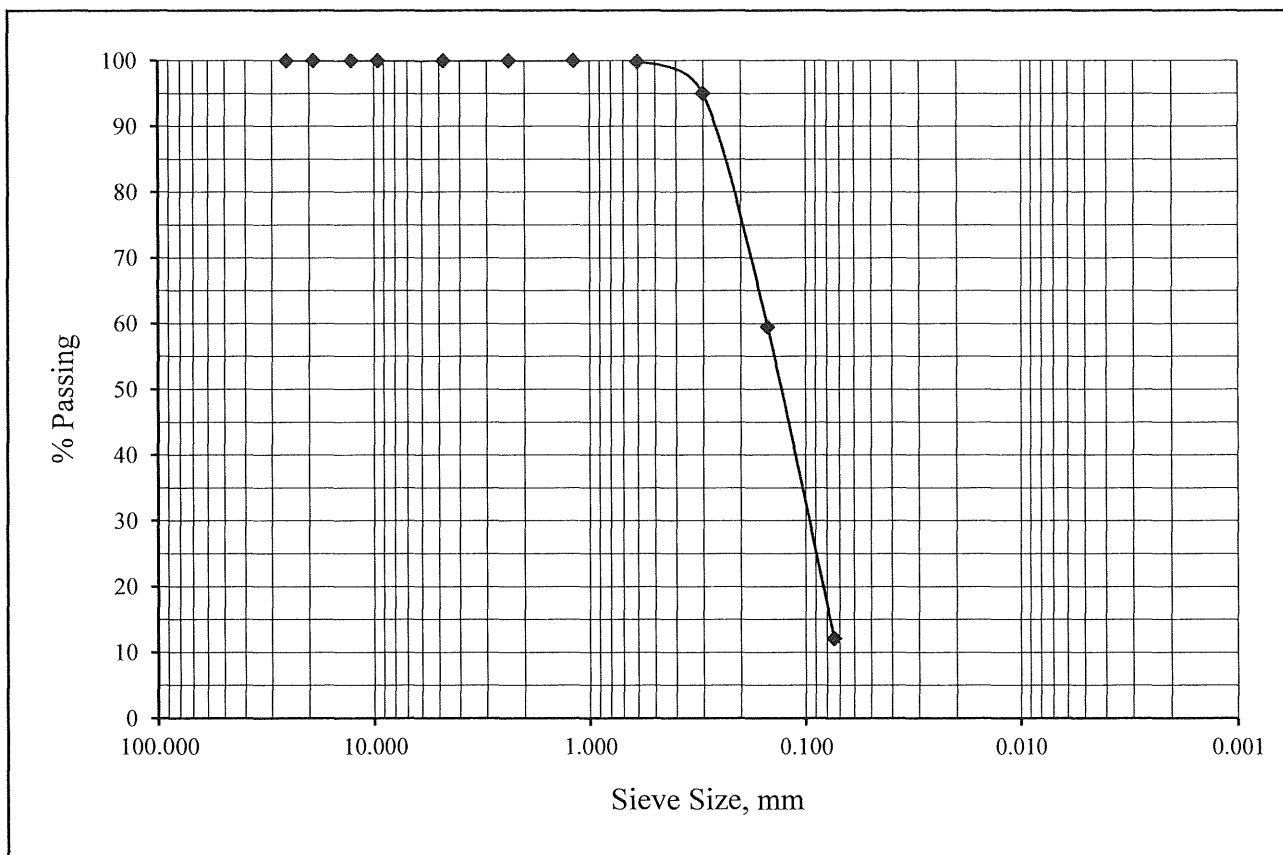
ASTM C117 & C136

Project Number: 544-22319
Project Name: Monroe Street
Lab ID Number: LN6-22370
Sample ID: BH-1 R-2 @ 5'

September 7, 2022

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	99.9
#50	0.30	95.0
#100	0.15	59.5
#200	0.074	12.1





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Gradation

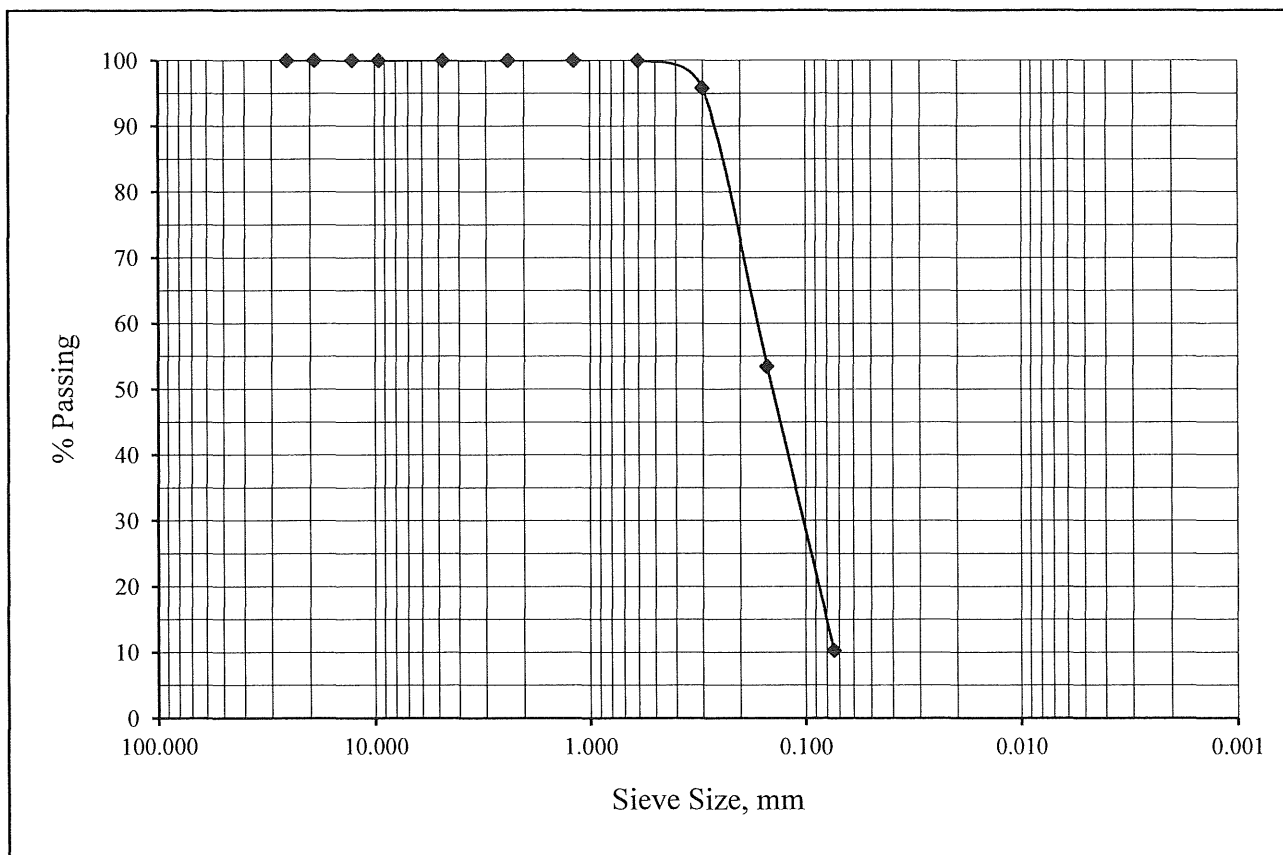
ASTM C117 & C136

Project Number: 544-22319
Project Name: Monroe Street
Lab ID Number: LN6-22370
Sample ID: BH-2 R-2 @ 10'

September 7, 2022

Soil Classification: SP-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	100.0
#50	0.30	95.8
#100	0.15	53.5
#200	0.074	10.4





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Gradation

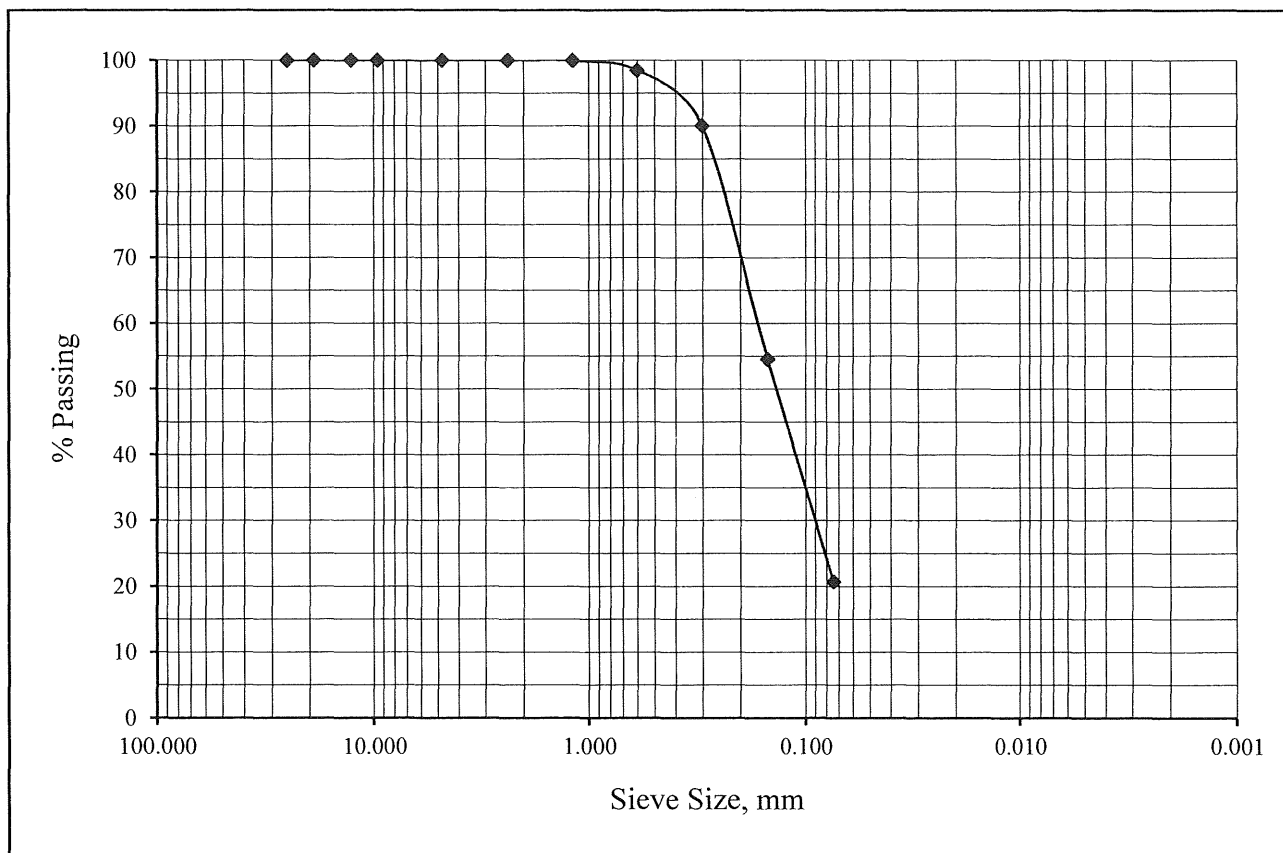
ASTM C117 & C136

Project Number: 544-22319
Project Name: Monroe Street
Lab ID Number: LN6-22370
Sample ID: BH-3 S-4 @ 20'

September 7, 2022

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	98.5
#50	0.30	90.1
#100	0.15	54.5
#200	0.074	20.7





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Gradation

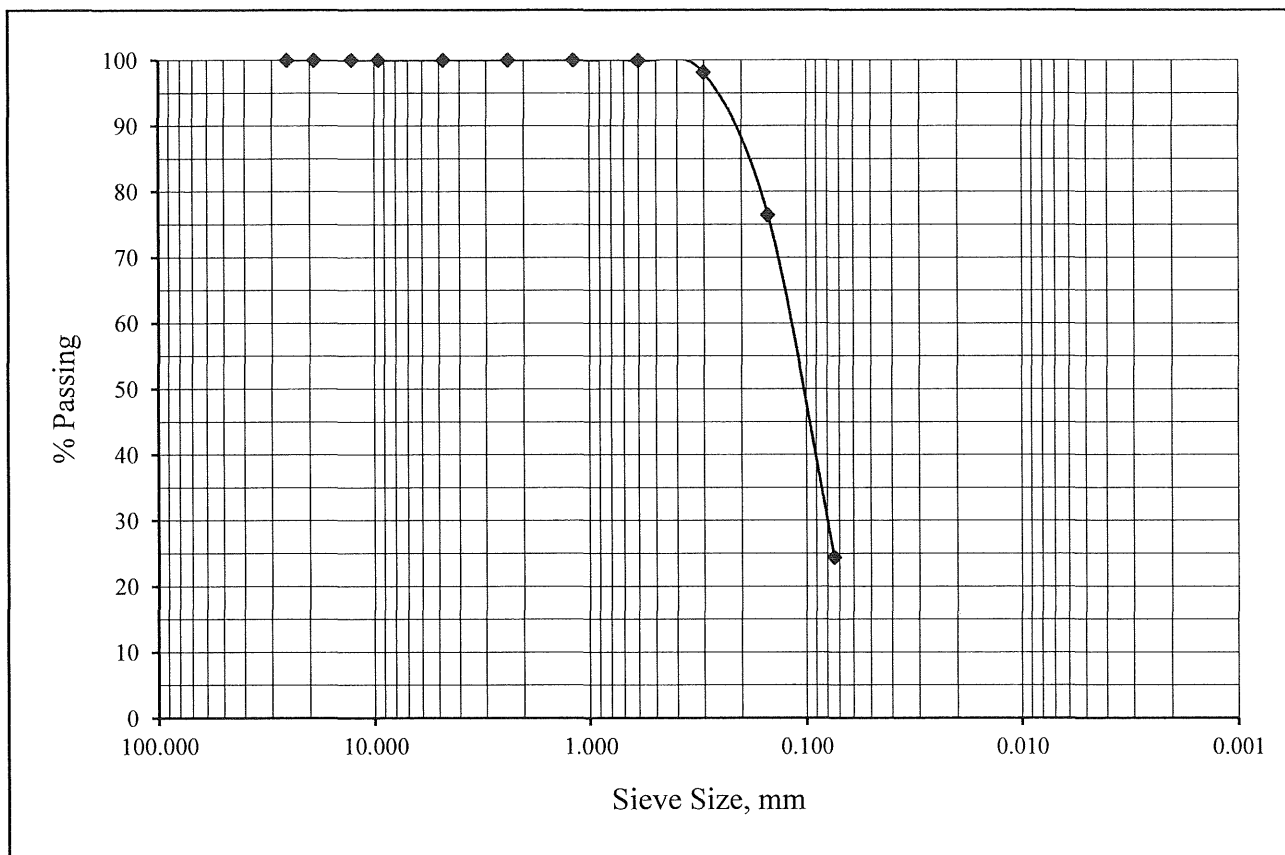
ASTM C117 & C136

Project Number: 544-22319
Project Name: Monroe Street
Lab ID Number: LN6-22370
Sample ID: BH-7 R-2 @ 10'

September 7, 2022

Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	99.9
#50	0.30	98.1
#100	0.15	76.5
#200	0.074	24.4





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Gradation

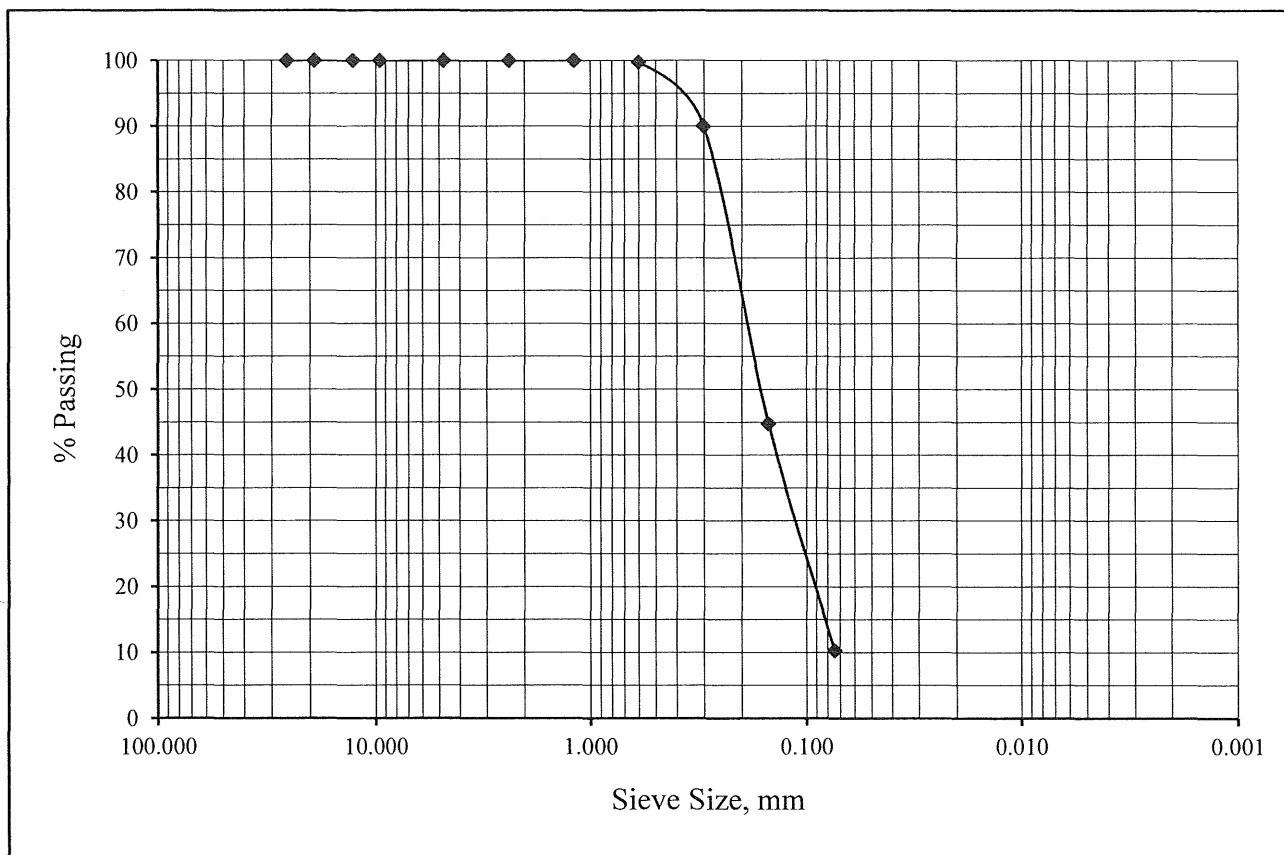
ASTM C117 & C136

Project Number: 544-22319
Project Name: Monroe Street
Lab ID Number: LN6-22370
Sample ID: BH-9 S-3 @ 15'

September 7, 2022

Soil Classification: SP-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	100.0
#30	0.60	99.7
#50	0.30	90.1
#100	0.15	44.8
#200	0.074	10.4





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One Dimensional Consolidation

ASTM D2435 & D5333

Job Number: 544-22319
Job Name: Monroe Street

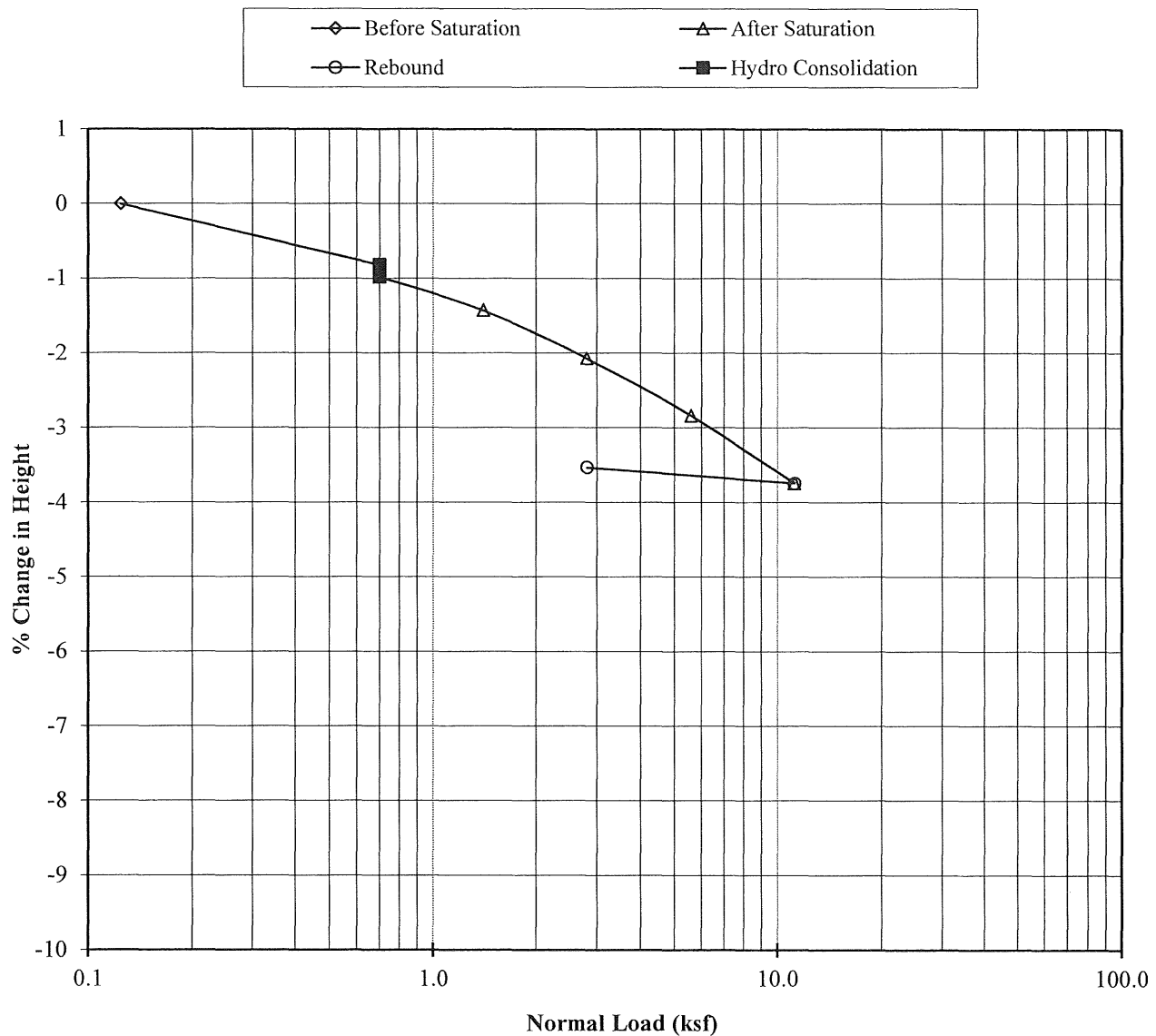
September 7, 2022

Lab ID Number: LN6-22370
Sample ID: BH-1 R-2 @ 5'
Soil Description: Gray Brown Silty Sand (SM)

Initial Dry Density, pcf: 95.7
Initial Moisture, %: 4.0
Initial Void Ratio: 0.742
Specific Gravity: 2.67

Hydrocollapse: 0.2% @ 0.702 ksf

% Change in Height vs Normal Pressure Diagram





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One Dimensional Consolidation

ASTM D2435 & D5333

Job Number: 544-22319
Job Name: Monroe Street

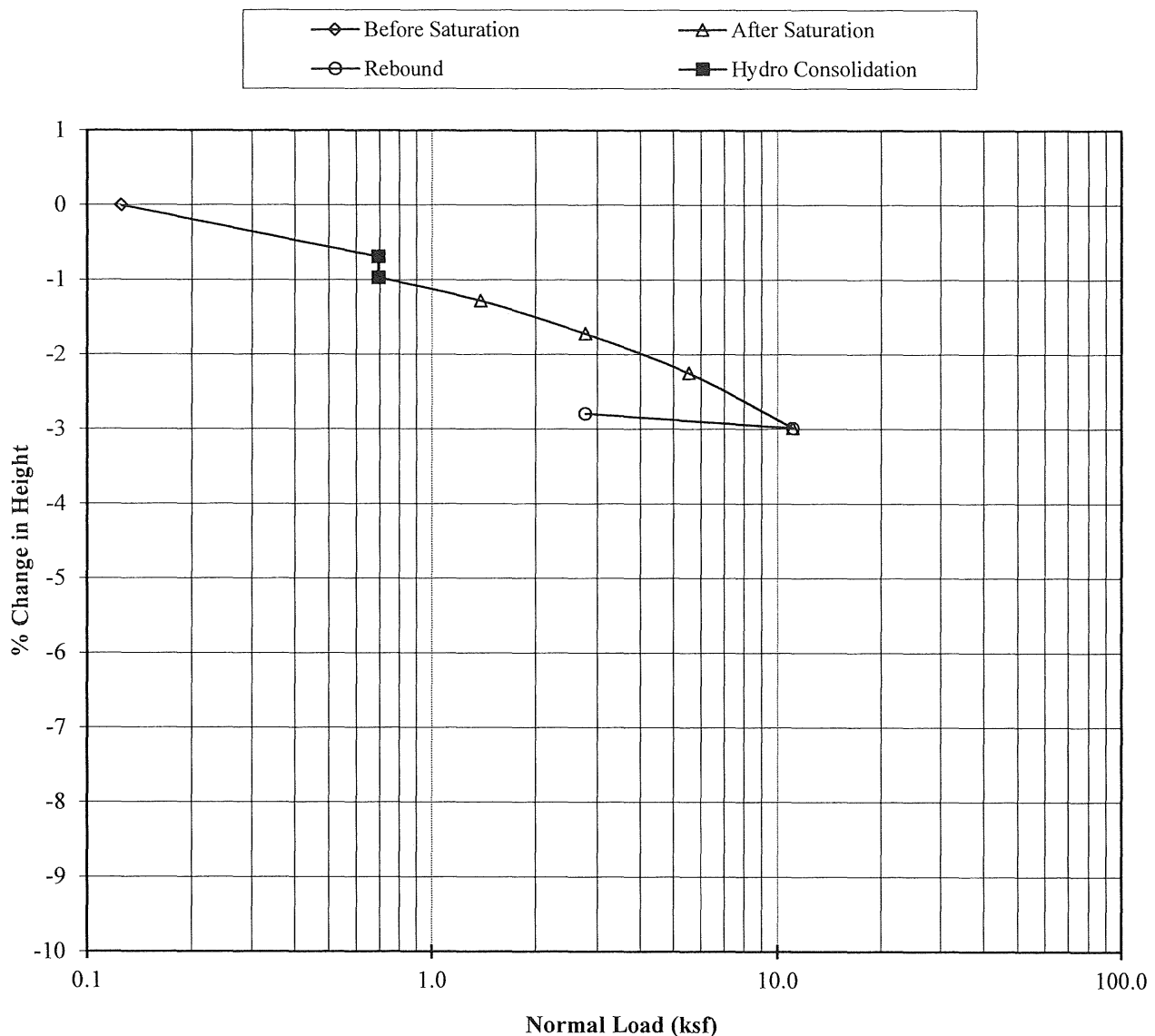
September 7, 2022

Lab ID Number: LN6-22370
Sample ID: BH-2 R-2 @ 10'
Soil Description: Olive Brown Sand w/Silt (SP-SM)

Initial Dry Density, pcf: 98.3
Initial Moisture, %: 4.1
Initial Void Ratio: 0.696
Specific Gravity: 2.67

Hydrocollapse: 0.3% @ 0.694 ksf

% Change in Height vs Normal Pressure Diagram





Sladden Engineering

6782 Stanton Ave., Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
45090 Golf Center Pkwy, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Date: September 7, 2022

Account No.: 544-22319

Customer: Discovery Land Company

Location: APN's 780-020-001, 002, 003 & 780-010-012, Monroe Street, La Quinta

Analytical Report

Corrosion Series

	pH per CA 643	Soluble Sulfates per CA 417 ppm	Soluble Chloride per CA 422 ppm	Min. Resistivity per CA 643 ohm-cm
BH-1 @ 0-5'	8.7	80	80	3600
BH-8 @ 0-5'	9.1	40	50	4600

APPENDIX C

SEISMIC DESIGN PARAMETERS SEISMIC DESIGN MAPS

Project: Residential Development
 Project Number: 544-22319
 Client: Discovery Land Company
 Site Lat/Long: 33.6626/ -116.2296
 Controlling Seismic Source: San Andreas

REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured
Site Class D - Table 11.4-1	F_a	1.0
Site Class D - 21.3(ii)	F_v	2.5
$0.2*(S_{D1}/S_{DS})$	T_0	0.140
S_{D1}/S_{DS}	T_s	0.699
Fundamental Period (12.8.2)	T	Period
Seismic Design Maps or Fig 22-14	T_L	8
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	0.7435*
Equation 11.4-2 - F_v*S_1	S_{M1}	1.1152*

RISK COEFFICIENT

Cr - At Periods ≤ 0.2 , $Cr=C_{RS}$	C_{RS}	0.899
Cr - At Periods ≥ 1.0 , $Cr=C_{R1}$	C_{R1}	0.884

REFERENCE	NOTATION	VALUE
F_v (Table 11.4-2)[Used for General Spectrum]	F_v	1.7
Design Maps	S_s	1.595
Design Maps	S_1	0.656
Equation 11.4-1 - F_a*S_s	S_{MS}	1.595*
Equation 11.4-3 - $2/3*S_{MS}$	S_{DS}	1.063*
Design Maps	PGA	0.697
Table 11.8-1	F_{PGA}	1.1
Equation 11.8-1 - $F_{PGA}*PGA$	PGA_M	0.767*
Section 21.5.3	80% of PGA_M	0.613
Design Maps	C_{RS}	0.899
Design Maps	C_{R1}	0.884

Cr - At Periods between 0.2 and 1.0
 use trendline formula to complete

Period	Cr
0.200	0.899
0.300	0.897
0.400	0.895
0.500	0.893
0.600	0.892
0.680	0.890
1.000	0.884

* Code based design value. See accompanying data for Site Specific Design values.

Mapped values from <https://seismicmaps.org/>



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PROBABILISTIC SPECTRA¹
2% in 50 year Exceedence

Project No: 544-22319

Period	UGHM	RTHM	Max Directional Scale Factor ²	Probabilistic MCE
0.010	0.842	0.799	1.19	0.951
0.100	1.380	1.337	1.19	1.591
0.200	1.838	1.791	1.20	2.149
0.300	2.135	2.002	1.22	2.442
0.500	2.156	1.958	1.23	2.408
0.750	1.793	1.618	1.24	2.006
1.000	1.541	1.369	1.24	1.698
2.000	0.906	0.798	1.24	0.990
3.000	0.624	0.547	1.25	0.684
4.000	0.455	0.397	1.25	0.496
5.000	0.345	0.303	1.26	0.382

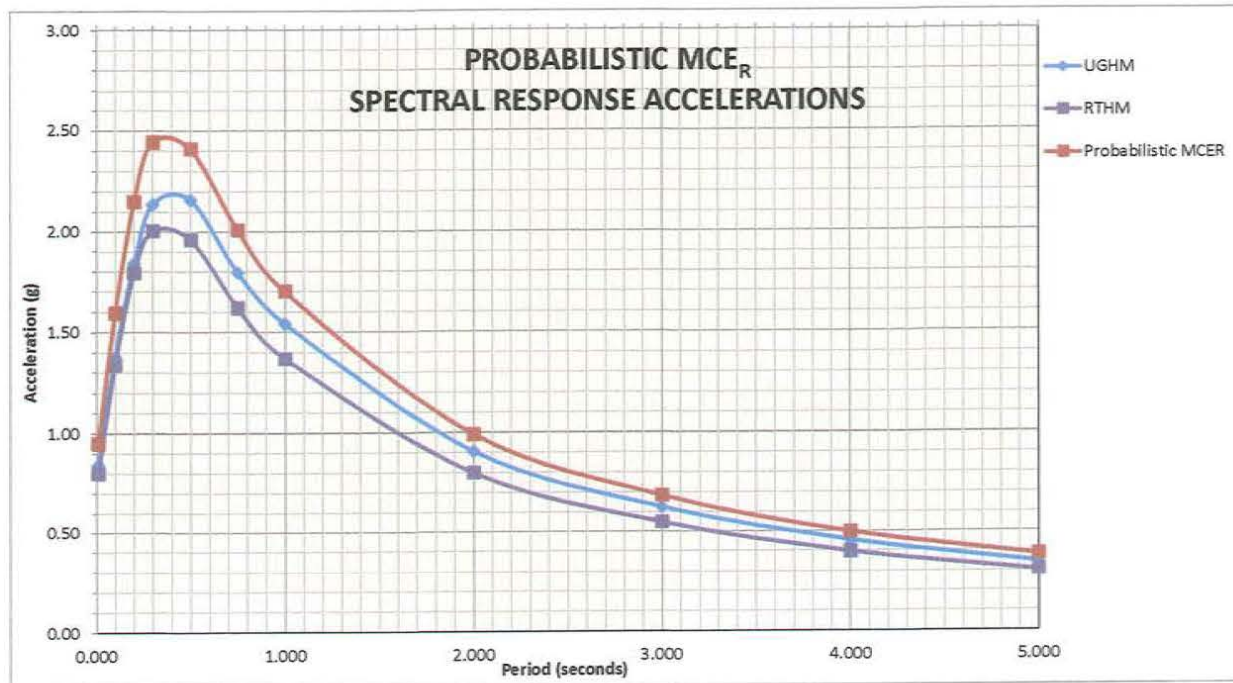
¹ Data Sources:

<https://earthquake.usgs.gov/hazards/interactive/>

<https://earthquake.usgs.gov/designmaps/rtgm/>

² Shahi-Baker RotD100/RotD50 Factors (2014)

Probabilistic PGA: 0.842
Is Probabilistic $S_{a(max)} < 1.2F_a$? **NO**



DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations¹

Controlling Source: San Andreas

Is Probabilistic $S_{a(max)} < 1.2F_a$?

NO

Project No: 544-22319

Period	Deterministic PSa Median ± 1.0 for 5% Damping	Max Directional Scale Factor ²	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.689	1.19	0.819	0.819
0.020	0.691	1.19	0.823	0.823
0.030	0.703	1.19	0.836	0.836
0.050	0.746	1.19	0.888	0.888
0.075	0.893	1.19	1.063	1.063
0.100	1.060	1.19	1.262	1.262
0.150	1.304	1.20	1.565	1.565
0.200	1.460	1.20	1.753	1.753
0.250	1.569	1.21	1.898	1.898
0.300	1.626	1.22	1.984	1.984
0.400	1.640	1.23	2.018	2.018
0.500	1.587	1.23	1.953	1.953
0.750	1.289	1.24	1.598	1.598
1.000	1.086	1.24	1.347	1.347
1.500	0.785	1.24	0.973	0.973
2.000	0.601	1.24	0.745	0.745
3.000	0.413	1.25	0.516	0.516
4.000	0.291	1.25	0.364	0.364
5.000	0.217	1.26	0.273	0.273

Is Deterministic $S_{a(max)} < 1.5 * F_a$?

NO

Section 21.2.2 Scaling Factor:

N/A

Deterministic PGA:

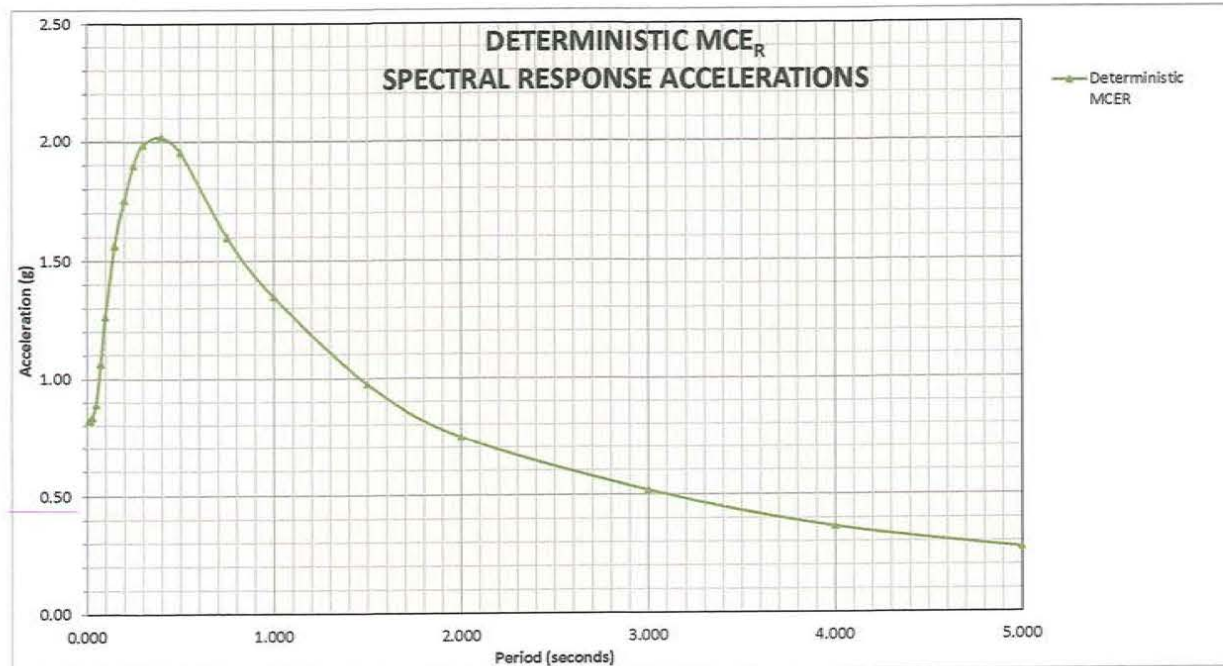
0.689

Is Deterministic PGA $\geq F_{PGA} * 0.5$?

YES

¹ NGAWest 2 GMPE worksheet and
Uniform California Earthquake Rupture
Forecast, Version 3 (UCERF3) - Time
Dependent Model

² Shahi-Baker RotD100/RotD50 Factors
(2014)



SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	0.951	0.819	0.819	0.546
0.100	1.591	1.262	1.262	0.841
0.200	2.149	1.753	1.753	1.168
0.300	2.442	1.984	1.984	1.323
0.500	2.408	1.953	1.953	1.302
0.750	2.006	1.598	1.598	1.066
1.000	1.698	1.347	1.347	0.898
2.000	0.990	0.745	0.745	0.496
3.000	0.684	0.516	0.516	0.344
4.000	0.496	0.364	0.364	0.243
5.000	0.382	0.273	0.273	0.182

ASCE 7-16: Section 21.4

Site Specific

	Calculated Value	Design Value
SDS:	1.190	1.190
SD1:	1.033	1.033
SMS:	1.786	1.786
SM1:	1.549	1.549
Site Specific PGAm:	0.689	0.689
Site Class:	D measured	

Seismic Design Category - Short*

D

Seismic Design Category - 1s*

D

* Risk Categories I, II, or III

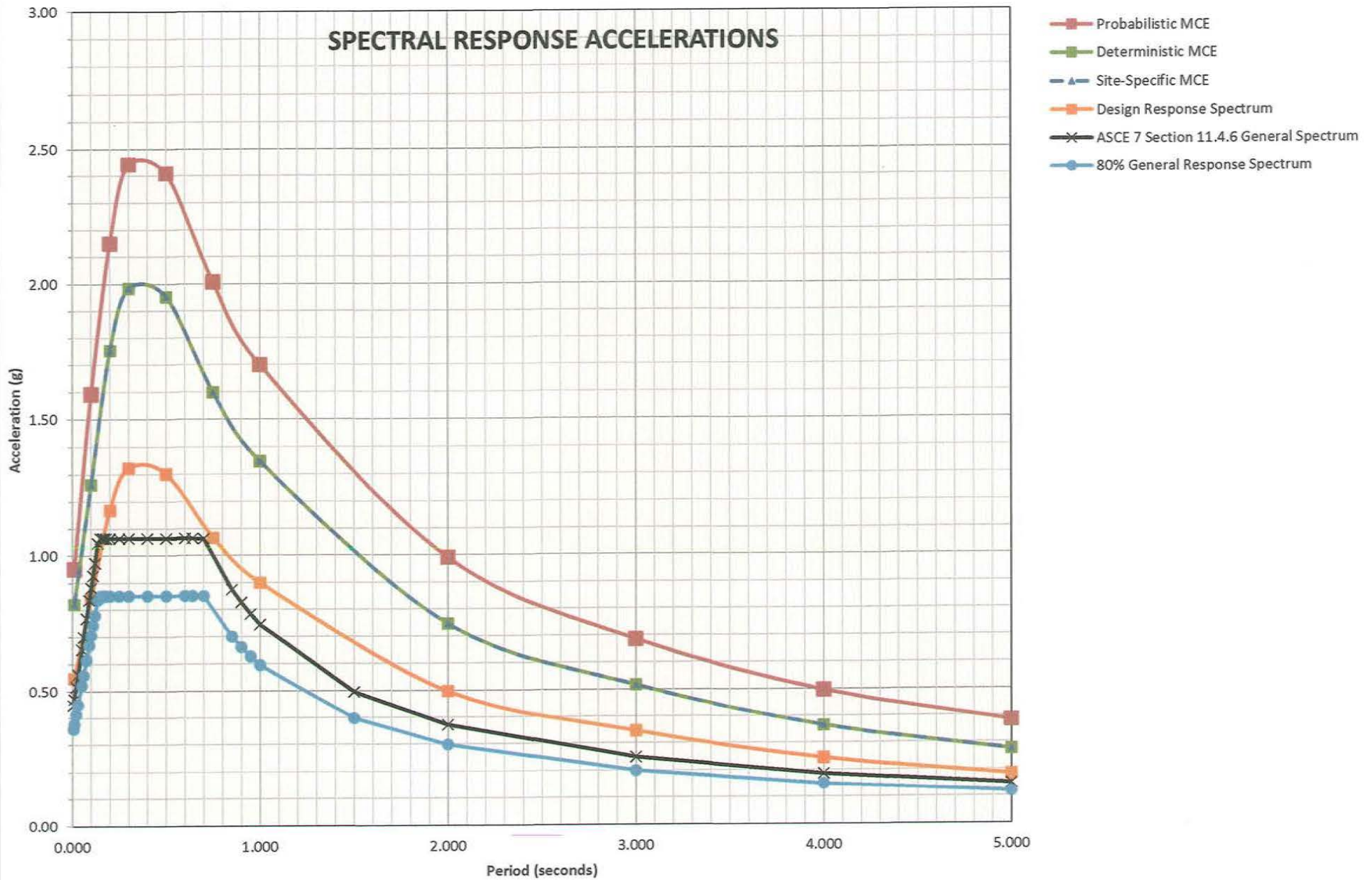
Period	ASCE 7 SECTION 11.4.6 General Spectrum	80% General Response Spectrum
0.005	0.448	0.359
0.010	0.471	0.377
0.020	0.517	0.413
0.030	0.562	0.450
0.050	0.653	0.523
0.060	0.699	0.559
0.075	0.768	0.614
0.090	0.836	0.669
0.100	0.882	0.705
0.110	0.927	0.742
0.120	0.973	0.778
0.136	1.046	0.837
0.150	1.063	0.851
0.160	1.063	0.851
0.170	1.063	0.851
0.180	1.063	0.851
0.200	1.063	0.851
0.250	1.063	0.851
0.300	1.063	0.851
0.400	1.063	0.851
0.500	1.063	0.851
0.600	1.063	0.851
0.640	1.063	0.851
0.700	1.062	0.850
0.850	0.875	0.700
0.900	0.826	0.661
0.950	0.783	0.626
1.000	0.743	0.595
1.500	0.496	0.397
2.000	0.372	0.297
3.000	0.248	0.198
4.000	0.186	0.149
5.000	0.149	0.119

Project No: 544-22319



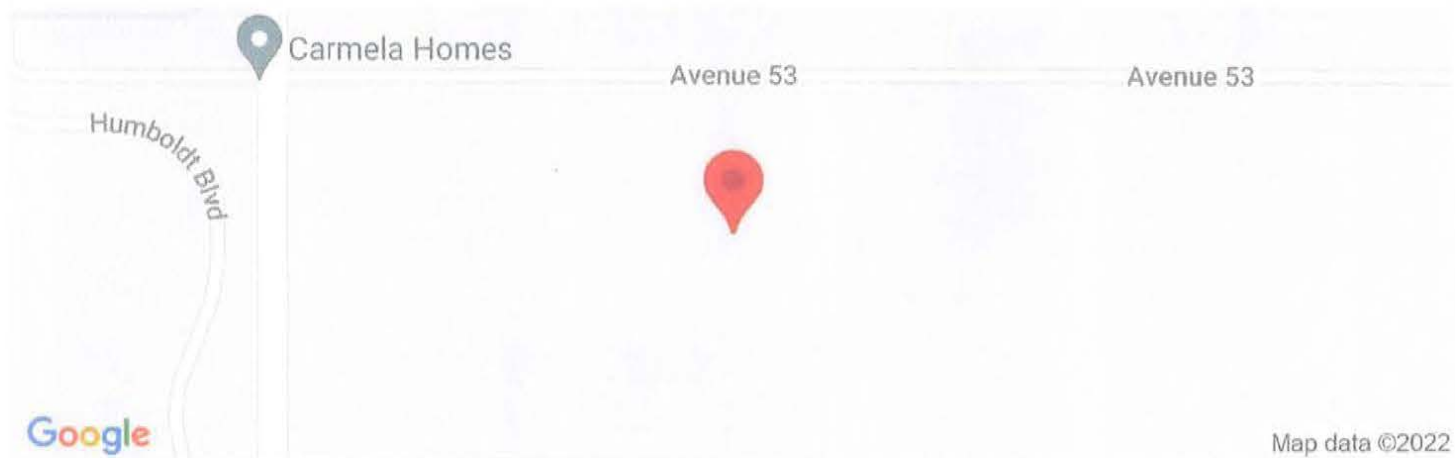
Sladden Engineering

SPECTRAL RESPONSE ACCELERATIONS





Latitude, Longitude: 33.6626, -116.2296



Map data ©2022

Date	10/17/2022, 10:55:02 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.595	MCE_R ground motion. (for 0.2 second period)
S_1	0.656	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.595	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.063	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.697	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.767	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
S_{sRT}	1.888	Probabilistic risk-targeted ground motion. (0.2 second)
S_{sUH}	2.1	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S_{sD}	1.595	Factored deterministic acceleration value. (0.2 second)
S_{1RT}	0.74	Probabilistic risk-targeted ground motion. (1.0 second)
S_{1UH}	0.836	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S_{1D}	0.656	Factored deterministic acceleration value. (1.0 second)
PGA_d	0.697	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.83	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.899	Mapped value of the risk coefficient at short periods
C_{R1}	0.884	Mapped value of the risk coefficient at a period of 1 s
C_v	1.419	Vertical coefficient

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APPENDIX H
LANDMARK (2022)

Geotechnical Report

APN 780-010-014

Vista Santa Rosa, California

Prepared for:

Bravo Properties, Inc.

P.O. Box 820

Palm Desert, CA 92240



Prepared by:

LandMark Consultants, Inc.

77-948 Wildcat Drive

Palm Desert, CA 92211

(760) 360-0665

April 2022



780 N. 4th Street
El Centro, CA 92243
(760) 370-3000
landmark@landmark-ca.com

77-948 Wildcat Drive
Palm Desert, CA 92211
(760) 360-0665
gchandra@landmark-ca.com

April 20, 2022

Mr. Pablo Bravo
MBG Construction, LLC
72670 Fred Waring Drive
Palm Desert, CA 92260

Geotechnical Report
APN 780-010-014
Vista Santa Rosa, California
LCI Report No.: LP22032

Dear Mr. Bravo:

As per your request, *LandMark Consultants, Inc.* is providing the following geotechnical report for the proposed single-family residential project located along Avenue 53, east of Monroe Street, Vista Santa Rosa, County of Riverside, California. The proposed development will consist of nine (9) new single-family residential homes that are planned to be one story, wood/metal-frame structures with shallow reinforced concrete foundations and slab-on-grade concrete floors.

Purpose of Work

The purpose of this study was to investigate the upper 50 feet of subsurface soil at selected locations within the site for evaluation of physical/engineering properties. From the analysis of the field and laboratory data, professional opinions were developed and are provided in this report regarding geotechnical conditions at this site and the effect on design and construction.

Authorization

Mr. Pablo Bravo of MBG Construction, LLC provided authorization by written agreement to proceed with our work on February 3, 2022. We conducted our work in general accordance with our written proposal dated January 11, 2022.

Field Exploration

Initial subsurface exploration was performed on March 14, 2022 using Cal Pac Drilling of Yucaipa, California to advance five (5) borings to a depth of 20 to 50 feet below existing ground surface. The borings were advanced with a truck-mounted, Mobile B-61 drill rig using 8-inch diameter, hollow-stem, continuous-flight augers. The approximate boring locations were established in the field and plotted on the site map by sighting to discernable site features. The boring locations are shown on the Site and Exploration Plan (Plate A-2).

Our geo-technician observed the drilling operations and maintained a log of the soil encountered and sampling depths, visually classified the soil encountered during drilling in accordance with the Unified Soil Classification System, and obtained drive tube and bulk samples of the subsurface materials at selected intervals. Relatively undisturbed soil samples were retrieved using a 2-inch outside diameter (OD) split-spoon sampler or a 3-inch OD Modified California Split-Barrel (ring) sampler. The samples were obtained by driving the sampler ahead of the auger tip at selected depths.

The drill rig was equipped with a 140-pound CME automatic hammer with a 30-inch drop for conducting Standard Penetration Tests (SPT) in accordance with ASTM D1586. The number of blows required to drive the samplers the last 12 inches of an 18-inch drive length into the soil is recorded on the boring logs as “blows per foot”. Blow counts reported on the boring logs represent the field blow counts. No corrections have been applied for effects of overburden pressure, automatic hammer drive energy, drill rod lengths, liners, and sampler diameter. When samples were not able to be driven an 18 inches depth, sampler penetration depth was recorded for 50 blows with a 140-lbs drive hammer.

After logging and sampling the soil, the exploratory borings were backfilled with the excavated material. The backfill was loosely placed and was not compacted to the requirements specified for engineered fill.

The subsurface logs are presented on Plates B-1 thru B-5 in Appendix B. A key to the log symbols is presented on Plate B-6. The stratification lines shown on the subsurface logs represent the approximate boundaries between the various strata. However, the transition from one stratum to another may be gradual over some range of depth.

Laboratory Testing

Laboratory tests were conducted on selected bulk soil samples to aid in classification and evaluation of selected properties of the site soils. The tests were conducted in general conformance to the procedures of the American Society for Testing and Materials (ASTM) or other standardized methods as referenced below. The laboratory testing program consisted of the following tests:

- < Particle Size Analyses (ASTM D422)
- < Unit Dry Densities (ASTM D2937)
- < Moisture Contents (ASTM D2216)
- < Moisture-Density Relationship (ASTM D1557)
- < Chemical Analyses (soluble sulfates & chlorides, pH, and resistivity) (Caltrans Methods)

The laboratory test results are presented on the subsurface logs (Appendix B) and Appendix C. Engineering parameters of soil strength, compressibility, and relative density utilized for developing design criteria provided within this report were extrapolated from data obtained from the field and laboratory testing program.

Site Conditions

The project site is rectangular shaped in plan view, elongated in the north-south direction, and is relatively flat-lying. The site currently is vacant. The project site is bounded by Avenue 53rd on the south. Adjacent properties are flat-lying and are approximately at the same elevation with this site. Vacant lots, farming and single-family residences are located to around the subject site. The Cahuilla Desert Academy is located to the northeast.

The project site lies at an elevation of approximately 25 to 30 feet below mean sea level (AMSL) in the Coachella Valley region of the California low desert. Annual rainfall in this arid region is less than 4 inches per year with four months of average summertime temperatures above 100 °F. Winter temperatures are mild, seldom reaching freezing.

Geologic Setting

The project site is located in the Coachella Valley portion of the Salton Trough physiographic province. The Salton Trough is a geologic structural depression resulting from large scale regional faulting. The trough is bounded on the northeast by the San Andreas Fault and Chocolate Mountains and the southwest by the Peninsular Range and faults of the San Jacinto Fault Zone.

The Salton Trough represents the northward extension of the Gulf of California, containing both marine and non-marine sediments since the Miocene Epoch. Tectonic activity that formed the trough continues at a high rate as evidenced by deformed young sedimentary deposits and high levels of seismicity. Figure 1 shows the location of the site in relation to regional faults and physiographic features.

The surrounding regional geology includes the Peninsular Ranges (Santa Rosa and San Jacinto Mountains) to the south and west, the Salton Basin to the southeast, and the Transverse Ranges (Little San Bernardino and Orocopia Mountains) to the north and east. Hundreds of feet to several thousand feet of Quaternary fluvial, lacustrine, and aeolian soil deposits underlie the Coachella Valley. The southeastern part of the Coachella Valley lies below sea level. In the geologic past, the ancient Lake Cahuilla submerged the area. Calcareous tufa deposits may be observed along the ancient shoreline as high as elevation 45 feet above mean seal level (AMSL) along the Santa Rosa Mountains from La Quinta southward. Lacustrine (lake bed) deposits comprise the subsurface soils over much of the eastern Coachella Valley with alluvial outwash along the flanks of the valley.

Subsurface Soils

Subsurface soils encountered during the field exploration conducted on March 14, 2022 consist of surficial silty sand (SM), sandy silt (ML) and sand (SP) overlying medium dense to dense sands (SP) and silty sands (SM) to a depth of 50 feet, the maximum depth of exploration. The near surface soils are non-expansive in nature. The subsurface logs (Plates B-1 thru B-5) depict the stratigraphic relationships of the various soil types.

Groundwater

Groundwater was not encountered in the borings during the time of exploration. Groundwater well information collected near the subject site (Well 336848N1162328W001), indicated that the ground water level ranges from 79 feet to 80 feet below the ground surfaces in the last 5 years. Groundwater levels may fluctuate with precipitation, irrigation of adjacent properties, drainage, and site grading. The groundwater level noted should not be interpreted to represent an accurate or permanent condition. Based on the regional topography, groundwater flow is assumed to be generally towards the southeast within the site area. Flow directions may vary locally in the vicinity of the site.

Faulting

The project site is located in the seismically active Coachella Valley of southern California with numerous mapped faults of the San Andreas Fault System traversing the region. We have performed a computer-aided search of known faults or seismic zones that lie within a 46-mile radius of the project site (Table 1). A fault map illustrating known active faults relative to the site is presented on Figure 1, *Regional Fault Map*. Figure 2 shows the project site in relation to local faults.

The criterion for fault classification adopted by the California Geological Survey defines Earthquake Fault Zones along active or potentially active faults. An active fault is one that has ruptured during Holocene time (roughly within the last 11,000 years). A fault that has ruptured during the last 1.8 million years (Quaternary time), but has not been proven by direct evidence to have not moved within Holocene time is considered to be potentially active. A fault that has not moved during Quaternary time is considered to be inactive.

Review of the current Alquist-Priolo Earthquake Fault Zone maps (CGS, 2000a) indicates that the nearest mapped Earthquake Fault Zone is the San Andreas – Coachella faults located approximately 5.4 miles northeast of the project site.

General Ground Motion Analysis

The project site is considered likely to be subjected to moderate to strong ground motion from earthquakes in the region. Ground motions are dependent primarily on the earthquake magnitude and distance to the seismogenic (rupture) zone. Acceleration magnitudes also are dependent upon attenuation by rock and soil deposits, direction of rupture and type of fault; therefore, ground motions may vary considerably in the same general area.

2019 CBC General Ground Motion Parameters: The California Building Code (CBC) requires that a site-specific ground motion hazard analysis be performed in accordance with ASCE 7-16 Section 11.4.8 for structures on Site Class D and E sites with S_1 greater than or equal to 0.2 and Site Class E sites with S_s greater than or equal to 1.0. *This project site has been classified as Site Class D and has a S_1 value of 0.67, which would require a site-specific ground motion hazard analysis.* However, ASCE 7-16 Section 11.4.8 provides three exceptions which permit the use of conservative values of design parameters for certain conditions for Site Class D and E sites in lieu of a site-specific hazard analysis.

The exceptions are:

- Exception 1: Structures on Site Class E sites with S_s greater than or equal to 1.0, provided the site coefficient F_a is taken as equal to that of Site Class C.
- Exception 2: Structures on Site Class D sites with S_1 greater than or equal to 0.2, provided the value of the seismic response coefficient C_s is determined by Equations 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Equation 12.8-3 for $T_L \geq T > 1.5T_s$ or Equation 12.8-4 for $T > T_L$.
- Exception 3: Structures on Site Class E sites with S_1 greater than or equal to 0.2, provided that T is less than or equal to T_s and the equivalent static force procedure is used for design.

Based on our understanding of the proposed development, the seismic design parameters presented in Table 2 were calculated assuming that one of the exceptions listed above applies to the proposed structures at this site. **However, the structural engineer should verify that one of the exceptions is applicable to the proposed structures.** If none of the exceptions apply, our office should be consulted to perform a site-specific ground motion hazard analysis.

The 2019 CBC general ground motion parameters are based on the Risk-Targeted Maximum Considered Earthquake (MCE_R). The Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps Web Application (SEAOC, 2020) was used to obtain the site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters.

Design spectral response acceleration parameters are defined as the earthquake ground motions that are two-thirds ($2/3$) of the corresponding MCE_R ground motions. The Maximum Considered Earthquake Geometric Mean (MCE_G) peak ground acceleration adjusted for soil site class effects (PGA_M) value to be used for liquefaction and seismic settlement analysis in accordance with 2019 CBC Section 1803A.5.12 ($PGA_M = F_{PGA} * PGA$) is estimated at 0.79g for the project site. ***Design earthquake ground motion parameters are provided in Table 2.***

Seismic and Other Hazards

► **Groundshaking.** The primary seismic hazard at the project site is the potential for strong groundshaking during earthquakes along the San Andreas fault. A further discussion of groundshaking mentioned above.

► **Surface Rupture.** The project site does not lie within a State of California, Alquist-Priolo Earthquake Fault Zone or County of Riverside Fault Zone. Surface fault rupture is considered to be unlikely at the project site because of the well-delineated fault lines through the Coachella Valley as shown on USGS and CDMG maps. However, because of the high tectonic activity and deep alluvium of the region, we cannot preclude the potential for surface rupture on undiscovered or new faults that may underlie the site.

► **Liquefaction.** Liquefaction is not a potential design consideration because of the depth to groundwater.

Other Potential Geologic Hazards.

► **Landsliding.** The hazard of landsliding is unlikely due to the regional planar topography. No ancient landslides are shown on geologic maps of the region and no indications of landslides were observed during our site investigation.

► **Volcanic hazards.** The site is not located in proximity to any known volcanically active area and the risk of volcanic hazards is considered very low.

► **Tsunamis, sieches, and flooding.** The site does not lie near any large bodies of water, so the threat of tsunami, sieches, or other seismically-induced flooding is unlikely.

► **Expansive soil.** The near surface soils at the project site consist of sands which are non-expansive.

Seismic Settlement

An evaluation of the non-liquefaction seismic settlement potential was performed using the relationships developed by Tokimatsu and Seed (1984, 1987) for dry sands. This method is an empirical approach to quantify seismic settlement using SPT blow counts and PGA estimates from the probabilistic seismic hazard analysis.

The soils beneath the site consist primarily of medium dense to dense sands. Based on the empirical relationships, total induced settlements are estimated to be less than ½ inch in the event of a MCE_G earthquake (0.79g peak ground acceleration). Should settlement occur, buried utility lines and the buildings may not settle equally. Therefore, we recommend that utilities, especially at the points of entry to the buildings, be designed to accommodate differential movement. The computer printouts for the estimates of induced settlement are included in Appendix D.

Hydroconsolidation

In arid climatic regions, granular soils have a potential to collapse upon wetting. This collapse (hydro-consolidation) phenomena is the result of the lubrication of soluble cements (carbonates) in the soil matrix causing the soil to densify from its loose configuration during deposition. Based on our experience in the vicinity of the project site, there is a slight risk of collapse upon inundation from at the site. Therefore, development of building foundation is not required to include provisions for mitigating the hydro-consolidation caused by soil saturation from landscape irrigation or broken utility lines.

Soil Infiltration Rate

A total of two (2) infiltration tests were conducted on April 14, 2022 at the proposed location for the on-site storm-water retention basin as shown on the Site and Exploration Plan (Plate A-2). The infiltration tests were performed to the guideline from Design Handbook for Low Impact Development Best Management Practices, prepared by Riverside County Flood Control and Water Conservation District, Appendix A, Section 2.3, dated September 2011.

The tests were performed using perforated pipes inside a 6-inch diameter hand auger borehole made to depths of approximately 5.0 feet below the existing ground surface, corresponding to the anticipated bottom depth of the stormwater retention basin. The pipes were filled with water and successive readings of drop in water levels were made every 10 minutes for a total elapsed time of 60 minutes, until a stabilization drop was recorded.

The test results indicate that the stabilized soil infiltration rate for the soil ranges from 4.8 to 5.8 inches per hour. A maximum soil infiltration rate of 4.8 inches per hour may be used for the on-site storm-water retention basin design. An oil/water separator should be installed at inlets to the stormwater retention basin to prevent sealing of the basin bottom with silt and oil residues. The field and conversion calculation worksheets are included in Appendix E.

We recommend additional testing should be performed after the completion of rough grading operations, to verify the soil infiltration rate.

Site Preparation

Pre-grade Meeting: Prior to site preparation, a meeting should be held at the site with as a minimum, the owner's representative, grading contractor and geotechnical engineer in attendance.

Clearing and Grubbing: Any surface improvements, debris or vegetation including grass, trees, and weeds on the site at the time of construction should be removed from the construction area. Root balls should be completely excavated. Organic stripping should be hauled from the site and not used as fill.

Any trash, construction debris, concrete slabs, old pavement, landfill, and buried obstructions such as old foundations, un-controlled fills and utility lines exposed during rough grading should be traced to the limits of the foreign material by the grading contractor and removed under our supervision. Any excavations resulting from site clearing should be dish-shaped to the lowest depth of disturbance and backfilled under the observation of the geotechnical engineer's representative.

Mass Grading: Prior to placing any fills, the surface 12 inches of soil should be removed, the exposed surface should be scarified to a depth of 8 inches, uniformly moisture conditioned to $\pm 2\%$ over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density. Native soils may be used for mass grading, placed in 6 inches maximum lifts, uniformly moisture conditioned to at least 2% over optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density

Building Pad Preparation: The existing surface soil within the proposed building pad areas should be removed to 18 inches below the original grade or 36 inches below the lowest foundation grade (whichever deeper), extending five feet beyond all exterior wall/column lines (including adjacent concrete areas). Exposed sub-grade should be scarified to a depth of 6 to 8 inches, uniformly moisture conditioned to at least 2% over optimum moisture content, and re-compacted a minimum of 90% of the maximum density determined in accordance with ASTM D1557 methods.

Auxiliary Structures Foundation Preparation: Auxiliary structures such as free standing or retaining walls should have footings extended to a minimum of 18 inches below grade. The existing soil beneath the structure foundation prepared in the manner described for the house pad except the preparation needs only to extend 18 inches below and beyond the footing.

Sidewalk and Concrete Hardscape Areas: In areas other than the building pad which are to receive concrete slabs, the ground surface should be over-excavated to a depth of 8 to 12 inches, uniformly moisture conditioned to least 2% of optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density.

The on-site soils are suitable for use as compacted fill and utility trench backfill. Imported fill soil (if required) should be similar to onsite soil or non-expansive, granular soil meeting the USCS classifications of SM, SP-SM, or SW-SM with a maximum rock size of 6 inches and no less than 5% passing the No. 200 sieve. *The geotechnical engineer should approve imported fill soil sources before hauling material to the site.* Native and imported materials should be placed in lifts no greater than 8 inches in loose thickness, uniformly moisture conditioned to $\pm 2\%$ of optimum moisture, and re-compacted to at least 90% of ASTM D1557 maximum density.

Moisture Control and Drainage: The moisture condition of the house pad should be maintained during trenching and utility installation until concrete is placed or should be rewetted before initiating delayed construction. Adequate site drainage is essential to future performance of the project. Infiltration of excess irrigation water and stormwaters can adversely affect the performance of the subsurface soil at the site. Positive drainage should be maintained away from all structures (5% for 5 feet minimum across unpaved areas) to prevent ponding and subsequent saturation of the native soil.

Gutters and downspouts may be considered as a means to convey water away from foundations. If landscape irrigation is allowed next to the building, drip irrigation systems or lined planter boxes should be used. Drainage should be maintained without ponding.

Utility Trench Backfill

On-site soil free of debris, vegetation, and other deleterious matter may be suitable for use as utility trench backfill. Backfill within roadway should, at a minimum, conform to County of Riverside Standard No. 818 – Utility Trench Backfill (Appendix F).

Backfill within roadways should be placed in layers not more than 6 to 8 inches in thickness, uniformly moisture conditioned to least 2% of optimum moisture and mechanically compacted to a minimum of 90% of the ASTM D1557 maximum dry density except for the top 12 inches of the trench which shall be compacted to at least 95%. Native backfill should only be placed and compacted after encapsulating buried pipes with suitable bedding and pipe envelope material.

Pipe envelope/bedding should be clean sand (Sand Equivalent $SE > 30$). Precautions should be taken in the compaction of the backfill to avoid damage to the pipes and structures.

Building Foundations and Settlements

Shallow Foundation: Shallow column footings and continuous wall footings are suitable to support the building structures provided they are founded on a layer of properly prepared and compacted soil as described above. The foundations may be designed using an allowable soil bearing pressure of 1,800 psf. The allowable soil pressure may be increased by 20% for each foot of embedment depth in excess of 18 inches and by one-third for short term loads induced by winds or seismic events. The maximum allowable soil pressure at increased embedment depths shall not exceed 2,800 psf.

All exterior and interior foundations should be embedded a minimum of 18 inches deep. Continuous wall footings should have a minimum width of 12 inches. Spread footings should have a minimum width of 24 inches and should not be structurally isolated. ***Recommended concrete reinforcement and sizing for all footings should be provided by the structural engineer.*** Resistance to horizontal loads will be developed by passive earth pressure on the sides of footings and frictional resistance developed along the bases of footings and concrete slabs.

Passive resistance to lateral earth pressure may be calculated using an equivalent fluid pressure of 320 pcf to resist lateral loadings. The top one foot of embedment should not be considered in computing passive resistance unless the adjacent area is confined by a slab or pavement. An allowable friction coefficient of 0.38 may also be used at the base of the footings to resist lateral loading.

Slabs-on-Grade

Concrete slabs and flatwork should be a minimum of 4 inches thick. The concrete floor slabs may either be monolithically placed with the foundation or dowelled after footing placement. The concrete slabs may be placed on granular subgrade that has been compacted at least 90% relative compaction (ASTM D1557). ***Slab thickness and steel reinforcement should be determined by the design engineer.***

American Concrete Institute (ACI) guidelines (ACI 302.1R-15 Chapter 5, Section 5.2.3) provide recommendations regarding the use of moisture barriers beneath concrete slabs. The concrete floor slabs should be underlain by a 10-mil polyethylene vapor retarder that works as a capillary break to reduce moisture migration into the slab section. All laps and seams should be overlapped 6-inches or as recommended by the manufacturer. The vapor retarder should be protected from puncture. The joints and penetrations should be sealed with the manufacturer's recommended adhesive, pressure-sensitive tape, or both. The vapor retarder should extend a minimum of 12 inches into the footing excavations. The vapor retarder may lie directly on the granular fill with 2 inches of clean sand cover.

Placing sand over the vapor retarder may increase moisture transmission through the slab, because it provides a reservoir for bleed water from the concrete to collect. The sand placed over the vapor retarder may also move and mound prior to concrete placement, resulting in an irregular slab thickness. For areas with moisture sensitive flooring materials, ACI recommends that concrete slabs be placed without a sand cover directly over the vapor retarder, provided that the concrete mix uses a low-water cement ratio and concrete curing methods are employed to compensate for release of bleed water through the top of the slab. The vapor retarder should have a minimum thickness of 15-mil (Stego-Wrap or equivalent). All independent concrete flatworks should be underlain by 12 inches of moisture conditioned and compacted soils. All flatwork should be jointed in square patterns and at irregularities in shape at a maximum spacing of 10 feet or the least width of the sidewalk.

Concrete Mixes and Corrosivity

Selected chemical analyses for corrosivity were conducted on bulk samples of the near surface soil from the project site (Plate C-2). The native soils have low levels of sulfate and low chloride ion concentrations. Resistivity determinations on the soil indicate a moderate potential for metal loss because of electrochemical corrosion processes. A minimum of 2,500 psi concrete of Type II Portland Cement with a maximum water/cement ratio of 0.6 (by weight) should be used for concrete placed in contact with native soil on this project (sitework including streets, sidewalks, driveways, hardscape, and foundations).

Landmark does not practice corrosion engineering. We recommend that a qualified corrosion engineer evaluate the corrosion potential on metal construction materials and concrete at the site.

Permanent Slopes

Cut and Fill slopes should be constructed generally no steeper than 3 (H):1(V) to permit slope maintenance with motor graders, and provide erosional stability from wind or rain while unprotected without landscape cover. Slopes with a 2(H):1(V) gradient are permitted, provided it is recognized that such slopes are more prone to erosion and do not permit maintenance by motorized riding equipment and require landscape cover to retard erosion.

Pavements

Pavements should be designed according to CALTRANS or other acceptable methods. Traffic indices were not provided by the project engineer or owner; therefore, we have provided structural sections for several traffic indices for comparative evaluation. The public agency or design engineer should decide the appropriate traffic index for the site. Maintenance of proper drainage is necessary to prolong the service life of the pavements. Based on the current State of California CALTRANS method, an estimated R-value of 50 for the subgrade soil and assumed traffic indices, the following table provides our estimates for asphaltic concrete (AC) pavement sections.

PAVEMENT STRUCTURAL SECTIONS

R-Value of Subgrade Soil - 50 (minimum)

Design Method - CALTRANS 2020

Traffic Index (assumed)	Flexible Pavements		Rigid (PCC) Pavements	
	Asphaltic Concrete Thickness (in.)	Aggregate Base Thickness (in.)	Concrete Thickness (in.)	Aggregate Base Thickness (in.)
4.0	2.5	4.0	4.0	4.0
5.0	3.0	4.0	6.0	4.0
6.0	3.0	4.0	6.0	6.0

Notes:

- 1) Asphaltic concrete shall be Caltrans, Type B, ¾ inch maximum medium grading, (½ inch for parking areas) medium grading with PG70-10 asphalt concrete, compacted to a minimum of 95% of the 50-blow Marshall density (ASTM D1559).
- 2) Aggregate base shall conform to Caltrans Class 2 (¾ in. maximum), compacted to a minimum of 95% of ASTM D1557 maximum dry density.
- 3) Place pavements on 12 inches of moisture conditioned (at least 2% of over optimum) native soil compacted to a minimum of 95% of the maximum dry density determined by ASTM D1557, or the governing agency requirements.
- 4) Portland cement concrete for pavements should have Type V cement, a minimum compressive strength of 3,250 psi at 28 days, and a maximum water-cement ratio of 0.55.

Final recommended pavement sections may need to be based on sampling and R-Value testing during grading operations when actual subgrade soils will be exposed.

Observation and Density Testing

Site preparation and fill placement should be continuously observed and tested by a representative of a qualified geotechnical engineering firm. Near full-time observation services during the excavation and scarification process is necessary to detect undesirable materials or conditions and soft areas that may be encountered in the construction area. The geotechnical firm that provides observation and testing during construction shall assume the responsibility of "*geotechnical engineer of record*" and, as such, shall perform additional tests and investigation as necessary to satisfy themselves as to the site conditions and the recommendations for site development.

Closure

We did not encounter soil conditions that would preclude implementation of the proposed project provided the recommendations contained in this report are implemented in the design and construction of this project.

We recommend that *Landmark Consultants, Inc.* be retained to provide the tests and observations services during construction. *The geotechnical engineering firm providing such tests and observations shall become the geotechnical engineer of record and assume responsibility for the project.*

Landmark Consultants, Inc. recommendations for this site are, to a high degree, dependent upon appropriate quality control of subgrade preparation, fill placement, and foundation construction. Accordingly, the findings and professional opinions in this report are made contingent upon the opportunity for Landmark Consultants, Inc. to observe grading operations and foundation excavations for the proposed construction.

If parties other than Landmark Consultants, Inc. are engaged to provide observation and testing services during construction, such parties must be notified that they will be required to assume complete responsibility as the geotechnical engineer of record for the geotechnical phase of the project by concurring with the recommendations in this report and/or by providing alternative recommendations.

Additional information concerning the scope and cost of these services can be obtained from our office.

We appreciate the opportunity to provide our findings and professional opinions regarding geotechnical conditions at the site. If you have any questions or comments regarding our findings, please call our office at (760) 360-0665.

Respectfully Submitted,
LandMark Consultants, Inc.



Greg M. Chandra, P.E., M.ASCE
Principal Engineer



Attachments:

- Appendix A: Vicinity and Site Maps
- Appendix B: Subsurface Soil Logs and Soil Key
- Appendix C: Laboratory Test Results
- Appendix D: Settlement Calculations
- Appendix E: Soil Infiltration Test Results
- Appendix F: Utility Trench Backfill

TABLES

Table 1
Summary of Characteristics of Closest Known Active Faults

Fault Name	Approximate Distance (miles)	Approximate Distance (km)	Maximum Moment Magnitude (Mw)	Fault Length (km)	Slip Rate (mm/yr)
San Andreas - Coachella	5.4	8.6	7.2	96 ± 10	25 ± 5
Indio Hills *	6.3	10.1			
San Andreas - San Bernardino (South)	7.8	12.5	7.4	103 ± 10	30 ± 7
San Andreas - San Bernardino (North)	7.9	12.7	7.5	103 ± 10	24 ± 6
Blue Cut *	16.8	26.9			
Garnet Hill *	18.1	29.0			
San Jacinto - Anza	19.4	31.1	7.2	91 ± 9	12 ± 6
Eureka Peak	21.0	33.6	6.4	19 ± 2	0.6 ± 0.4
San Jacinto - Coyote Creek	22.3	35.7	6.8	41 ± 4	4 ± 2
Hot Springs *	28.4	45.4			
Burnt Mtn.	29.1	46.6	6.5	21 ± 2	0.6 ± 0.4
San Jacinto - Borrego	32.2	51.5	6.6	29 ± 3	4 ± 2
Morongo *	32.9	52.6			
Pinto Mtn.	33.0	52.8	7.2	74 ± 7	2.5 ± 2
Pisgah Mtn. - Mesquite Lake	33.5	53.6	7.3	89 ± 9	0.6 ± 0.4
Landers	36.2	58.0	7.3	83 ± 8	0.6 ± 0.4
Earthquake Valley	39.5	63.2	6.5	20 ± 2	2 ± 1
San Jacinto - San Jacinto Valley	41.9	67.0	6.9	43 ± 4	12 ± 6
Elsinore - Julian	43.2	69.1	7.1	76 ± 8	5 ± 2
S. Emerson - Copper Mtn.	43.5	69.6	7	54 ± 5	0.6 ± 0.4
Elmore Ranch	44.4	71.0	6.6	29 ± 3	1 ± 0.5
Johnson Valley (northern)	45.5	72.8	6.7	35 ± 4	0.6 ± 0.4

* Note: Faults not included in CGS database.

Table 2
2019 California Building Code (CBC) and ASCE 7-16 Seismic Parameters

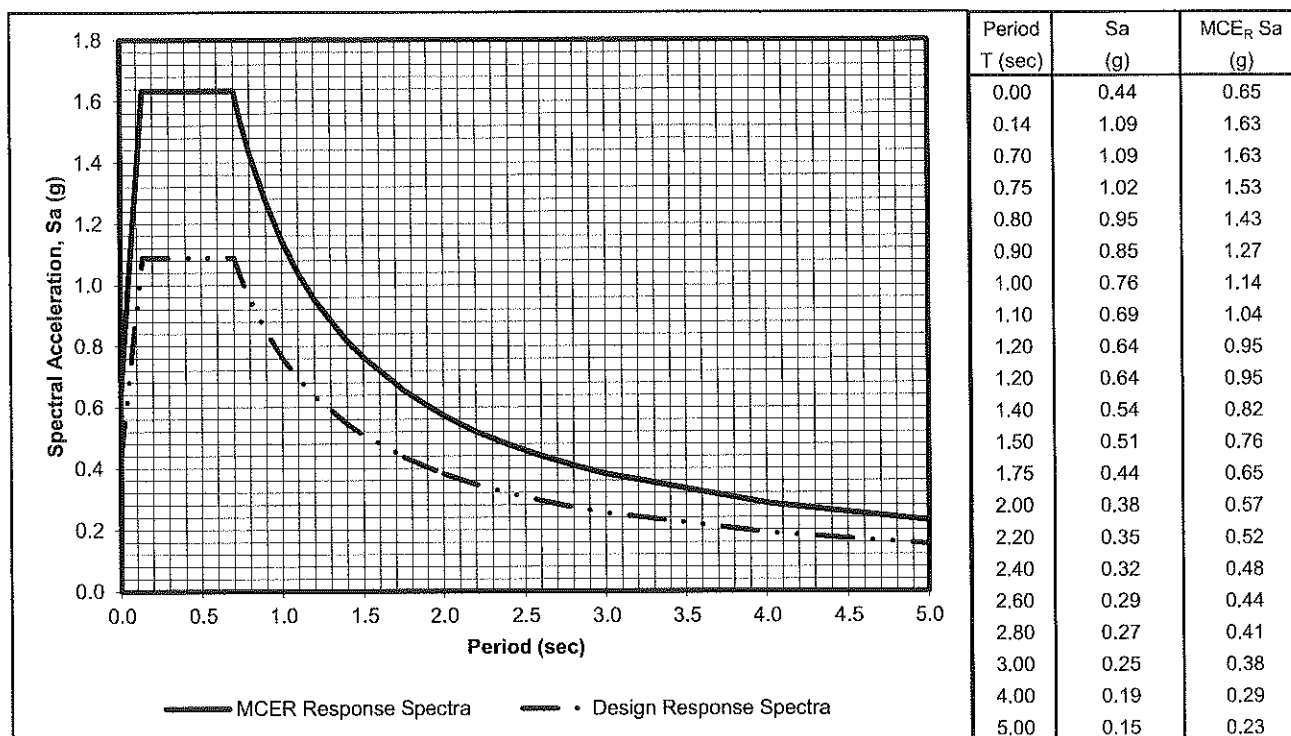
Soil Site Class:	D	<u>ASCE 7-16 Reference</u> Table 20.3-1
Latitude:	33.6657 N	
Longitude:	-116.2263 W	
Risk Category:	II	
Seismic Design Category:	D	

Maximum Considered Earthquake (MCE) Ground Motion

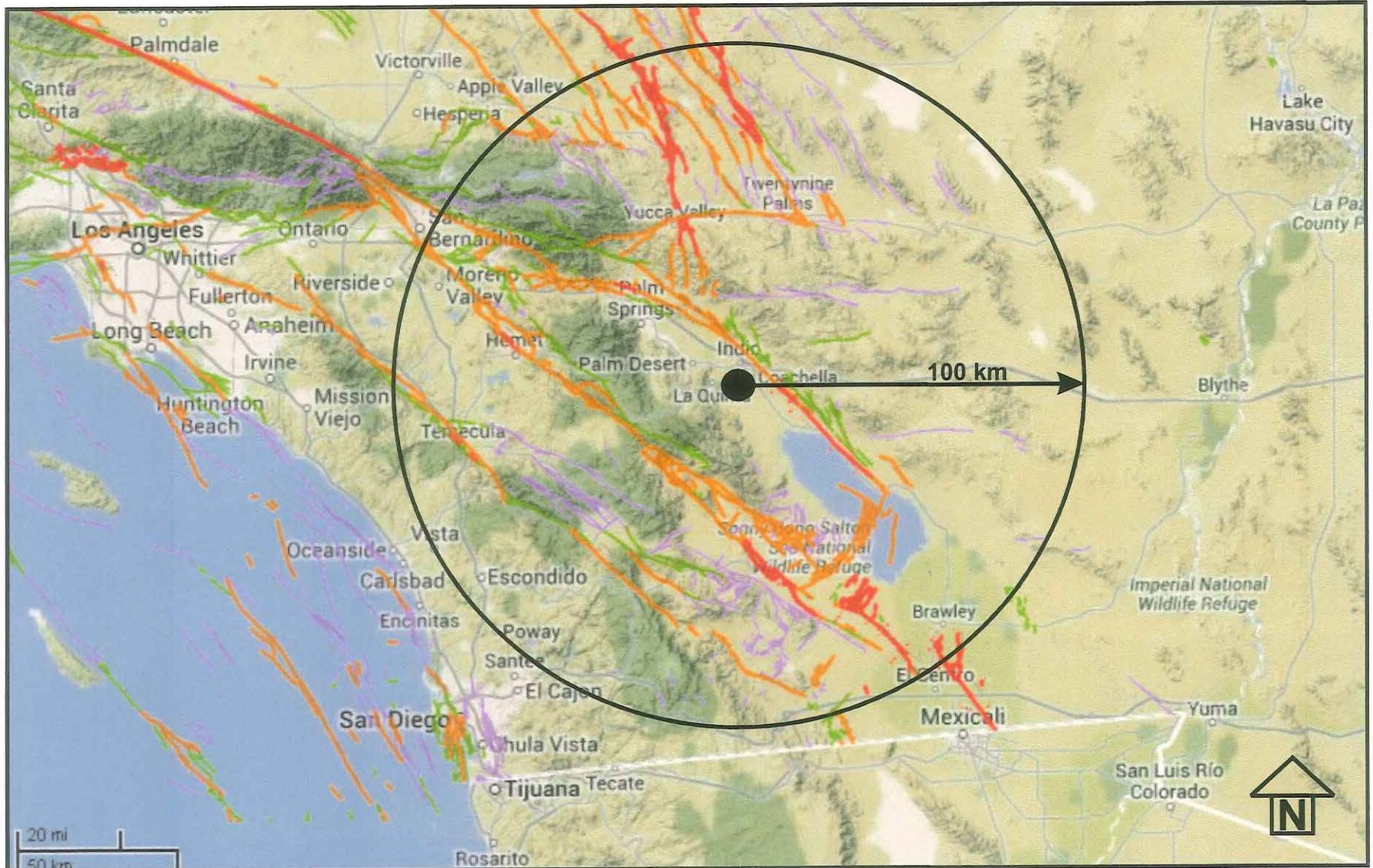
Mapped MCE _R Short Period Spectral Response	S_s	1.634 g	ASCE Figure 22-1
Mapped MCE _R 1 second Spectral Response	S_1	0.673 g	ASCE Figure 22-2
Short Period (0.2 s) Site Coefficient	F_a	1.00	ASCE Table 11.4-1
Long Period (1.0 s) Site Coefficient	F_v	1.70	ASCE Table 11.4-2
MCE _R Spectral Response Acceleration Parameter (0.2 s)	S_{MS}	1.634 g	= $F_a * S_s$ ASCE Equation 11.4-1
MCE _R Spectral Response Acceleration Parameter (1.0 s)	S_{M1}	1.144 g	= $F_v * S_1$ ASCE Equation 11.4-2

Design Earthquake Ground Motion

Design Spectral Response Acceleration Parameter (0.2 s)	S_{DS}	1.089 g	= $2/3 * S_{MS}$ ASCE Equation 11.4-3
Design Spectral Response Acceleration Parameter (1.0 s)	S_{D1}	0.763 g	= $2/3 * S_{M1}$ ASCE Equation 11.4-4
Risk Coefficient at Short Periods (less than 0.2 s)	C_{RS}	0.897	ASCE Figure 22-17
Risk Coefficient at Long Periods (greater than 1.0 s)	C_{RI}	0.883	ASCE Figure 22-18
	T_L	8.00 sec	ASCE Figure 22-12
	T_O	0.14 sec	= $0.2 * S_{D1} / S_{DS}$
	T_S	0.70 sec	= S_{D1} / S_{DS}
Peak Ground Acceleration	PGA_M	0.79 g	ASCE Equation 11.8-1



FIGURES



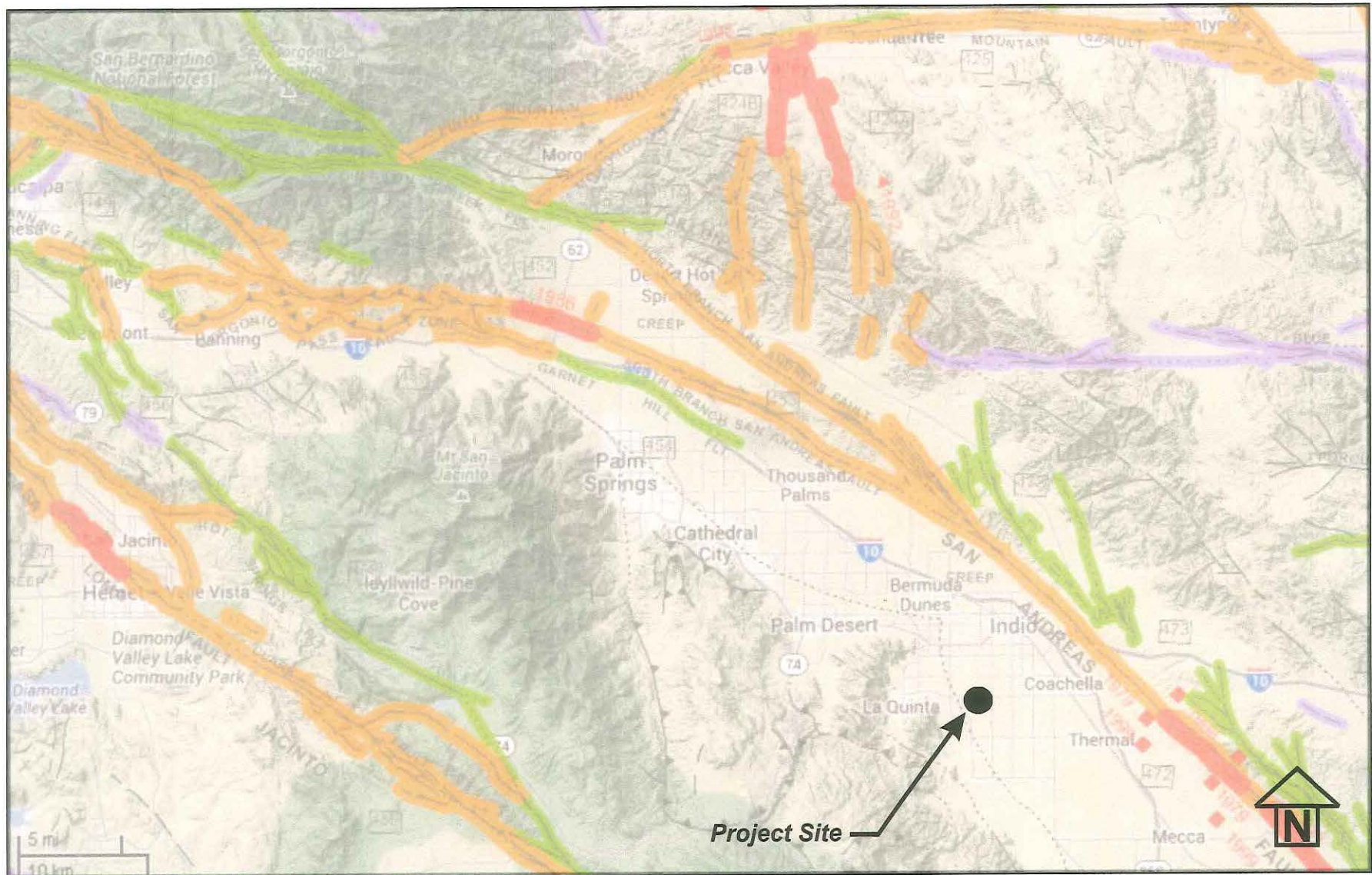
Source: California Geological Survey 2010 Fault Activity Map of California
<http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html#>

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Regional Fault Map

Figure 1



Source: California Geological Survey 2010 Fault Activity Map of California
<http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html#>

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Project No.: LP22032

Map of Local Faults

Figure 2

EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. Concealed faults in the Great Valley are based on maps of selected subsurface horizons, so locations shown are approximate and may indicate structural trend only. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE (Indicating Recency of Movement)



Fault along which historic (last 200 years) displacement has occurred and is associated with one or more of the following:

(a) a recorded earthquake with surface rupture. (Also included are some well-defined surface breaks caused by ground shaking during earthquakes, e.g. extensive ground breakage, not on the White Wolf fault, caused by the Arvin-Tehachapi earthquake of 1952). The date of the associated earthquake is indicated. Where repeated surface ruptures on the same fault have occurred, only the date of the latest movement may be indicated, especially if earlier reports are not well documented as to location of ground breaks.

(b) fault creep slippage - slow ground displacement usually without accompanying earthquakes.

(c) displaced survey lines.



A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.



Date bracketed by triangles indicates local fault break.



No triangle by date indicates an intermediate point along fault break.



Fault that exhibits fault creep slippage. Hechures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.



Square on fault indicates where fault creep slippage has occurred that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).



Holocene fault displacement (during past 11,700 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridges, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting.



Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults except features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.



Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement sometime during the past 1.6 million years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age. Unnumbered Quaternary faults were based on Fault Map of California, 1975. See Bulletin 201, Appendix D for source data.



Pre-Quaternary fault (older than 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissance nature, or was not done with the object of dating fault displacements. Faults in this category are not necessarily inactive.

ADDITIONAL FAULT SYMBOLS



Bar and ball on downthrown side (relative or apparent).



Arrows along fault indicate relative or apparent direction of lateral movement.



Arrow on fault indicates direction of dip.



Low angle fault (barbs on upper plate). Fault surface generally dips less than 45° but locally may have been subsequently steepened. On offshore faults, barbs simply indicate a reverse fault regardless of steepness of dip.

OTHER SYMBOLS



Numbers refer to annotations listed in the appendices of the accompanying report. Annotations include fault name, age of fault displacement, and pertinent references including Earthquake Fault Zone maps where a fault has been zoned by the Alquist-Priolo Earthquake Fault Zoning Act. This Act requires the State Geologist to delineate zones to encompass faults with Holocene displacement.



Structural discontinuity (offshore) separating differing Neogene structural domains. May indicate discontinuities between basement rocks.

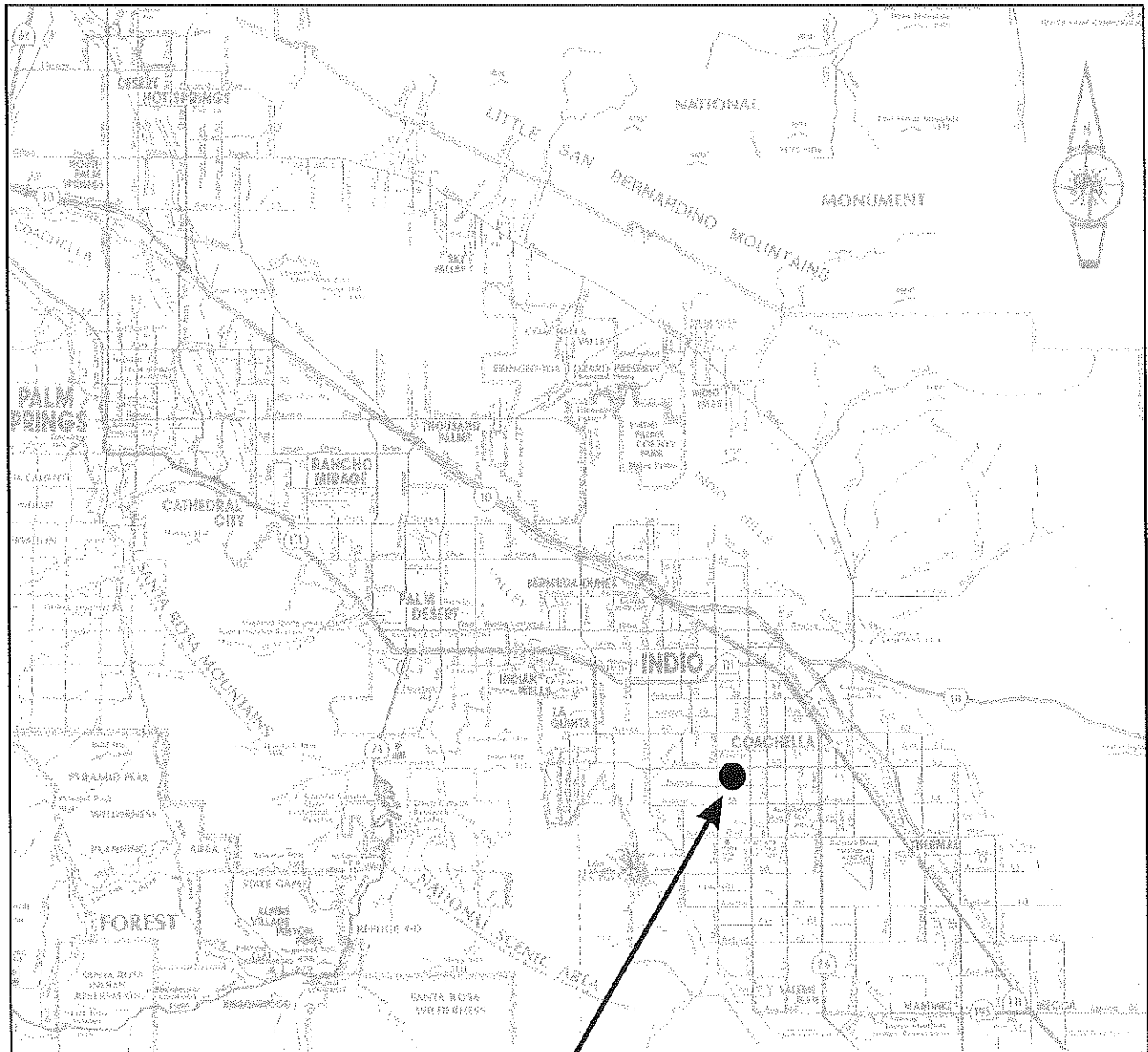


Brawley Seismic Zone, a linear zone of seismicity locally up to 10 km wide associated with the releasing step between the Imperial and San Andreas faults.

Geologic Time Scale	Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
				ON LAND	OFFSHORE
Quaternary	Historic	[Red line with triangle]	[Red line]	Displacement during historic time (e.g. San Andreas fault 1869). Includes areas of known fault creep.	
	200	[Red line]	[Red line]	Displacement during Holocene time.	Fault offsets Holocene sediments (or strata of Pleistocene age).
	11,700	[Yellow line]	[Yellow line]	Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
Early Quaternary	700,000	[Green line]	[Green line]	Unnumbered Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
	1,600,000*	[Brown line]	[Brown line]	Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
Pre-Quaternary	4.5 billion (Age of Earth)	[Dotted line]	[Dotted line]		

* Quaternary now recognized as extending to 2.6 Ma (Walker and Geissman, 2009). Quaternary faults in this map were established using the previous 1.6 Ma criterion.

APPENDIX A



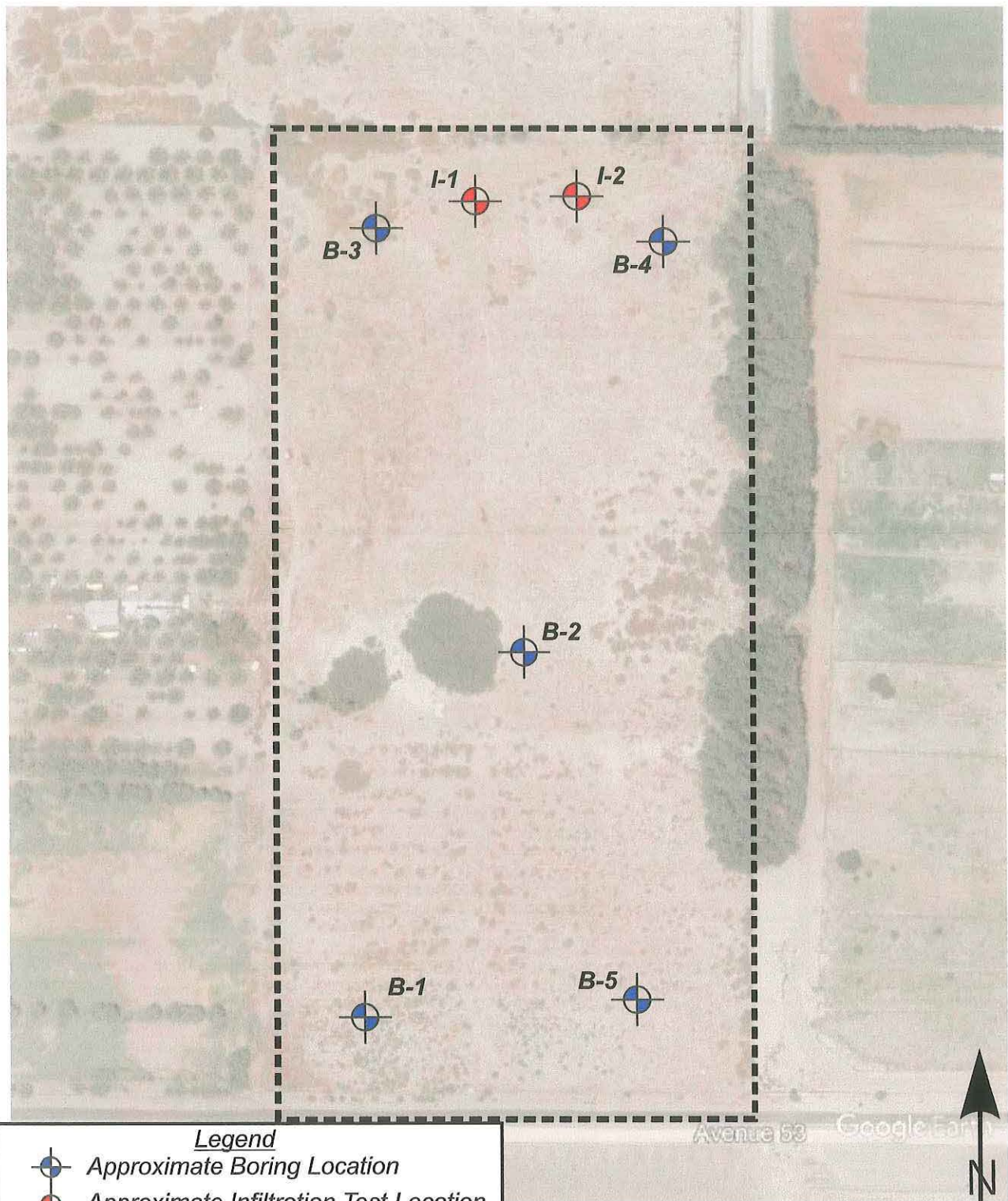
Project Site

LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Vicinity Map

**Plate
A-1**



Legend

 Approximate Boring Location

 Approximate Infiltration Test Location

0 300

Scale in Feet

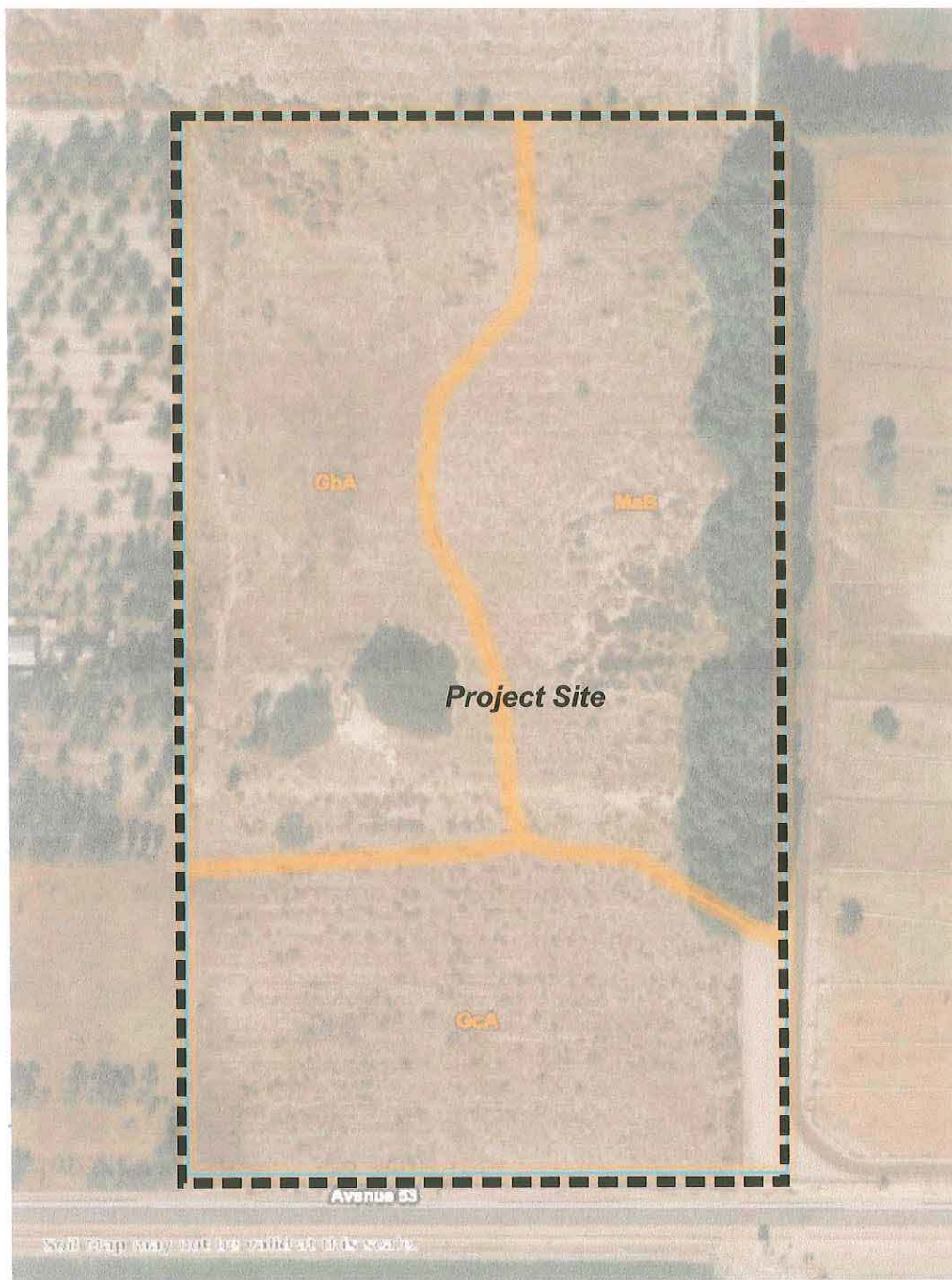


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Project No.: LP22032

Site and Exploration Plan

Plate
A-2



11 13 41' W



Map Scale: 1"=250' printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84

11 13 41' W



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

4/21/2022
Page 1 of 3

LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

**USDA Soil Conservation
Soil Service Map**

**Plate
A-3**

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California

Survey Area Data: Version 13, Sep 15, 2021

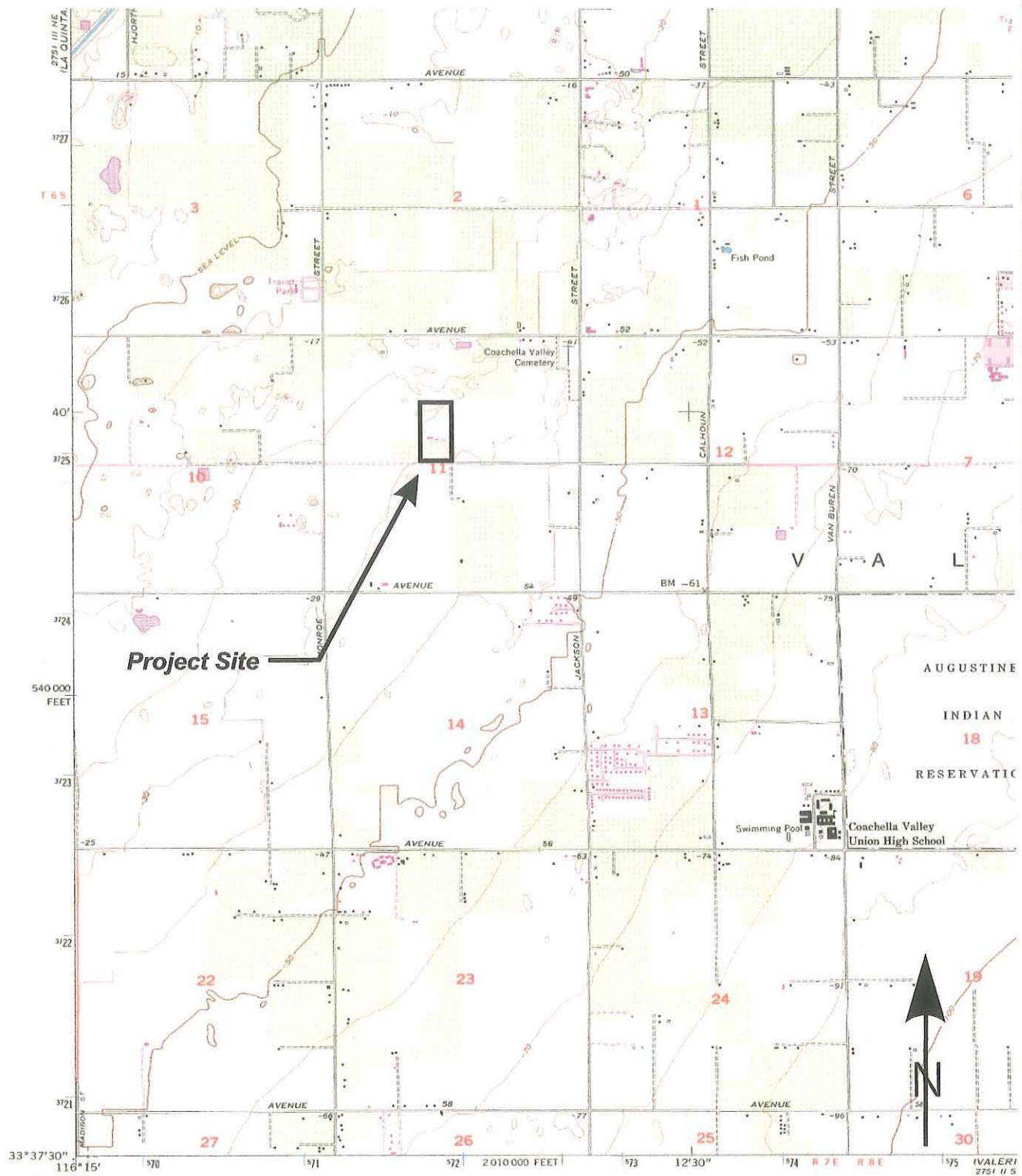
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GbA	Gilman fine sandy loam, 0 to 2 percent slopes	7.5	35.6%
GcA	Gilman fine sandy loam, wet, 0 to 2 percent slopes	6.1	28.8%
MaB	Myoma fine sand, 0 to 5 percent slopes	7.5	35.6%
Totals for Area of Interest		21.0	100.0%



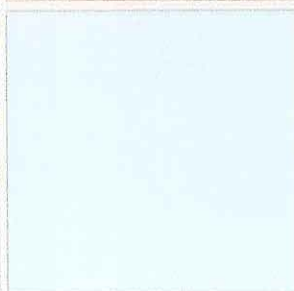
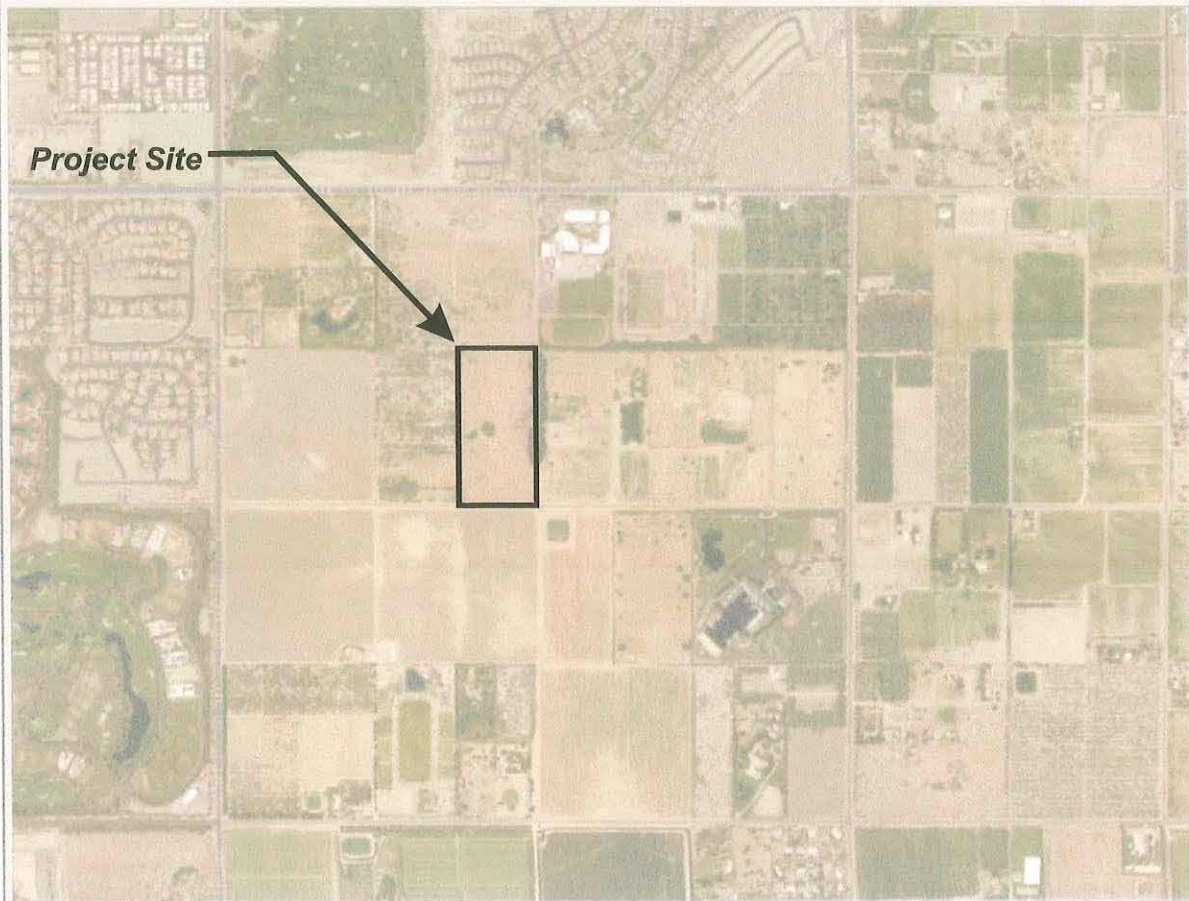
LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Topographic Map

Plate
A-4

Fault Map



Legend

Faults

- OTHER AGENCY
- ADJUT PRICE
- RIVERSIDE COUNTY

Notes



0 1,505 3,009 Feet

"IMPORTANT" Maps and data are to be used for reference purposes only. Map features are approximate and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

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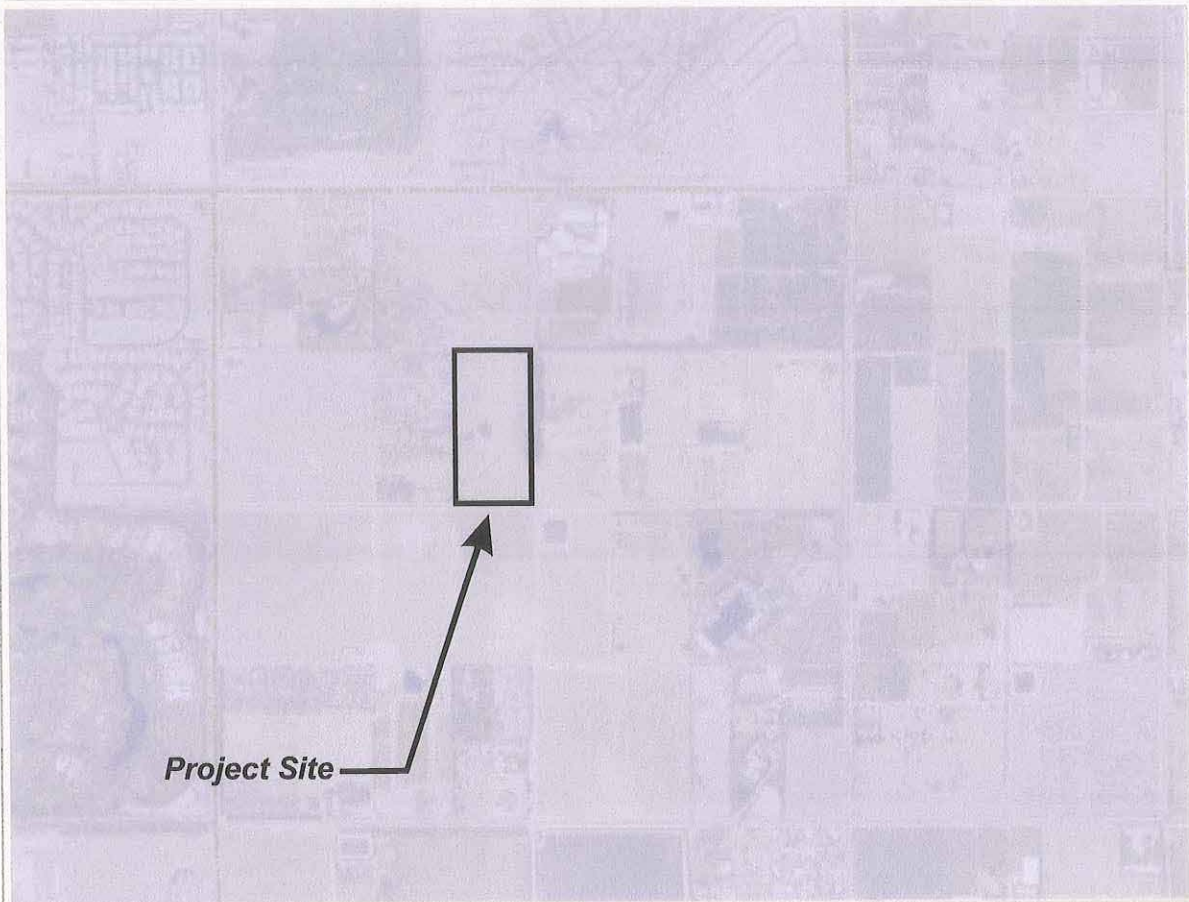
LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Riverside County
Geographic Information System (GIS)
Fault Map

Plate
A-5

Subsidence Map



Project Site

Legend

- Subsidence
- Greater Subsidence
 - Active
 - Stable

Notes



0 1,505 3,009 Feet

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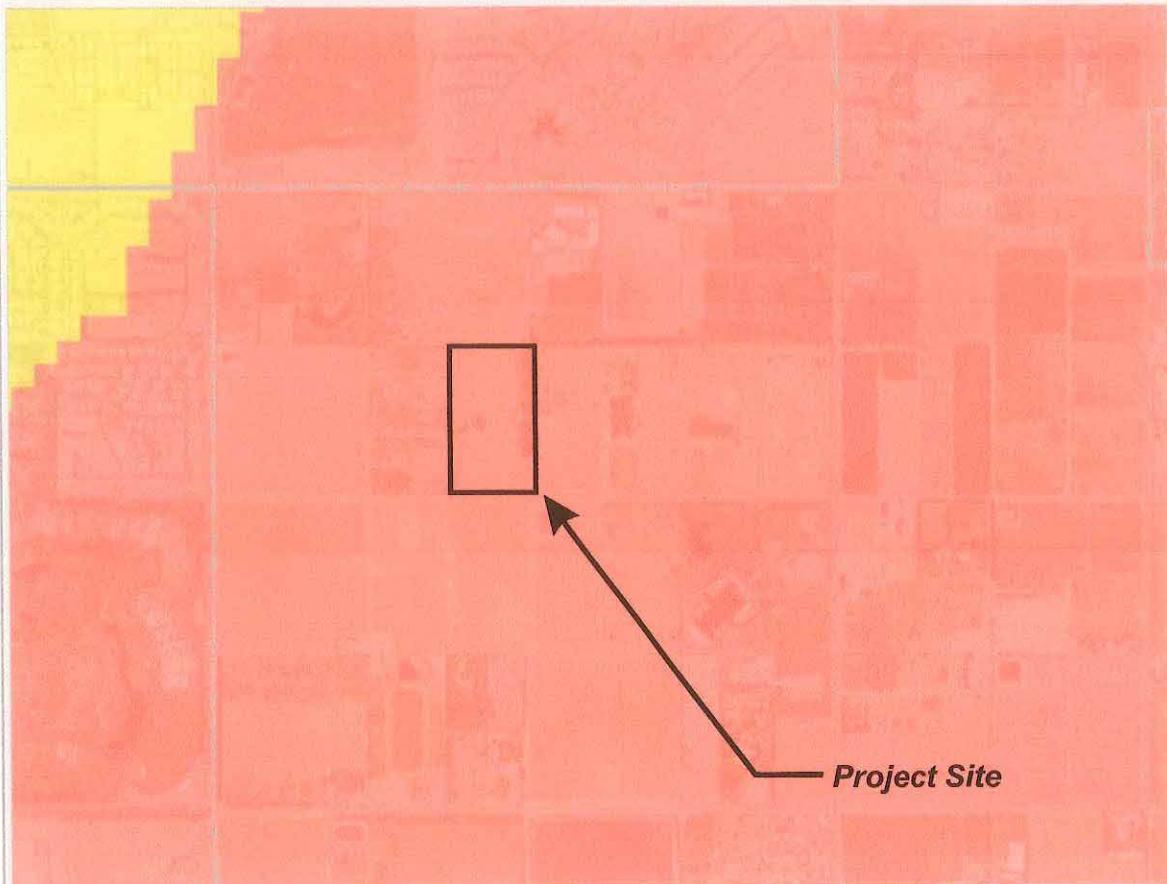
LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Riverside County
Geographic Information System (GIS)
Subsidence

Plate
A-6

Liquefaction Map



Legend

- Liquefaction**
- Overlapped by other
 - High
 - Low
 - Moderate
 - Very High
 - Very Low

Notes



0 1,505 3,009 Feet

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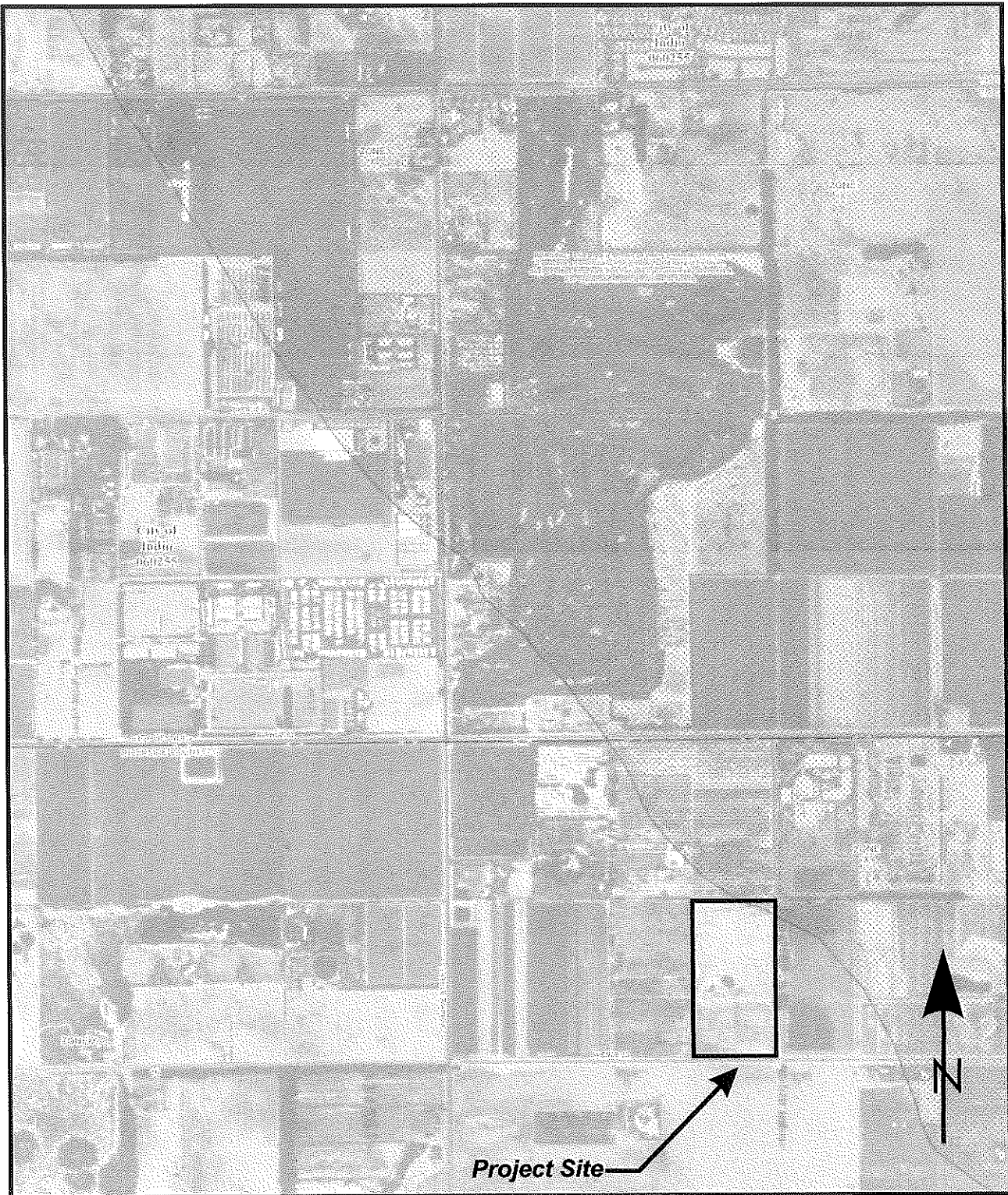
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LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Riverside County
Geographic Information System (GIS)
Liquefaction Zones

Plate
A-7



Reference: Federal Emergency Management Agency (FEMA)
Indio, California, Riverside County
Community-Panel Numbers 06065C 2261G

LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Flood Insurance Rate Map (FIRM)

Plate
A-8

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
--------	---

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

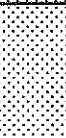
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
	Base Flood Elevation line and value; elevation in feet*
	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

	Cross section line
	Transect line
	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
	1000-meter Universal Transverse Mercator grid values, zone 11N
	5000-foot grid ticks; California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
	Bench mark (see explanation in Notes to Users section of this FIRM panel)
	River Mile

APPENDIX B

DEPTH	FIELD				LOG OF BORING No. B-1 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)	OTHER TESTS
5			41		SILTY SAND (SM): Lt. brown, dry, dense, fine grained	103.8	1.7	Passing #200 = 47.6%
10			14		SAND (SP-SM): Lt. brown, dry, medium dense, fine grained		1.8	Passing #200 = 2.1%
15			29		SANDY SILT (ML): Lt. brown to gray brown, moist to very moist, medium dense, fine grained sand	97.0	8.7	
20			11				15.7	Passing #200 = 68.0%
25			29		some clay	93.7	28.9	
30								
35								
40								
45								
50								
55								
60					Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			

DATE DRILLED: 3/14/22 TOTAL DEPTH: 26.5 Feet DEPTH TO WATER: NA
 LOGGED BY: L. Jackson TYPE OF BIT: Hollow Stem Auger DIAMETER: 8 in.
 SURFACE ELEVATION: Approximately -25 ft HAMMER WT.: 140 lbs. DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
Geo-Engineers and Geologists

PLATE B-1

DEPTH	FIELD				LOG OF BORING No. B-2 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)	OTHER TESTS
5			21		SANDY SILT (ML): Lt. brown, moist, medium dense, fine grained sand	78.2	7.2	Passing #200 = 63.1%
10			11		SILTY SAND (SM): Lt. brown, dry to damp, medium dense, fine grained		2.5	
15			26			101.0	2.2	Passing #200 = 13.6%
20			25				4.2	
25			30		SAND (SP-SM): Yellowish brown, dry, dense, fine grained	97.7	1.5	Passing #200 = 7.0%
30			27		SANDY SILT (ML): Lt. brown, moist, medium dense, fine grained sand		12.4	
35			23		SAND (SP-SM): Lt. brown, dry, medium dense, fine grained		2.0	Passing #200 = 6.9%
40			21		SILTY SAND (SM): Olive gray, moist, medium dense to dense, fine to medium grained		9.0	
45			39				7.7	Passing #200 = 25.0%
50			34				5.0	
55					Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			
60								

DATE DRILLED: 3/14/22

TOTAL DEPTH: 51.5 Feet

DEPTH TO WATER: NA

LOGGED BY: L. Jackson

TYPE OF BIT: Hollow Stem Auger

DIAMETER: 8 in.

SURFACE ELEVATION: Approximately -25 ft

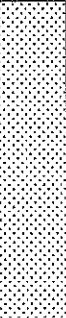
HAMMER WT.: 140 lbs.

DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
Geo-Engineers and Geologists

PLATE B-2

DEPTH	FIELD				LOG OF BORING No. B-3 SHEET 1 OF 1		LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)	OTHER TESTS	
5			20		SAND (SP-SM): Lt. brown, dry, medium dense, fine grained	91.2	1.4		
10			8		loose		1.9	Passing #200 = 8.6%	
15			24		SILTY SAND (SM): Reddish brown to lt. brown, damp, medium dense to dense, fine grained sand	95.2	3.5		
20			23				4.7	Passing #200 = 33.1%	
25			40				102.1	3.0	
30									
35									
40									
45									
50									
55									
60					Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.				

DATE DRILLED: 3/14/22 TOTAL DEPTH: 26.5 Feet DEPTH TO WATER: NA
 LOGGED BY: L. Jackson TYPE OF BIT: Hollow Stem Auger DIAMETER: 8 in.
 SURFACE ELEVATION: Approximately -25 ft HAMMER WT.: 140 lbs. DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
Geo-Engineers and Geologists

PLATE B-3

DEPTH	FIELD				LOG OF BORING No. B-4 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)	OTHER TESTS
5			23		SAND (SP): Lt. brown, dry, medium dense, fine grained	89.8	1.1	Passing #200 = 3.9%
10			10				1.5	
15			21		SILTY SAND (SM): Lt. brown, dry to damp, medium dense to dense, fine grained sand	86.5	1.9	Passing #200 = 18.5%
20			29				8.5	
25					Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			
30								
35								
40								
45								
50								
55								
60								

DATE DRILLED: 3/14/22	TOTAL DEPTH: 21.5 Feet	DEPTH TO WATER: NA
LOGGED BY: L. Jackson	TYPE OF BIT: Hollow Stem Auger	DIAMETER: 8 in.
SURFACE ELEVATION: Approximately -25 ft	HAMMER WT.: 140 lbs.	DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
Geo-Engineers and Geologists

PLATE B-4

DEPTH	FIELD				LOG OF BORING No. B-5 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)
5			33		SAND (SP): Lt. brown, dry, dense to medium dense, fine grained	90.6	0.9	Passing #200 = 1.9%
10			17				1.0	
15			29		SILTY SAND (SM): Lt. brown, dry to damp, medium dense to dense, fine grained sand	92.8	2.2	Passing #200 = 30.9%
20			19				7.0	
25			36				94.7	
30								
35								
40								
45								
50								
55								
60					Groundwater not encountered at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			

Groundwater not encountered at time of drilling.
This is not considered the stabilized groundwater depth
as groundwater may rise to a level higher than that
measured in borehole.

DATE DRILLED: 3/14/22

TOTAL DEPTH: 26.5 Feet

DEPTH TO WATER: NA

LOGGED BY: L. Jackson

TYPE OF BIT: Hollow Stem Auger

DIAMETER: 8 in.

SURFACE ELEVATION: Approximately -25 ft

HAMMER WT.: 140 lbs.

DROP: 30 in.

PROJECT NO. LP22032

LANDMARK
Geo-Engineers and Geologists

PLATE B-5

DEFINITION OF TERMS

PRIMARY DIVISIONS		SYMBOLS		SECONDARY DIVISIONS	
Coarse grained soils More than half of material is larger than No. 200 sieve	Gravels	Clean gravels (less than 5% fines)		GW	Well graded gravels, gravel-sand mixtures, little or no fines
				GP	Poorly graded gravels, or gravel-sand mixtures, little or no fines
		Gravel with fines		GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
				GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	Sands	Clean sands (less than 5% fines)		SW	Well graded sands, gravelly sands, little or no fines
				SP	Poorly graded sands or gravelly sands, little or no fines
		Sands with fines		SM	Silty sands, sand-silt mixtures, non-plastic fines
				SC	Clayey sands, sand-clay mixtures, plastic fines
Fine grained soils More than half of material is smaller than No. 200 sieve	Silts and clays			ML	Inorganic silts, clayey silts with slight plasticity
	Liquid limit is less than 50%			CL	Inorganic clays of low to medium plasticity, gravelly, sandy, or lean clays
				OL	Organic silts and organic clays of low plasticity
	Silts and clays			MH	Inorganic silts, micaceous or diatomaceous silty soils, elastic silts
	Liquid limit is more than 50%			CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays of medium to high plasticity, organic silts
Highly organic soils				PT	Peat and other highly organic soils

GRAIN SIZES

Silts and Clays	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		
	200	40	10	4	3/4"	3"	12"
US Standard Series Sieve				Clear Square Openings			

Sands, Gravels, etc.	Blows/ft. *
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Clays & Plastic Silts	Strength **	Blows/ft. *
Very Soft	0-0.25	0-2
Soft	0.25-0.5	2-4
Firm	0.5-1.0	4-8
Stiff	1.0-2.0	8-16
Very Stiff	2.0-4.0	16-32
Hard	Over 4.0	Over 32

* Number of blows of 140 lb. hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 in. I.D.) split spoon (ASTM D1586).

** Unconfined compressive strength in tons/s.f. as determined by laboratory testing or approximated by the Standard Penetration Test (ASTM D1586), Pocket Penetrometer, Torvane, or visual observation.

Type of Samples:

☐ Ring Sample

☐ Standard Penetration Test

☐ Shelby Tube

☒ Bulk (Bag) Sample

Drilling Notes:

1. Sampling and Blow Counts

Ring Sampler - Number of blows per foot of a 140 lb. hammer falling 30 inches.

Standard Penetration Test - Number of blows per foot.

Shelby Tube - Three (3) inch nominal diameter tube hydraulically pushed.

2. P. P. = Pocket Penetrometer (tons/s.f.).

3. NR = No recovery.

4. GWT = Ground Water Table observed @ specified time.

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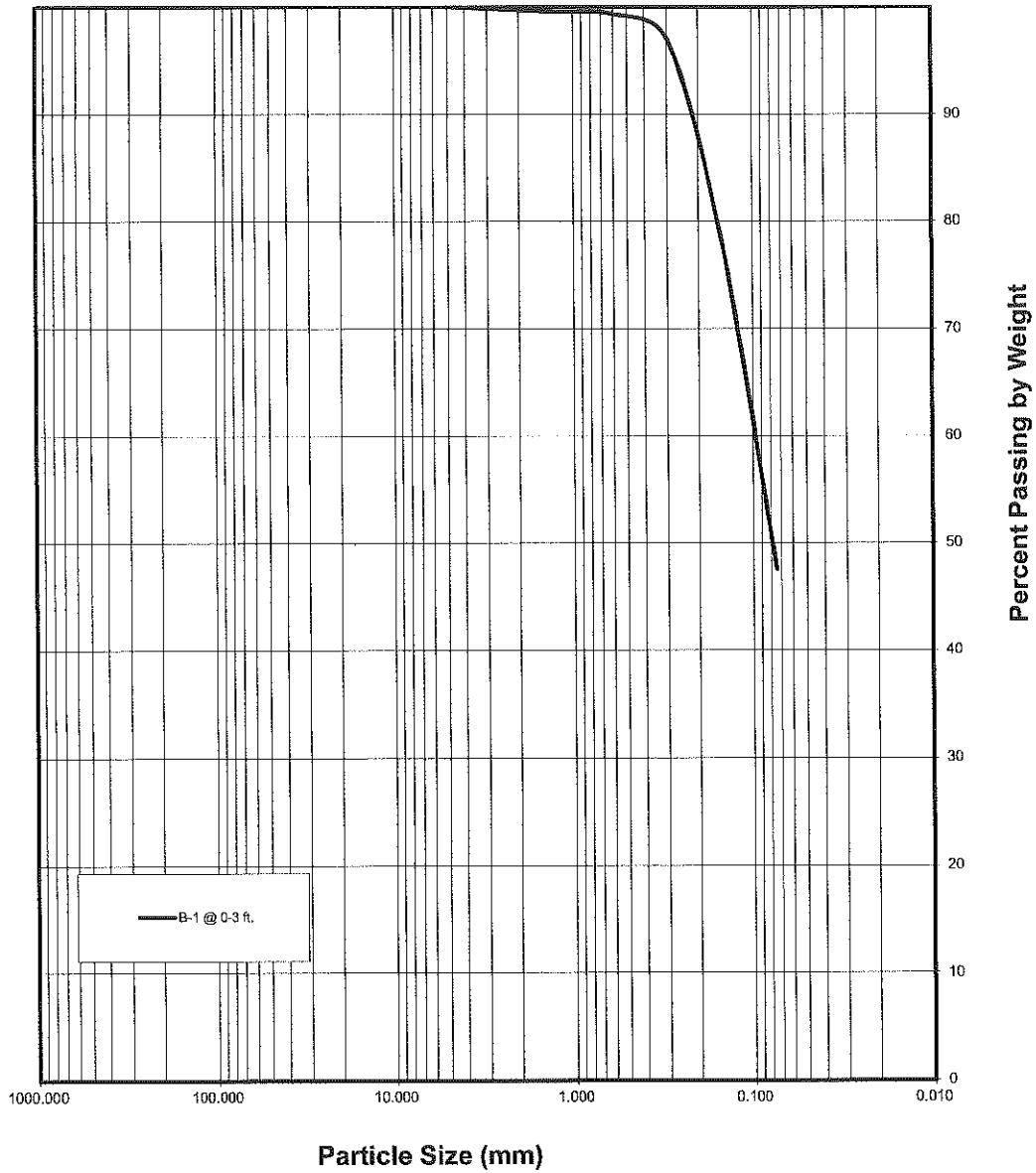
Project No. LP22032

Key to Logs

Plate
B-6

APPENDIX C

SIEVE ANALYSIS					
Cobbles and Boulders	Gravel		Sand		
	Coarse	Fine	Coarse	Medium	Fine



LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Grain Size Analysis

Plate
C-1

LANDMARK CONSULTANTS, INC.

CLIENT: MBG Construction, LLC

PROJECT: APN 780-010-014 -- La Quinta, CA

JOB No.: LP22032

DATE: 04/15/22

CHEMICAL ANALYSIS

Boring:	B-1	Caltrans Method
Sample Depth, ft:	0-3	
pH:	7.9	643
Electrical Conductivity (mmhos):	--	424
Resistivity (ohm-cm):	2,400	643
Chloride (Cl), ppm:	80	422
Sulfate (SO₄), ppm:	10	417

General Guidelines for Soil Corrosivity

Material Affected	Chemical Agent	Amount in Soil (ppm)	Degree of Corrosivity
Concrete	Soluble Sulfates	0 - 1,000	Low
		1,000 - 2,000	Moderate
		2,000 - 20,000	Severe
		> 20,000	Very Severe
Normal Grade Steel	Soluble Chlorides	0 - 200	Low
		200 - 700	Moderate
		700 - 1,500	Severe
		> 1,500	Very Severe
Normal Grade Steel	Resistivity	1 - 1,000	Very Severe
		1,000 - 2,000	Severe
		2,000 - 10,000	Moderate
		> 10,000	Low



Project No.: LP22032

Selected Chemical Test Results

Plate
C-2

Client: MBG Construction, LLC

Project: APN 780-010-014 -- La Quinta, CA

Project No.: LP22032

Date: 3/23/2022

Lab. No.: 0

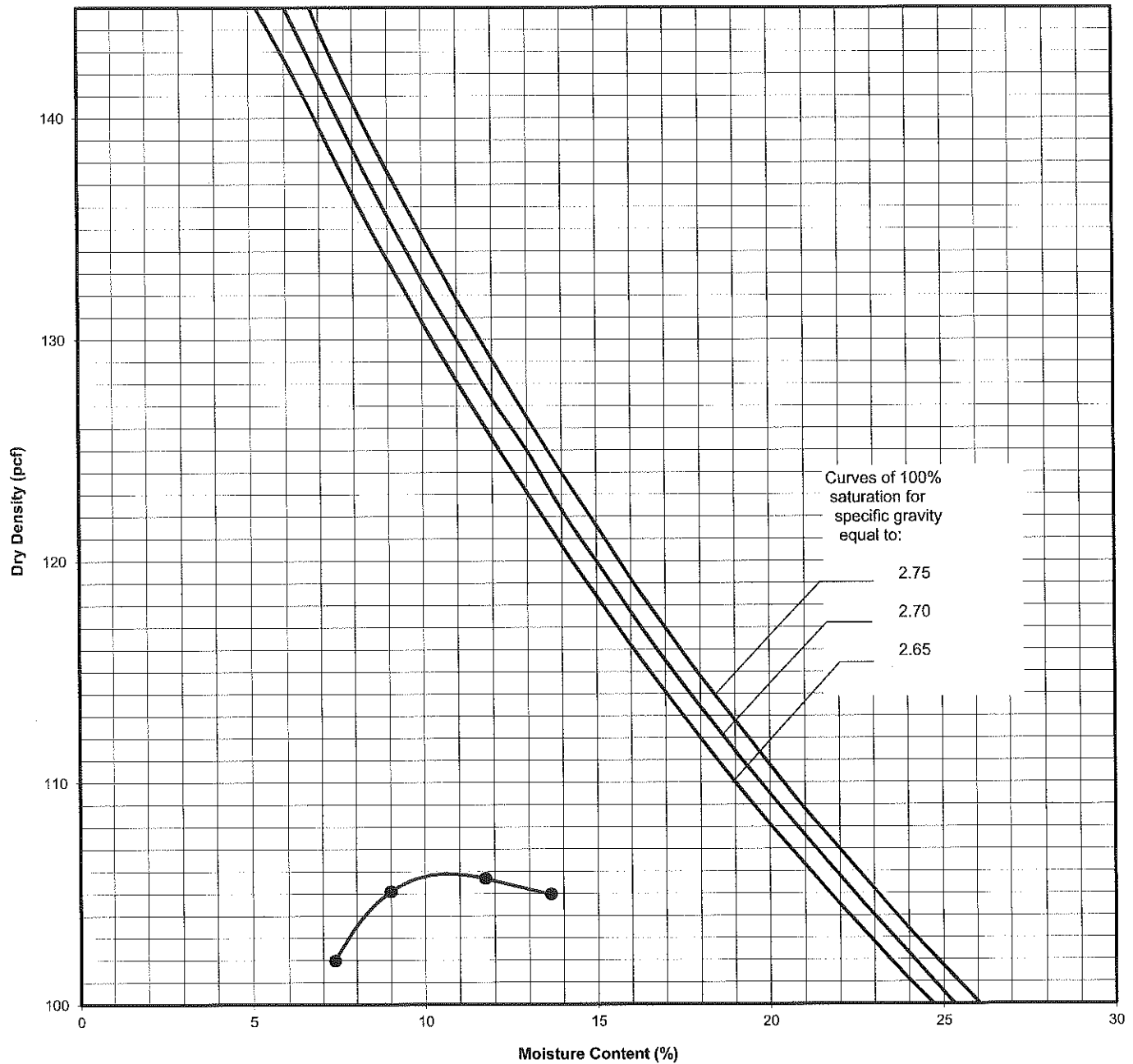
Soil Description: Olive-Brown Silty Sand

Sample Location: B-1 @ 0-3 ft.

Test Method: ASTM D-1557 A

Maximum Dry Density (pcf): 105.9

Optimum Moisture Content (%): 10.6



LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Moisture Density Relationship

Plate
C-3

APPENDIX D

Seismic Dry Settlement Calculation

Project Name: APN 780-010-014 -- La Quinta, CA

Project No.: LP22032

Location: B-2

Maximum Credible Earthquake	7.5
Design Ground Motion	0.79 g
Water Unit Weight,	62.4 pcf
Depth to Groundwater	80 ft
Hammer Efficiency	85

15.2

[illegible]

REFERENCES

- REFERENCES
- (1) Tokimatsu and Seed, 1984. Simplified Procedures for the Evaluation of Settlements in Clean Sands.
 - (2) Seed and Idriss, 1982. Ground Motion and Soil Liquefaction During Earthquakes, EERI Monograph.
 - (3) Youd, Leslie, 1997. Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils
 - (4) Pradel, Daniel, 1998. JGEE, Vol. 124, No. 4, ASCE
 - (5) Seed, et.al., 2003, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework. University of California, Earthquake Engineering Research Center Report 2003-06, 71 p.

APPENDIX E

LANDMARK CONSULTANTS, INC

Project:	APN 780-010-014	Project No:	LP22032	Date:	04/19/2022
Test Hole No:	P-1	Tested By:	Alex A		
Depth of Test Hole, D_T :	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	6"	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"?(y/n)
1	8:02	8:15	13.00	16.00	48.00	32.00	Yes
2	8:25	8:40	15.00	23.00	36.00	13.00	Yes

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:41	8:51	10.00	12.00	24.00	12.00	0.83
2	8:51	9:01	10.00	24.00	40.00	16.00	0.63
3	9:01	9:11	10.00	19.00	29.00	10.00	1.00
4	9:11	9:21	10.00	29.00	37.00	8.00	1.25
5	9:21	9:31	10.00	14.00	26.00	12.00	0.83
6	9:31	9:41	10.00	26.00	40.00	14.00	0.71
7							
8							
9							
10							
11							
12							

COMMENTS:



Project No.: LP22032

Percolation Test Results

Plate
E-1

LANDMARK CONSULTANTS, INC

Project:	APN 780-010-014	Project No:	LP22032	Date:	04/0192022
Test Hole No:	P-2	Tested By:	Alex A		
Depth of Test Hole, D_T :	60"	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	6"	Sides (if rectangular)=			
Sandy Soil Criteria Test*					

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	8:04	8:19	13.00	16.00	48.00	32.00	Yes
2	8:27	8:42	15.00	10.00	44.00	34.00	Yes

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	8:41	8:51	10.00	11.00	33.00	21.00	0.48
2	8:51	9:01	10.00	33.00	47.00	14.00	0.71
3	9:01	9:11	10.00	12.00	29.00	17.00	0.59
4	9:11	9:21	10.00	29.00	41.00	12.00	0.83
5	9:21	9:31	10.00	19.00	32.00	12.00	0.83
6	9:31	9:41	10.00	32.00	42.00	10.00	1.00
7							
8							
9							
10							
11							
12							

COMMENTS:

LANDMARK
Geo-Engineers and Geologists

Project No.: LP22032

Percolation Test Results

Plate
E-2

PERCOLATION RATE CONVERSION

CLIENT: MBG Construction, LLC
PROJECT: APN 780-010-014
PROJECT NO.: LP22032
DATE: 4/19/2022

TEST HOLE NO: P-1

Time interval, Δt = 10 inches

Initial Depth to Water, D_0 = 26 inches

Final Depth to Water, D_f = 40 inches

Total Depth of Test Hole, D_T = 60 inches

²Test Hole Radius, r = 4 inches

The conversion equation is used:

$$I_t = \frac{\Delta H \ 60 \ r}{\Delta t (r + 2H_{avg})}$$

" H_0 " is the initial height of water at the selected time interval

$$H_0 = D_T - D_0 = 60 - 26 = 34 \text{ inches}$$

" H_f " is the final height of water at the selected time interval

$$H_f = D_T - D_0 = 60 - 40 = 20 \text{ inches}$$

" ΔH " is the change in height over the time interval

$$\Delta H = \Delta D = H_0 - H_f = 34 - 20 = 14 \text{ inches}$$

" H_{avg} " is the average head height over the time interval

$$H_{avg} = (H_0 - H_f) / 2 = (34 + 20) / 2 = 27 \text{ inches}$$

" I_t " is the tested infiltration rate

$$I_t = \frac{\Delta H \ 60 \ r}{\Delta t (r + 2H_{avg})} = \frac{(14 \text{ in})(60 \text{ min/hr})(4 \text{ in})}{(10 \text{ min})(4 \text{ in} + 2(27 \text{ in}))} = 5.79 \text{ in/hr}$$

LANDMARK

Geo-Engineers and Geologists

Project No.: LP22032

Percolation Rate Conversion

Plate
E-3

PERCOLATION RATE CONVERSION

CLIENT: MBG Construction, LLC
PROJECT: APN 780-010-014
PROJECT NO.: LP22032
DATE: 4/19/2022

TEST HOLE NO: P-2

Time interval, Δt = 10 inches

Initial Depth to Water, D_0 = 32 inches

Final Depth to Water, D_f = 42 inches

Total Depth of Test Hole, D_T = 60 inches

²Test Hole Radius, r = 4 inches

The conversion equation is used:

$$I_t = \frac{\Delta H 60 r}{\Delta t (r + 2H_{avg})}$$

" H_0 " is the initial height of water at the selected time interval

$$H_0 = D_T - D_0 = 60 - 32 = 28 \text{ inches}$$

" H_f " is the final height of water at the selected time interval

$$H_f = D_T - D_0 = 60 - 42 = 18 \text{ inches}$$

" ΔH " is the change in height over the time interval

$$\Delta H = \Delta D = H_0 - H_f = 28 - 18 = 10 \text{ inches}$$

" H_{avg} " is the average head height over the time interval

$$H_{avg} = (H_0 - H_f) / 2 = (28 + 18) / 2 = 23 \text{ inches}$$

" I_t " is the tested infiltration rate

$$I_t = \frac{\Delta H 60 r}{\Delta t (r + 2H_{avg})} = \frac{(10 \text{ in})(60 \text{ min/hr})(4 \text{ in})}{(10 \text{ min})((4 \text{ in}) + 2(23 \text{ in}))} = 4.8 \text{ in/hr}$$

LANDMARK

Geo-Engineers and Geologists

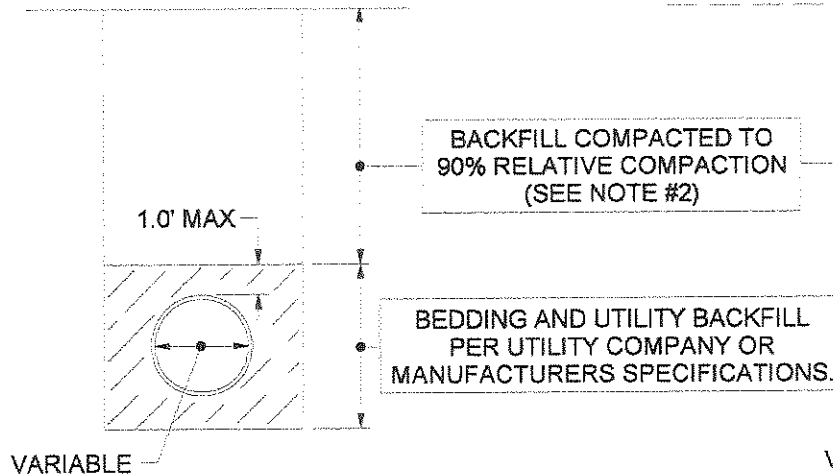
Project No.: LP22032

Percolation Rate Conversion

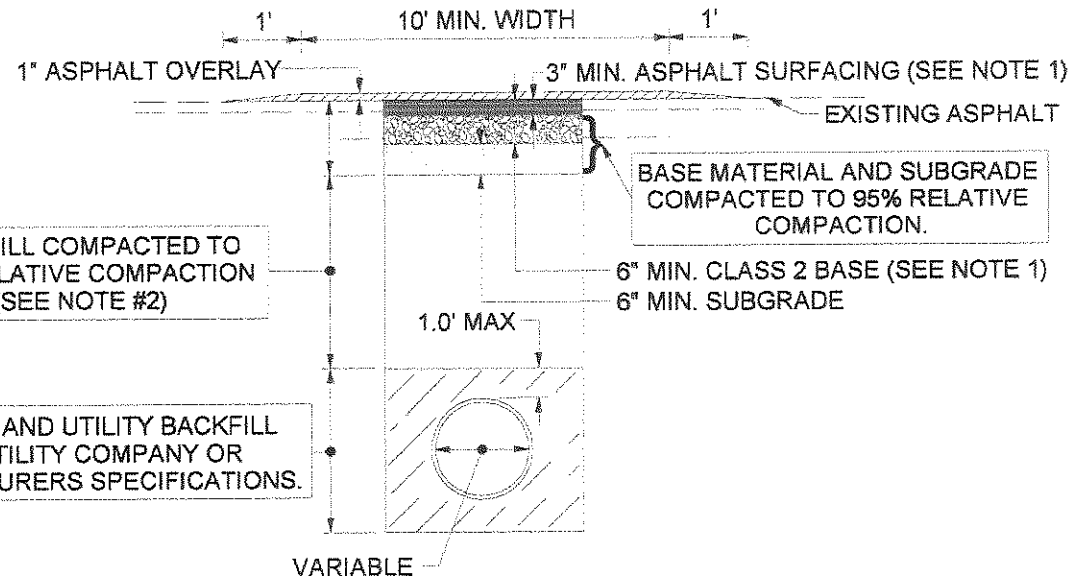
Plate
E-4

APPENDIX F

**NON-ASPHALT
SURFACED AREAS
CASE 1**



**ASPHALT SURFACED STREETS WITH
OVERLAY PARALLEL INSTALLATION
CASE 2**



NOT TO SCALE

NOTES:

1. REPLACE STRUCTURAL SECTION AS FOLLOWS:
SURFACING: EXISTING THICKNESS, OR 3" MIN. A.C., TYPE B.
BASE: CLASS 2 A.B. IN SAME THICKNESS AS EXISTING
BASE MATERIAL, 6" MIN. AS DIRECTED BY THE
INSPECTOR.
2. MAXIMUM LIFT THICKNESS IS 8 INCHES; MAXIMUM LIFT THICKNESS
WHEN PONDING AND JETTING IS 4 FEET.
3. WHEN A FIRM FOUNDATION IS NOT ENCOUNTERED, DUE TO SOFT,
SPONGY OR OTHER UNSUITABLE MATERIAL, SUCH MATERIAL
SHALL BE REMOVED TO THE LIMITS DIRECTED BY THE DIREC-
TOR OF TRANSPORTATION OR AFFECTED UTILITY COMPANY
AND THE RESULTING EXCAVATION BACKFILLED WITH PIPE BED-
DING MATERIAL.

**ASPHALT SURFACED STREET WITHOUT
OVERLAY PERPENDICULAR INSTALLATION
CASE 3**

