

**PRELIMINARY GEOTECHNICAL AND
INFILTRATION FEASIBILITY INVESTIGATION
PROPOSED MULTI-FAMILY
RESIDENTIAL DEVELOPMENT
APNs 118-270-053 AND -055
CORONA, CALIFORNIA**

**PROJECT NO. 33951.1R
OCTOBER 9, 2023
REVISED APRIL 17, 2024**

Prepared For:

Second Street Family LP
14211 Yorba Street, Suite 200
Tustin, California 92780

Attention: Mr. Scott Bering

October 9, 2023
Revised April 17, 2024

Second Street Family LP
14211 Yorba Street
Tustin, California 92780

Project No. 33951.1R

Attention: Mr. Scott Bering

Subject: Preliminary Geotechnical and Infiltration Feasibility Investigation, Proposed Multi-Family Residential Development, APNs 118-270-053 and -055, Corona, California.

LOR Geotechnical Group, Inc., is pleased to present this revised report of our geotechnical investigation for the subject project. This report was revised in response to the City of Corona, Planning Division comments in a letter dated April 8, 2024, which requested correction of erroneous APNs and to remove reference to APN 118-302-030 from the document. In summary, it is our opinion that the proposed development is feasible from a geotechnical perspective, provided the recommendations presented in the attached report are incorporated into design and construction. However, the contents of this summary should not be solely relied upon.

To provide adequate support for the proposed structures and structural improvements, we recommend that a compacted fill mat be constructed beneath footings and slabs. The compacted fill mat will provide a dense, high-strength soil layer to uniformly distribute the anticipated foundation loads over the underlying soils. All existing loose, compressible alluvial materials and any undocumented fill material should be removed from structural areas and areas to receive engineered compacted fills. The data developed during this investigation indicates that removals ranging from approximately 5 to 7 feet will be required from currently planned development areas. The given removal depths are preliminary and the actual depths of the removals should be determined during the grading operation by observation and/or in-place density testing.

Very low expansion potential and moderate R-value quality content generally characterize the upper onsite materials. Near completion and/or at the completion of site grading, additional foundation and subgrade soils should be tested, as necessary, to verify their expansion potential, soluble sulfate content, and R-value quality.

Our percolation test result indicates the soils tested are not conducive infiltration.

LOR Geotechnical Group, Inc.

TABLE OF CONTENTS

	<u>Page No.</u>
INTRODUCTION	1
PROJECT CONSIDERATIONS	1
AERIAL PHOTO ANALYSIS	2
EXISTING SITE CONDITIONS	2
SUBSURFACE FIELD INVESTIGATION	3
LABORATORY TESTING PROGRAM	3
GEOLOGIC CONDITIONS	4
Regional Geologic Setting.....	4
Site Geologic Conditions.....	5
Groundwater Hydrology.....	6
Mass Movement.....	6
Faulting.....	6
Historical Seismicity.....	8
Secondary Seismic Hazards.....	8
Liquefaction.....	9
Seiches/Tsunamis.....	9
Flooding (Water Storage Facility Failure).....	9
Seismically-Induced Landsliding.....	9
Rockfalls.....	9
Seismically-Induced Settlement.....	9
SOILS AND SEISMIC DESIGN CRITERIA (California Building Code 2022)	9
Site Classification.....	9
CBC Earthquake Design Summary.....	10
CONCLUSIONS	11
Foundation Support.....	11
Soil Expansiveness.....	11
Corrosion Screening.....	12
Infiltration.....	12
Geologic Mitigations.....	12
Seismicity.....	13

TABLE OF CONTENTS

	<u>Page No.</u>
RECOMMENDATIONS.	13
Geologic Recommendations.	13
General Site Grading.....	13
Initial Site Preparation.	14
Preparation of Fill Areas.	14
Engineered Compacted Fill.	15
Preparation of Foundation Areas.....	15
Short-Term Excavations.	16
Slope Construction.....	16
Slope Protection.....	16
Soil Expansiveness.	17
Foundation Design.....	17
Settlement.....	18
Building Area Slab-On-Grade.....	18
Exterior Flatwork.	19
Wall Pressures.....	19
Preliminary Pavement Design.	20
Infiltration.	22
Corrosion Protection.	22
Construction Monitoring.....	22
 LIMITATIONS.	 23
 TIME LIMITATIONS.	 24
 CLOSURE.	 25
 REFERENCES.	 26

TABLE OF CONTENTS

Page No.

APPENDICES

Appendix A

Index Map.	A-1
Site Plan.	A-2a and A-2b
Regional Geologic Map.....	A-3
Historical Seismicity Maps.	A-4 and A-5

Appendix B

Field Investigation Program.	B
Boring Log Legend.	B-i
Soil Classification Chart.	B-ii
Boring Logs.	B-1 through B-6

Appendix C

Borehole Percolation Testing Program.....	C
Infiltration Rate Test Results.	C-1

Appendix D

Laboratory Testing Program.....	D
Laboratory Test Results.....	D-1 and D-2
Project X Corrosion Engineering Test Results	

Appendix E

Seismic Design Spectra.....	E
-----------------------------	---

INTRODUCTION

During September and October of 2023, a Preliminary Geotechnical and Infiltration Feasibility Investigation was performed by LOR Geotechnical Group, Inc., for the proposed residential development within Assessor's Parcel Numbers (APNs) 118-270-053 and -055 in the city of Corona, California. The purpose of this investigation was to provide a technical evaluation of the geologic setting of the site and to provide geotechnical design recommendations for the proposed development. The scope of our services included:

- Review of available geotechnical literature, reports, maps, and agency information pertinent to the study area;
- Interpretation of aerial photographs of the site and surrounding regions dated 1948 through 2023;
- Geologic field reconnaissance mapping to verify the areal distribution of earth units and significance of surficial features as compiled from documents, literature, and reports reviewed;
- A subsurface field investigation to determine the physical soil conditions pertinent to the proposed development;
- Percolation testing via the borehole test method to determine Infiltration characteristics;
- Laboratory testing of selected soil samples obtained during the field investigation;
- Development of geotechnical recommendations for site grading and foundation design; and
- Preparation of this report summarizing our findings, and providing conclusions and recommendations for site development.

The approximate location of the site is shown on the attached Index Map, Enclosure A-1, within Appendix A.

PROJECT CONSIDERATIONS

To orient our investigation at the site, a Site Plan prepared by IDEArc, dated September 7, 2023, was furnished for our use. The proposed building configurations and associated driveway, parking, and landscape areas were indicated on this plan. The Site Plan was

utilized as a base map for our field investigation and is presented as Enclosure A-2b, within Appendix A.

As noted on the site plan, development of the site will include several two- and three-story multi-family residential structures, a swimming pool, play area, and new driveway, parking, and landscape areas. In addition, infiltration of on-site storm waters is proposed. The buildings are anticipated to be of wood frame and stucco or similar type construction and light to moderate foundation loads are anticipated with these types of structures.

Grading plans have not yet been developed. However, based on the current topography of the site and adjacent areas, very minor cuts and fills are anticipated to create level surfaces for the proposed improvements.

AERIAL PHOTO ANALYSIS

The aerial photographs reviewed consisted of vertical aerial photograph images of varying scales. We reviewed imagery available from Google Earth Pro (2023) computer software and from online Historic Aerials (2023).

To summarize briefly, parcels -053 and -055 were a part of the properties to the north and west and appeared to be used as a storage yard/salvage yard for vehicles from prior to 1948 through the late 1970s. As observed in the 1980 photograph, the site then contained a mobile home park. By 2016, the mobile home park was removed and W. 2nd Street as well as various improvements to the 91 Freeway to the north had been built. At this time, the site contained numerous stockpiles of materials including soils and construction materials and equipment. By 2018, the nearby roadway improvements were complete and the site was cleared of the previously noted stockpiles and construction related items.

No evidence for the presence of faults traversing the site area or mass movement features was noted during our review of the photographs covering the parcels and nearby vicinity.

EXISTING SITE CONDITIONS

APNs 118-270-053 and -055 consist of 3.5± acres of roughly rectangular shaped vacant land, located along the south side of W. 2nd Street and along the west side of S. Buena Vista Avenue in the city of Corona. The topography of the parcels consists of a very gentle gradient to the east. The parcels are currently vacant and contain some trees and light annual grasses and weeds. Some minor wind blown trash and debris is also present.

W. 2nd Street, a fully improved roadway, bounds all parcels on the north with the 91 Freeway beyond. Commercial properties lie to the south of APNs 118-270-053 and -055. S. Buena Vista Avenue, a fully improved roadway, bounds parcels -053 and -055 on the east. An apartment complex and vacant land that is similar to the site lie to the east across S. Buena Vista Avenue.

SUBSURFACE FIELD INVESTIGATION

Our subsurface field exploration program was conducted on September 19 and 21, 2023. The work consisted of advancing a total of 6 exploratory borings using a truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. In addition, one borehole percolation test was conducted in general accordance with the Deep Percolation Test procedure as outlined in the Technical Guidance Document for Water Quality Management Plans (CDM Smith, 2013). The approximate locations of our exploratory borings and percolation test are presented on Enclosures A-2a and A-2b, within Appendix A.

The subsurface conditions encountered in the exploratory borings were logged by a licensed geologist from this firm. The borings were drilled to depths ranging from approximately 11.5 to 51.5 feet below the existing ground surface. Refusal was experienced at a depth of approximately 27 feet in one of our borings due to abundant gravel and cobbles. Relatively undisturbed and bulk samples were obtained at a maximum depth interval of 5 feet, and returned to our geotechnical laboratory in sealed containers for further testing and evaluation.

A percolation test boring was drilled to the requested depth of approximately 15 feet below the existing ground surface at the requested location and tested on August 20, 2023.

A detailed description of the subsurface field exploration program and the boring logs are presented in Appendix B, while a detailed description of our borehole percolation testing program and the test results are presented in Appendix C.

LABORATORY TESTING PROGRAM

Selected soil samples obtained during the field investigation were subjected to geotechnical laboratory testing to evaluate their physical and engineering properties. Laboratory testing included in-place moisture content and dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, expansion index, Atterberg limits, and corrosion screening. Physical testing was conducted

in our geotechnical laboratory and chemical testing was conducted by our subconsultant, Project X Corrosion Engineering. A detailed description of the geotechnical laboratory testing program and the test results are presented in Appendix D.

GEOLOGIC CONDITIONS

Regional Geologic Setting

The proposed residential development site is located within the far northern portion of the Perris Block. The Perris Block lies within the larger Peninsular Ranges geomorphic province of southern California. The Peninsular Ranges geomorphic province is characterized by the presence of numerous, northwestern trending, small mountain ranges and intervening plains and valleys. The Peninsular Ranges province abuts to the north against a series of east-west trending mountain ranges, collectively referred to as the Transverse Ranges and extends southeastward into the Baja California Peninsula. The nearest of which are the Santa Ana Mountains to the west and the San Jacinto Mountains to the east. The intervening valley between the Santa Ana and San Jacinto Mountains is the Perris Plain, a mass of igneous rocks consisting of island-like hills of plutonic rocks surrounded by valleys, filled with various ages of alluvium.

The plutonic rocks of the Perris Plain consist of predominately tonalite, granodiorite, and quartz diorite, with many similar igneous rock varieties and lesser amounts of metamorphic and volcanic rocks. Long term erosion of the Perris Plain has resulted in more resistant rock types elevated above the remaining elevation, and the infilling of these areas with various types and ages of alluvium. The Perris Plain is considered to be internally stable, however, it is bounded on the north, west, and east by active faults. These are the Cucamonga fault, on the north, the San Jacinto fault on the east, and the Whittier-Elsinore fault on the southwestern margin.

The site is situated just south of the Temescal Wash on an area of alluvial deposits derived from the hills which lie southeast of the site. This alluvial material is composed of younger, alluvial channel sediments eroded from the area and deposited over non-marine sedimentary rocks at depths.

The nearest known active earthquake fault in relation to the site is the Chino-Central Avenue fault located approximately 0.5 kilometers (0.3 miles) to the northeast. However, as noted by past authors (Morton and Gray, 2002), the exact location of this feature in the site

region is not precisely known. A more detailed explanation and a complete list of nearby faults is presented in the Faulting section of this report.

The regional geology of the site and immediate surrounding region as mapped by the U.S.G.S. (Morton and Gray, 2002) is shown on Enclosure A-3, within Appendix A.

Site Geologic Conditions

The site lies along a series of coalescing alluvial fans emanating from the hills to the southeast falling northeasterly to the Temescal Wash. Past authors have mapped the units at the site to consist of the deposition of young, unconsolidated alluvial fan deposits of gray-hued sand and cobble and gravel-sand deposits (Morton and Gray, 2002). According to a soil survey conducted by the United States Department of Agriculture, the site is underlain by soils of the Garretson Series. These consist of gravelly very fine sandy loam developed in alluvium made primarily of metasedimentary materials. In addition to these materials, exposed across the surface of the site, a layer of fill materials are present overlying the alluvial materials. These units are described in further detail in the following sections:

Fill: Fill materials were encountered within both of our exploratory borings to depths of approximately 2 to 5 feet. These materials were typically comprised of silty sand with gravel and contained some asphalt and rebar debris. The fill materials are believed to be associated with past site development and use as a construction yard and are considered to be non-engineered fill.

Alluvium: Alluvial materials were encountered within all of our exploratory borings to the maximum depths explored. These units were noted to mainly consist of well graded sand with silt and gravel and sandy silt, with some silty sand clayey sand units encountered. These materials were red brown to brown in color. Some thin calcite stringers and pinhole porosity were observed within the finer grained units. The alluvial materials were in a medium dense/stiff state upon first encounter, generally becoming increasingly dense with increasing depth based on our equivalent Standard Penetration Test (SPT) data and in-place density testing. Refusal was experienced at a depth of approximately 27 feet due to abundant gravel and cobbles.

A detailed description of the subsurface soil conditions as encountered within our exploratory borings is presented on the Boring Logs within Appendix B.

Groundwater Hydrology

Groundwater was not encountered within any of our exploratory borings as advanced to a maximum depth of approximately 51.5 feet below the existing ground surface.

Local groundwater level measurements were researched at the California Department of Water Resources (CDWR) online Water Data Library (CDWR, 2023). The closest groundwater well found in this search was State Well Number 03S07W26J004S located approximately 700 feet east of the site. This well has groundwater measurements available from 2022 back to 2013 and ranged from approximately 105 to 123 feet below the existing ground surface elevation of approximately 642 feet above mean sea level.

Data from a groundwater contour map prepared by Carson and Matti (1985) indicates that from the time period of 1973 to 1979, groundwater was approximately 100 feet beneath the existing ground surface.

Based on this information and our nearby boring, the depth to groundwater beneath the subject property is likely on the order of 100+ feet.

Mass Movement

The site lies on a relatively flat surface. The occurrence of mass movement failures such as landslides, rockfalls, or debris flows within such areas is generally not considered common, and no evidence of mass movement was observed on the site.

Faulting

No active or potentially active faults are known to exist at the subject site. In addition, the subject site does not lie within a current State of California Earthquake Fault Zone (Hart and Bryant, 2003) nor does the site lie within a County of Riverside fault zone (TLMA, 2023).

As previously mentioned, the nearest known active earthquake fault in relation to the site is the Chino-Central Avenue fault located approximately 0.5 kilometers (0.3 miles) to the northeast. As previously mentioned and noted on the attached Regional Geologic Map, Enclosure A-3, the exact location of this feature in the site region is not precisely known and, therefore, queried by the USGS (Morton and Gray, 2002). This is due to a lack of surface expression, but it is believed to be buried under the recent alluvial deposits.

Other faults in the region include the Whittier-Elsinore fault zone located approximately 3.2 kilometers (2.0 miles) to the southwest, the Cucamonga fault located approximately 30.5 kilometers (19 miles) to the north, the San Jacinto fault located approximately 32.5 kilometers (20 miles) to the northeast, and the San Andreas fault located approximately 43.5 kilometers (27 miles) to the northeast.

The Elsinore fault zone is one of the largest in southern California. At its northern end it splays into two segments, the Whittier and Chino faults and at its southern end it is cut by the Yuba Wells fault. The primary sense of slip along the Elsinore fault is right lateral strike-slip. It is believed that the Elsinore fault zone is capable of producing an earthquake magnitude on the order of 6.5 to 7.5.

The Cucamonga fault is considered to be part of the Sierra Madre fault system which marks the southern boundary of the San Gabriel Mountains. This is a north dipping thrust fault which is believed to be responsible for the uplift of the San Gabriel Mountains. It is believed that the Cucamonga fault is capable of producing an earthquake magnitude on the order of 7.0 or greater.

The San Jacinto fault is a sub-parallel branch of the San Andreas fault extending from the northwestern San Bernardino area southward into the El Centro region. This fault has been active in recent times with several large magnitude events. The average slip rate on this fault is thought to be on the order of 6 to 12 mm per year, and, like the San Andreas fault, is thought to be capable of generating large magnitude events, on the order of 6.5 or greater.

The San Andreas fault is considered to be the major tectonic feature of California, separating the Pacific plate from the North American Plate. While estimates vary, the San Andreas fault is generally thought to have an average slip rate on the order of 24 mm per year and capable of generating large magnitude events on the order of 7.5 or greater.

Current standards of practice included a discussion of all potential earthquake sources within a 100 kilometer (62 mile) radius. However, while there are other large earthquake faults within a 100 kilometer (62 mile) radius of the site, none of these are considered as relevant to the site as the faults described above, due to their greater distance and/or smaller anticipated magnitudes.

Historical Seismicity

In order to obtain a general perspective of the historical seismicity of the site and surrounding region a search was conducted for seismic events at and around the area within various radii. This search was conducted utilizing the historical seismic search website of the U.S.G.S. (2022). This website conducts a search of a user selected cataloged seismic events database, within a specified radius and selected magnitudes, and then plots the events onto a map. At the time of our search, the database contained data from January 1, 1932 through October 5, 2023.

In our first search, the general seismicity of the region was analyzed by selecting an epicenter map listing all events of magnitude 4.0 and greater, recorded since 1932, within a 100 kilometer (62 mile) radius of the site, in accordance with guidelines of the California Division of Mines and Geology. This map illustrates the regional seismic history of moderate to large events. As depicted on Enclosure A-4, within Appendix A, the site lies within a relatively active region associated with the San Jacinto and Elsinore fault zones trending northwest-southeast.

In the second search, the micro seismicity of the area lying within a 10 kilometer (6.2 mile) radius of the site was examined by selecting an epicenter map listing events on the order of 1.0 and greater since 1978. The results of this search is a map that presents the seismic history around the area of the site with much greater detail, not permitted on the larger map. The reason for limiting the time period for the events on the detail map is to enhance the accuracy of the map. Events recorded prior to the mid to late 1970s are generally considered to be less accurate due to advancements in technology. As depicted on this map, Enclosure A-5, the Whittier-Elsinore fault is conspicuous as a northwest trending lineation of small seismic events located southwest of the site.

In summary, the historical seismicity of the site entails numerous small to medium magnitude earthquake events occurring in the region around the subject site. Any future developments at the subject site should anticipate that moderate to large seismic events could occur very near the site.

Secondary Seismic Hazards

Other secondary seismic hazards generally associated with severe ground shaking during an earthquake include liquefaction, seismic-induced settlement, seiches and tsunamis, earthquake induced flooding, landsliding, and rockfalls.

Liquefaction: The potential for liquefaction generally occurs during strong ground shaking within granular loose sediments where the groundwater is usually less than 50 feet below the ground surface. As groundwater is anticipated to lie greater than 50 feet beneath the site and the site is underlain by relatively dense alluvial materials, the possibility of liquefaction at the site is considered nil.

Seiches/Tsunamis: The potential for the site to be affected by a seiche or tsunami (earthquake generated wave) is considered nil due to absence of any large bodies of water near the site.

Flooding (Water Storage Facility Failure): There are no large water storage facilities located on or near the site which could possibly rupture during in earthquake and affect the site by flooding.

Seismically-Induced Landsliding: Due to the low relief of the site and surrounding region, the potential for landslides to occur at the site is considered nil.

Rockfalls: No large, exposed, loose or unrooted boulders are present above the site that could affect the integrity of the site.

Seismically-Induced Settlement: Settlement generally occurs within areas of loose, granular soils with relatively low density. Since the site is underlain by relatively dense alluvial materials, the potential for settlement is considered very low. In addition, the recommended earthwork operations to be conducted during the development of the site should mitigate any near surface loose soil conditions.

SOILS AND SEISMIC DESIGN CRITERIA (California Building Code 2022)

Design requirements for structures can be found within Chapter 16 of the 2022 California Building Code (CBC) based on building type, use, and/or occupancy. The classification of use and occupancy of all proposed structures at the site, shall be the responsibility of the building official.

Site Classification

Chapter 20 of the ASCE 7-16 defines six possible site classes for earth materials that underlie any given site. Bedrock is assigned one of three of these six site classes and these are: A, B, or C. Soil is assigned as C, D, E, or F. Per ASCE 7-16, Site Class A and

Site Class B shall be measured on-site or estimated by a geotechnical engineer, engineering geologist or seismologist for competent rock with moderate fracturing and weathering. Site Class A and Site Class B shall not be used if more than 10 feet of soil is between the rock surface and bottom of the spread footing or mat foundation. Site Class C can be used for very dense soil and soft rock with \tilde{N} values greater than 50 blows per foot. Site Class D can be used for stiff soil with \tilde{N} values ranging from 15 to 50 blows per foot. Site Class E is for soft clay soils with \tilde{N} values less than 15 blows per foot. Our investigation, mapping by others, and our experience in the site region indicates that the materials beneath the site are considered Site Class D stiff soils.

CBC Earthquake Design Summary

Earthquake design criteria have been formulated in accordance with the 2022 CBC and ASCE 7-16 for the site based on the results of our investigation to determine the Site Class and an assumed Risk Category II. However, these values should be reviewed and the final design should be performed by a qualified structural engineer familiar with the region. In addition, the building official should confirm the Risk Category utilized in our design (Risk Category II). Our design values are provided below:

CBC 2022/ASCE 7-16 SEISMIC DESIGN SUMMARY*	
Site Location (USGS WGS84) 33.8803, -117.5795, Risk Category II	
Site Class Definition Chapter 20 ASCE 7	D
S_s Mapped Spectral Response Acceleration at 0.2s Period	2.07
S₁ Mapped Spectral Response Acceleration at 1s Period	0.777
S_{MS} Adjusted Spectral Response Acceleration at 0.2s Period	2.317
S_{M1} Adjusted Spectral Response Acceleration at 1s Period	1.862
S_{DS} Design Spectral Response Acceleration at 0.2s Period	1.544
S_{D1} Design Spectral Response Acceleration at 1s Period	1.242
F_a Short Period Site Coefficient at 0.2s Period	1.0
F_v Long Period Site Coefficient at 1s Period	1.7
PGA_M Site Modified Peak Ground Acceleration	0.897
Seismic Design Category	E
*See Appendix E for detailed calculations	

CONCLUSIONS

This investigation provides a broad overview of the geotechnical and geologic factors which are expected to influence future site planning and development. On the basis of our field investigation and testing program, it is the opinion of LOR Geotechnical Group, Inc., that the proposed development of the site for the proposed use is feasible from a geotechnical standpoint, provided the recommendations presented in this report are incorporated into design and implemented during grading and construction.

It should be noted that the subsurface conditions encountered in our exploratory borings are indicative of the locations explored and the subsurface conditions may vary. If conditions are encountered during the construction of the project that differ significantly from those presented in this report, this firm should be notified immediately so we may assess the impact to the recommendations provided.

Foundation Support

To provide adequate support for the proposed structures, we recommend that a compacted fill mat be constructed beneath footings and slabs. The compacted fill mat will provide a dense, high-strength soil layer to uniformly distribute the anticipated foundation loads over the underlying soils.

Conventional foundation systems utilizing either individual spread footings and/or continuous wall footings will provide adequate support for the anticipated downward and lateral loads when utilized in conjunction with the recommended fill mat.

Soil Expansiveness

The upper, granular materials encountered during this investigation were tested and found to have a very low expansion potential. Therefore, specialized construction procedures to specifically resist expansive soil activity for this type of soil is not anticipated at this time. However, the upper, silty materials encountered during this investigation were tested and found to have a low expansion potential. It is anticipated, based on the recommended removals within, that the on-site soils will be mixed and blended during site grading and that the expansion potential of the on-site soils may change. However, for preliminary design purposes, typical reinforcement for slabs-on-grade support by low expansive soils is presented below. The final design should be based on additional evaluation of the

on-site and any imported soil for their expansion potential and plasticity limits during rough grading operations.

Corrosion Screening

Select representative samples from our borings were taken to Project X Corrosion Engineering for full corrosion series testing. Results from soil corrosivity testing completed by Project X Corrosion Engineering are presented within Appendix D.

The corrosivity test results indicate that soluble sulfate concentrations in the samples were less than 0.10 percent by weight. These concentrations indicate an exposure class S0 for sulfate (ACI 318). No special mitigation methods are considered necessary.

The corrosivity test results indicate that chloride concentrations were below 500 ppm. This concentration indicates an exposure class C1 for chloride (ACI 318). Special mitigation measures are not considered necessary.

Soil pH for the samples was 7.1, neutral. Therefore, the need for specialized design is not anticipated.

Concentrations of ammonium and nitrate indicate the soil may be aggressive towards copper.

Resistivity results for the samples were in the corrosive to ferrous metals.

LOR Geotechnical does not practice corrosion engineering. If further information concerning the corrosion characteristics, or interpretation of the results submitted herein, is required, then a competent corrosion engineer should be consulted.

Infiltration

The results of our field investigation and percolation test data indicate that the site soil materials at the depth and location tested are not conducive to infiltration.

Geologic Mitigations

No special mitigation methods are deemed necessary at this time, other than the geotechnical recommendations provided in the following sections.

Seismicity

Seismic ground rupture is generally considered most likely to occur along pre-existing active faults. Since no known faults are known to exist at, or project into the site, the probability of ground surface rupture occurring at the site is considered nil.

Due to the site's close proximity to the faults described above, it is reasonable to expect a relatively strong ground motion seismic event to occur during the lifetime of the proposed development on the site. Large earthquakes could occur on other faults in the general area, but because of their lesser anticipated magnitude and/or greater distance, they are considered less significant than the faults described above from a ground motion standpoint.

The effects of ground shaking anticipated at the subject site should be mitigated by the seismic design requirements and procedures outlined in Chapter 16 of the California Building Code. However, it should be noted that the current building code requires the minimum design to allow a structure to remain standing after a seismic event, in order to allow for safe evacuation. A structure built to code may still sustain damage which might ultimately result in the demolishing of the structure (Larson and Slosson, 1992).

No secondary seismic hazards are anticipated to impact the proposed development.

RECOMMENDATIONS

Geologic Recommendations

No special geologic recommendations are deemed necessary at this time, other than the geotechnical recommendations provided in the following sections.

General Site Grading

It is imperative that no clearing and/or grading operations be performed without the presence of a qualified geotechnical engineer. An onsite, pre-job meeting with the developer, the contractor, the jurisdictional agency, and the geotechnical engineer should occur prior to all grading related operations. Operations undertaken at the site without the geotechnical engineer present may result in exclusions of affected areas from the final compaction report for the project.

Grading of the subject site should be performed in accordance with the following recommendations as well as applicable portions of the California Building Code, and/or applicable local ordinances.

All areas to be graded should be stripped of significant vegetation and other deleterious materials. Any undocumented fill encountered during grading should be completely removed, cleaned of significant deleterious materials and may then be reused as compacted fill. It is our recommendation that any existing fills under any proposed flatwork and paved areas be removed and replaced with engineered compacted fill. If this is not done, premature structural distress (settlement) of the flatwork and pavement may occur.

Cavities created by the removal of any subsurface obstructions that could be encountered, such as foundations, utilities, and septic systems associated with the previous on-site development, should be thoroughly cleaned of loose soil, organic matter and other deleterious materials, shaped to provide access for construction equipment, and backfilled as recommended in the following Engineered Compacted Fill section of this report.

Initial Site Preparation

The existing loose alluvial soils and existing fill materials should be removed from all proposed structural and/or fill areas. The data developed during this investigation indicates that removals on the order of 5 to 7 feet deep will be required from proposed development areas in order to encounter competent alluvium upon which engineered compacted fill can be placed. This will allow for the removal of the undocumented fill and any subsurface features associated with the past site use. The given removal depths are preliminary. Deeper fills may be present locally. Removals should expose alluvial materials with an in-situ relative compaction of at least 85 percent (ASTM D 1557). The actual depths of the removals should be determined during the grading operation by observation and/or in-place density testing.

Preparation of Fill Areas

Prior to placing fill, the surfaces of all areas to receive fill should be scarified to a minimum depth of 12 inches. The scarified soil should be brought to near optimum moisture content and compacted to a relative compaction of at least 90 percent (ASTM D 1557).

Engineered Compacted Fill

The onsite soils should provide adequate quality fill material, provided they are free from oversized and/or organic matter and other deleterious materials. Unless approved by the geotechnical engineer, rock or similar irreducible material with a maximum dimension greater than 6 inches should not be buried or placed in fills.

If required, import fill should be inorganic, non-expansive granular soils free from rocks or lumps greater than 6 inches in maximum dimension. Sources for import fill should be approved by the geotechnical engineer prior to their use. Fill should be spread in maximum 8-inch uniform, loose lifts, each lift brought to near optimum moisture content, and compacted to a relative compaction of at least 90 percent in accordance with ASTM D 1557.

Preparation of Foundation Areas

All footings should rest upon at least 24 inches of properly compacted fill material placed over competent alluvium. In areas where the required fill thickness is not accomplished by the recommended removals or by site rough grading, the footing areas should be further subexcavated to a depth of at least 24 inches below the proposed footing base grade, with the subexcavation extending at least 5 feet beyond the footing lines. The bottom of all excavations should be scarified to a depth of 12 inches, brought to near optimum moisture content, and recompacted to at least 90 percent relative compaction (ASTM D 1557) prior to the placement of compacted fill.

It should be noted that no structure should be placed across any areas where the maximum depth of fill to minimum depth of fill is greater than a 3 to 1 ratio as measured from the bottom of the footing.

Concrete floor slabs should bear on a minimum of 24 inches of compacted soil. This should be accomplished by the recommendations provided above. The final pad surfaces should be rolled to provide smooth, dense surfaces upon which to place the concrete.

Short-Term Excavations

Following the California Occupational and Safety Health Act (CAL-OSHA) requirements, excavations 5 feet deep and greater should be sloped or shored. All excavations and shoring should conform to CAL-OSHA requirements. Short-term excavations of 5 feet deep and greater will conform to Title 8 of the California Code of Regulations, Construction Safety Orders, Section 1504 and 1539 through 1547. Based on the findings from our exploratory borings, it appears that Type C soils are the predominant type of soil on the project and all short-term excavations should be based on this type of soil.

Deviation from the standard short-term slopes are permitted using option four, Design by a Registered Professional Engineer (Section 1541.1).

Short-term excavation construction and maintenance are the responsibility of the contractor and should be a consideration of his methods of operation and the actual soil conditions encountered.

Slope Construction

Preliminary data indicates that cut and fill slopes should be constructed no steeper than two horizontal to one vertical. Fill slopes should be overfilled during construction and then cut back to expose fully compacted soil. A suitable alternative would be to compact the slopes during construction, then roll the final slopes to provide dense, erosion-resistant surfaces.

Slope Protection

Since the site soil materials are susceptible to erosion by running water, measures should be provided to prevent surface water from flowing over slope faces. Slopes at the project should be planted with a deep rooted ground cover as soon as possible after the completion of grading. The use of succulent ground covers such as iceplant or sedum is not recommended. If watering is necessary to sustain plant growth on slopes, then the watering operation should be monitored to assure proper operation of the irrigation system and to prevent over watering.

Soil Expansiveness

The upper materials encountered during this investigation were found to be relatively granular and are considered to have a very low expansion potential with some minor on-site materials having a low expansion potential. Therefore, specialized construction procedures to specifically resist expansive soil activity are anticipated at this time and are provided within the following sections of this report.

Additional evaluation of on-site and any imported soils for their expansion potential should be conducted following completion of the grading operation.

Foundation Design

If the site is prepared as recommended, the proposed structures may be safely supported on conventional shallow foundations, either individual spread footings and/or continuous wall footings, bearing entirely on a minimum of 24 inches of engineered compacted fill placed over competent alluvial materials. All foundations should have a minimum width of 12 inches and should be established a minimum of 12 inches below lowest adjacent grade.

For the minimum width and depth, spread foundations may be designed using an allowable bearing pressure of 2,000 psf. This bearing pressure may be increased by 200 psf for each additional foot of width, and by 500 psf for each additional foot of depth, up to a maximum of 4,000 psf. For example, a footing 2 feet wide and embedded 2 feet will have an allowable bearing pressure of 2,700 psf.

The above values are net pressures; therefore, the weight of the foundations and the backfill over the foundations may be neglected when computing dead loads. The values apply to the maximum edge pressure for foundations subjected to eccentric loads or overturning. The recommended pressures apply for the total of dead plus frequently applied live loads, and incorporate a factor of safety of at least 3.0. The allowable bearing pressures may be increased by one-third for temporary wind or seismic loading.

The resultant of the combined vertical and lateral seismic loads should act within the middle one-third of the footing width. The maximum calculated edge pressure under the toe of foundations subjected to eccentric loads or overturning should not exceed the increased allowable pressure.

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footings bearing against compacted fill, passive earth pressure may be considered to be developed at a rate of 300 pounds per square foot per foot of depth. Base friction may be computed at 0.30 times the normal load. Base friction and passive earth pressure may be combined without reduction. These values are for dead load plus live load and may be increased by one-third for wind or seismic loading.

Footings on low expansive soils should be reinforced with a minimum of four # 4 rebars, two near the top and two near the bottom of the footings.

The preceding recommendations to counteract low expansive soil activity should be considered preliminary and should be revised upon the completion of the site grading. More stringent parameters for design of foundations on expansive soils can be specified by a structural engineer experienced in these matters.

Settlement

Total settlement of individual foundations will vary depending on the width of the foundation and the actual load supported. Maximum settlement of shallow foundations designed and constructed in accordance with the preceding recommendations are estimated to be on the order of 0.5 inch. Differential settlements between adjacent footings should be about one-half of the total settlement. Settlement of all foundations is expected to occur rapidly, primarily as a result of elastic compression of supporting soils as the loads are applied, and should be essentially completed shortly after initial application of the loads.

Building Area Slab-on-Grade

To provide adequate support, concrete floor slabs-on-grade should bear on a minimum of 24 inches of engineered fill compacted soil. The final pad surfaces should be rolled to provide smooth, dense surfaces.

The minimum reinforcement for slabs-on-grade supported by low expansive soil is #3 reinforcing bars at 18-inches on center, each way. The slab thickness shall be a minimum of 4-inches. Slab-on-grade supported by soils with expansion potential above low should be designed by a structural engineer experienced in such design. Special design of slabs-on-grade supported by very low expansion potential soils is not required.

Prior to placing concrete, the upper 12-inches of the subgrade soil should be pre-saturated to 2 to 4 percent over optimum moisture content.

Slabs to receive moisture-sensitive coverings should be provided with a moisture vapor retarder/barrier. We recommend that a vapor retarder/barrier be designed and constructed according to the American Concrete Institute 302.1R, Concrete Floor and Slab Construction, which addresses moisture vapor retarder/barrier construction. At a minimum, the vapor retarder/barrier should comply with ASTM E 1745 and have a nominal thickness of at least 10 mils. The vapor retarder/barrier should be properly sealed, per the manufacturer's recommendations, and protected from punctures and other damage.

For slabs in humidity-controlled areas, a layer of dry, granular material (sand) should be placed above the vapor retarder/barrier.

The slabs should be protected from rapid and excessive moisture loss which could result in slab curling. Careful attention should be given to slab curing procedures, as the site area is subject to large temperature extremes, humidity, and strong winds.

Exterior Flatwork

To provide adequate support, exterior flatwork improvements should rest on a minimum of 12 inches of soil compacted to at least 90 percent (ASTM D 1557).

To resist expansive soil forces, flatwork supported by low expansive soils should be reinforced with a minimum of # 3 rebar at 18 inches each way. Flatwork areas should be pre-saturated to 2 to 4 percent over optimum prior to placing concrete.

Flatwork surface should be sloped a minimum of 1 percent away from buildings and slopes, to approved drainage structures.

Wall Pressures

The design of footings for retaining walls should be performed in accordance with the recommendations described earlier under Preparation of Foundation Areas and Foundation Design. For design of retaining wall footings, the resultant of the applied loads should act in the middle one-third of the footing, and the maximum edge pressure should not exceed the basic allowable value without increase.

For design of retaining walls unrestrained against movement at the top, we recommend an active pressure of 50 pounds per square foot (psf) per foot of depth be used. This assumes level backfill consisting of compacted, non-expansive, on-site soils placed against the structures and within the back cut slope extending upward from the base of the stem at 35 degrees from the vertical or flatter.

Retaining structures subject to uniform surcharge loads within a horizontal distance behind the structures equal to the structural height should be designed to resist additional lateral loads equal to 0.45 times the surcharge load. Any isolated or line loads from adjacent foundations or vehicular loading will impose additional wall loads and should be considered individually.

To avoid over stressing or excessive tilting during placement of backfill behind walls, heavy compaction equipment should not be allowed within the zone delineated by a 45-degree line extending from the base of the wall to the fill surface. The backfill directly behind the walls should be compacted using light equipment such as hand operated vibrating plates and rollers. No material larger than three inches in diameter should be placed in direct contact with the wall.

Wall pressures should be verified prior to construction, when the actual backfill materials and conditions have been determined. Recommended pressures are applicable only to level, non-expansive, properly drained backfill with no additional surcharge loadings. If inclined backfills are proposed, this firm should be contacted to develop appropriate active earth pressure parameters.

Preliminary Pavement Design

Testing and design for preliminary onsite pavement was conducted in accordance with the California Highway Design Manual and the Guide for the Design and Construction of Concrete Parking Lots (ACI330R).

Based upon our preliminary sampling and testing, and upon an assumed Traffic Index generally used for similar projects, it appears that the structural sections tabulated below should provide satisfactory pavements for the subject on-site pavement improvements:

AREA	T.I. ¹	DESIGN R-VALUE	PRELIMINARY SECTION
On site vehicular parking with occasional truck traffic (ADTT=1)	5.0	30	0.25' AC / 0.45' AB or 4.5" PCC / 4.0" AB
On site vehicular parking with occasional truck traffic (ADTT=10)	6.0	30	0.25' AC / 0.70' AB or 5.0" PCC / 4.0" AB
AC - Asphalt Concrete AB - Class 2 Aggregate Base PCC - Portland Cement Concrete ¹ to be determined by project engineer			

The above structural sections are predicated upon 90 percent relative compaction (ASTM D 1557) of all utility trench backfills and 95 percent relative compaction (ASTM D 1557) of the upper 12 inches of pavement subgrade soils and of any aggregate base utilized. In addition, the aggregate base should meet Caltrans specifications for Class 2 Aggregate Base.

In areas of the pavement which will receive high abrasion loads due to start-ups and stops, or where trucks will move on a tight turning radius, consideration should be given to installing concrete pads. Such pads should be a minimum of 4.5 inch thick concrete, with a 4 inch thick aggregate base. Concrete pads are also recommended in areas adjacent to trash storage areas where heavier loads will occur due to operation of trucks lifting trash dumpsters.

The recommended Portland Cement (PCC) concrete pavement should have a minimum modulus of rupture (MR) of 550 pounds per square inch (psi). Transverse joints should be sawcut in the pavement at approximately 12 to 15-foot intervals within 4 to 6 hours of concrete placement, or preferably sooner. Sawcut depth should be equal to approximately one quarter of slab thickness. Construction joints should be constructed such that adjacent sections butt directly against each other and are keyed into each other. Parallel pavement sections should also be keyed into each other.

It should be noted that all of the above pavement design was based upon the results of preliminary sampling and testing, and should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed.

Infiltration

The results of our field investigation and percolation test data indicates the site earth materials at the depth and location tested are not conducive to acceptable infiltration. Therefore, water quality storm water systems should not incorporate on-site infiltration when determining storm water treatment capacity.

Corrosion Protection

Based on the test results, this soil is classified as corrosive to ferrous metals and potentially aggressive towards copper. The laboratory data above should be reviewed and corrosion design should be completed by a qualified corrosion engineer.

In lieu of corrosion design for metal piping, ABS/PVC may be used. Soil corrosion is not considered a factor with ABS/PVC materials. ABS/PVC is considered suitable for use due to the corrosion potential of the on-site soils with respect to metals.

LOR Geotechnical does not practice corrosion engineering. If further information concerning the corrosion characteristics, or interpretation of the results submitted herein, is required, then a competent corrosion engineer should be consulted.

Construction Monitoring

Post investigative services are an important and necessary continuation of this investigation. Project plans and specifications should be reviewed by the project geotechnical consultant prior to construction to confirm that the intent of the recommendations presented in this report have been incorporated into the design.

Additional R-value, expansion, and soluble sulfate content testing should be conducted after/during site rough grading.

During construction, sufficient and timely geotechnical observation and testing should be provided to correlate the findings of this investigation with the actual subsurface conditions

exposed during construction. Items requiring observation and testing include, but are not necessarily limited to, the following:

1. Site preparation-stripping and removals.
2. Excavations, including approval of the bottom of excavations prior to the processing and preparation of the bottom areas for fill placement.
3. Scarifying and compacting prior to fill placement.
4. Foundation excavations.
5. Subgrade preparation for pavements and slabs-on-grade.
6. Placement of engineered compacted fill and backfill, including approval of fill materials and the performance of sufficient density tests to evaluate the degree of compaction being achieved.

LIMITATIONS

This report contains geotechnical conclusions and recommendations developed solely for use by Second Street Family LP, and their design consultants, for the purposes described earlier. It may not contain sufficient information for other uses or the purposes of other parties. The contents should not be extrapolated to other areas or used for other facilities without consulting LOR Geotechnical Group, Inc.

The recommendations are based on interpretations of the subsurface conditions concluded from information gained from subsurface explorations and a surficial site reconnaissance.

The interpretations may differ from actual subsurface conditions, which can vary horizontally and vertically across the site. If conditions are encountered during the construction of the project, which differ significantly from those presented in this report, this firm should be notified immediately so we may assess the impact to the recommendations provided. Due to possible subsurface variations, all aspects of field construction addressed in this report should be observed and tested by the project geotechnical consultant.

If parties other than LOR Geotechnical Group, Inc., provide construction monitoring services, they must be notified that they will be required to assume responsibility for the geotechnical phase of the project being completed by concurring with the recommendations provided in this report or by providing alternative recommendations.

The report was prepared using generally accepted geotechnical engineering practices under the direction of a state licensed geotechnical engineer. No warranty, expressed or implied, is made as to conclusions and professional advice included in this report. Any persons using this report for bidding or construction purposes should perform such independent investigations as deemed necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Governmental Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a significant amount of time without a review by LOR Geotechnical Group, Inc., verifying the suitability of the conclusions and recommendations.

Second Street Family LP
October 9, 2023
Revised April 17, 2024

Project No. 33951.1R

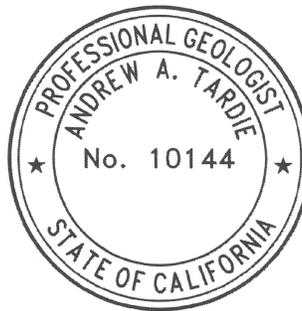
CLOSURE

It has been a pleasure to assist you with this project. We look forward to being of further assistance to you as construction begins. Should conditions be encountered during construction that appear to be different than indicated by this report, please contact this office immediately in order that we might evaluate their effect.

Should you have any questions regarding this report, please do not hesitate to contact our office at your convenience.

Respectfully submitted,
LOR Geotechnical Group, Inc.


Andrew A. Tardie, PG 10144
Vice President




John P. Leuer, GE 2030
President



AAT:RMM:JPL:ss

Distribution: Addressee (2) and via email sbering@c-cdev.com

REFERENCES

American Society of Civil Engineers, 2016, Minimum Design Load for Buildings and Other Structures, ASCE 7-16.

California Building Standards Commission and International Conference of Building Officials, 2022, California Building Code, 2022 Edition.

California Department of Water Resources, 2023, Online Water Data Library (WDL), <https://wdl.water.ca.gov/waterdatalibrary/Map.aspx>.

CDM Smith, 2013, Technical Guidance Document for Water Quality Management Plans, dated June 2013.

County of Riverside, Flood Control and Water Conservation District (CRFCWCD), 2011, Design Handbook for Low Impact Development Best Management Practices, dated September 2011.

Google Earth, 2023, Imagery from various years, www.google.com/earth.

Hart, E.W. and W.A. Bryant, 2010, Fault-Rupture Hazard Zones in California, California Dept. of Conservation Division of Mines and Geology Special Publication 42.

Historic Aerials (Nationwide Environmental Title Research, LLC), 2023, Imagery from Various Years, <https://www.historicaerials.com/>.

Larson, R., and Slosson, J., 1992, The Role of Seismic Hazard Evaluation in Engineering Reports, in Engineering Geology Practice in Southern California, AEG Special Publication Number 4, pp 191-194.

Matti J.C. and Carson, S.E., 1985, Contour Map Showing Minimum Depth to Groundwater, Upper Santa Ana River Valley, California, 1973-1979, USGS Miscellaneous Field Studies Map MF-1802.

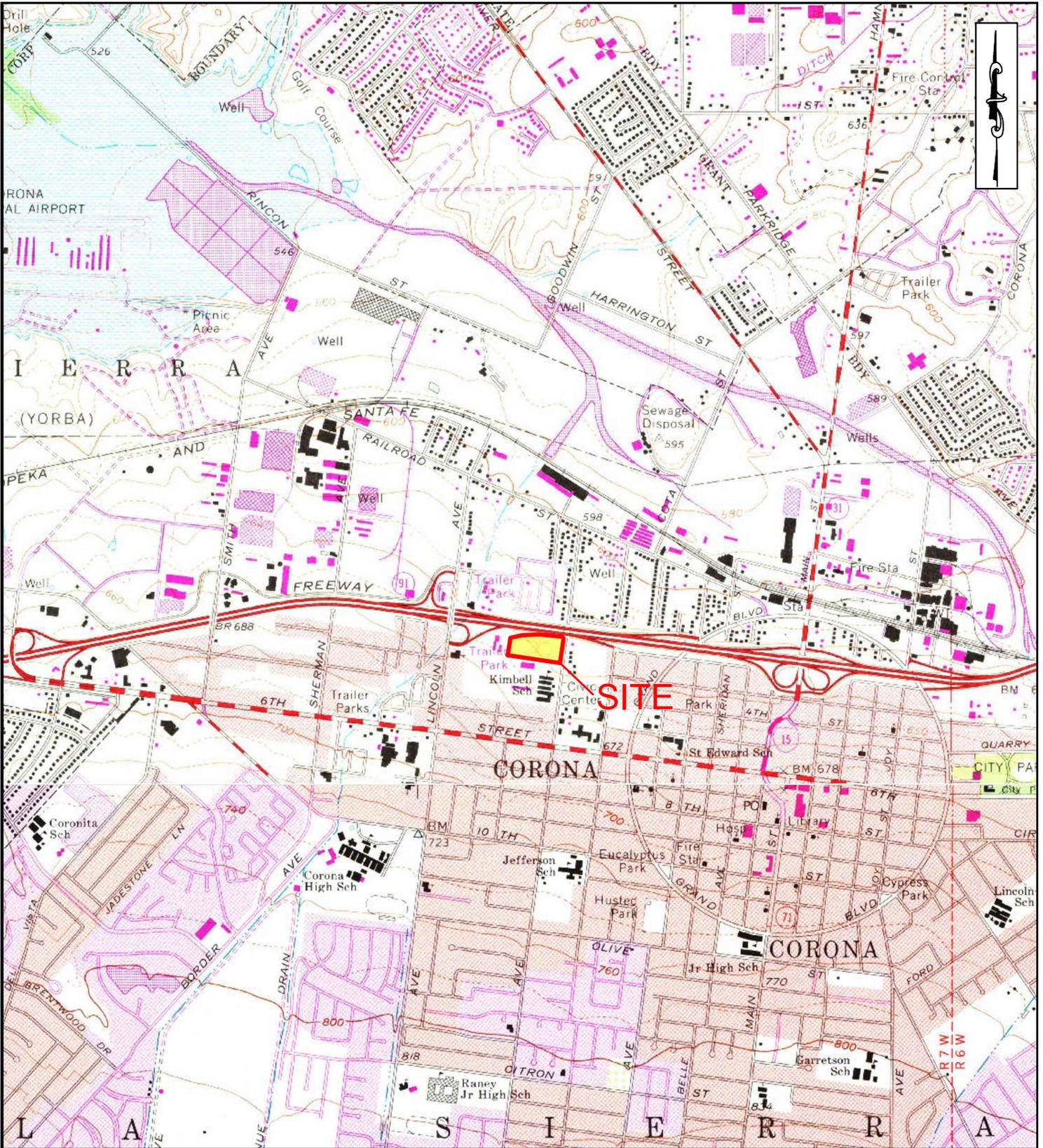
Morton, D.M. and Gray, C.H., Jr., 2002, Geologic Map of the Corona North 7.5' Quadrangle, Riverside and San Bernardino Counties, California, Version 1.0, USGS Open File Report 00-22.

Riverside County Land Information System, 2023
<http://www3.tlma.co.riverside.ca.us/pa/rclis/index.html>.

USGS, 2023, <https://earthquake.usgs.gov/earthquakes/map>.

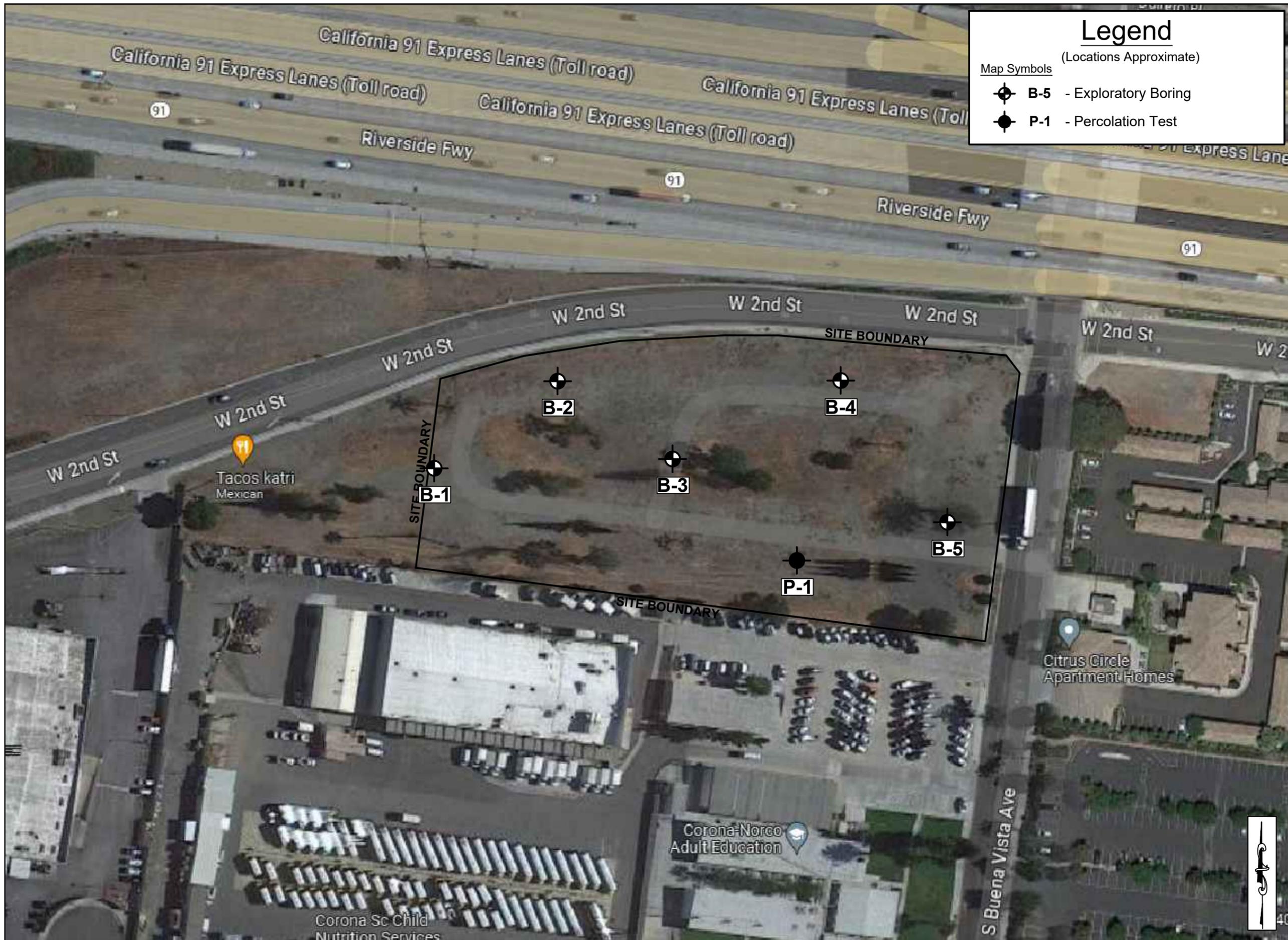
APPENDIX A

**Index Map, Site Plan, Regional Geologic Map,
and Historical Seismicity Maps**



INDEX MAP

PROJECT:	Proposed Multi-Family Residential Development, Corona, California	PROJECT NO.:	33951.1
CLIENT:	Second Street Family LP	ENCLOSURE:	A-1
LOR GEOTECHNICAL GROUP, INC.		DATE:	October 2023, Revised April 2024
		SCALE:	1" ≈ 2,000'



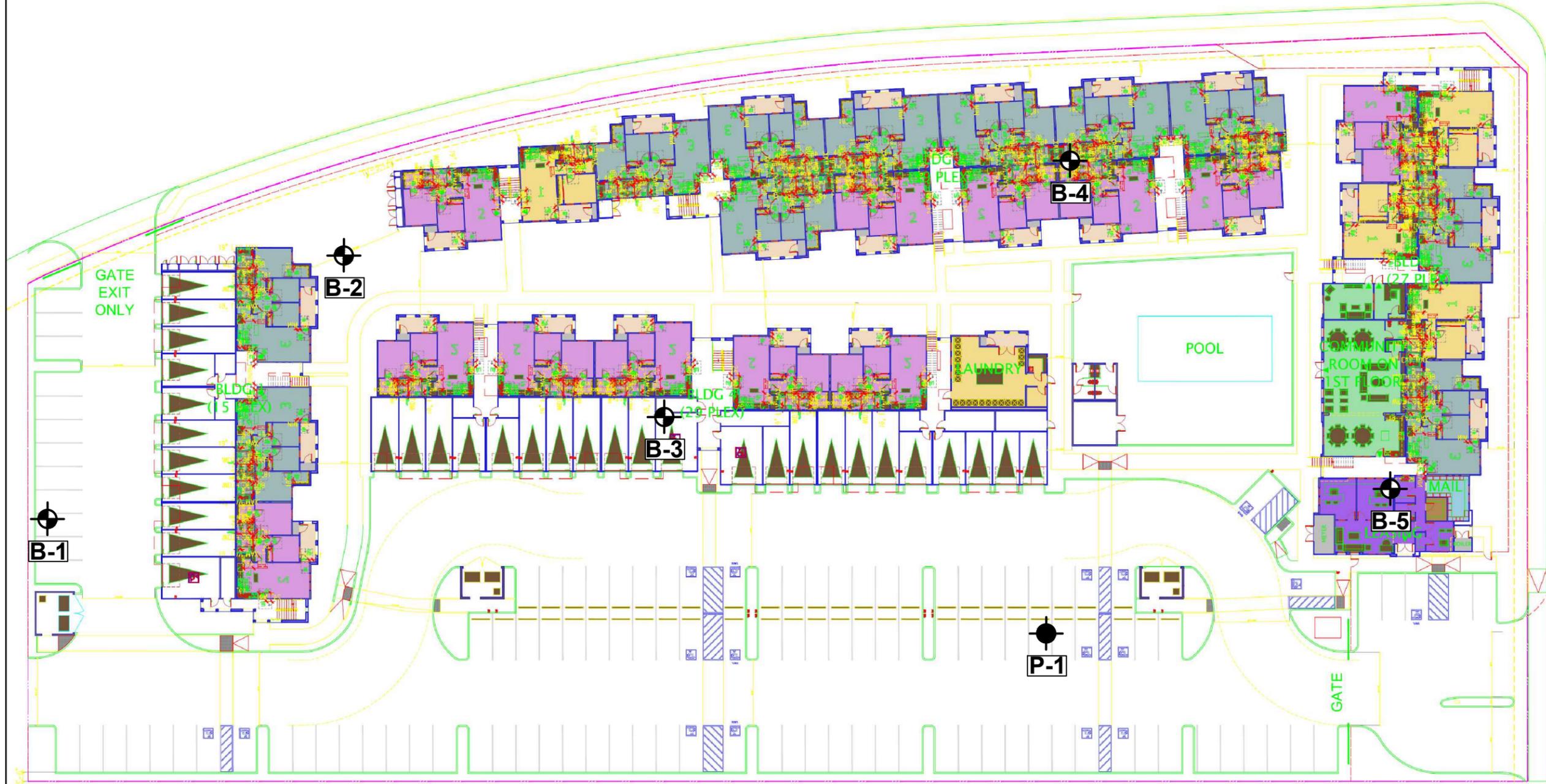
Legend
(Locations Approximate)

Map Symbols

-  **B-5** - Exploratory Boring
-  **P-1** - Percolation Test

SITE PLAN

PROJECT: Proposed Multi-Family Residential Development, Corona, California	PROJECT NO.: 33951.1	
CLIENT: Second Street Family LP	ENCLOSURE: A-2a	DATE: October 2023, Revised April 2024
LOR GEOTECHNICAL GROUP, INC.		SCALE: 1" = 100'



Legend

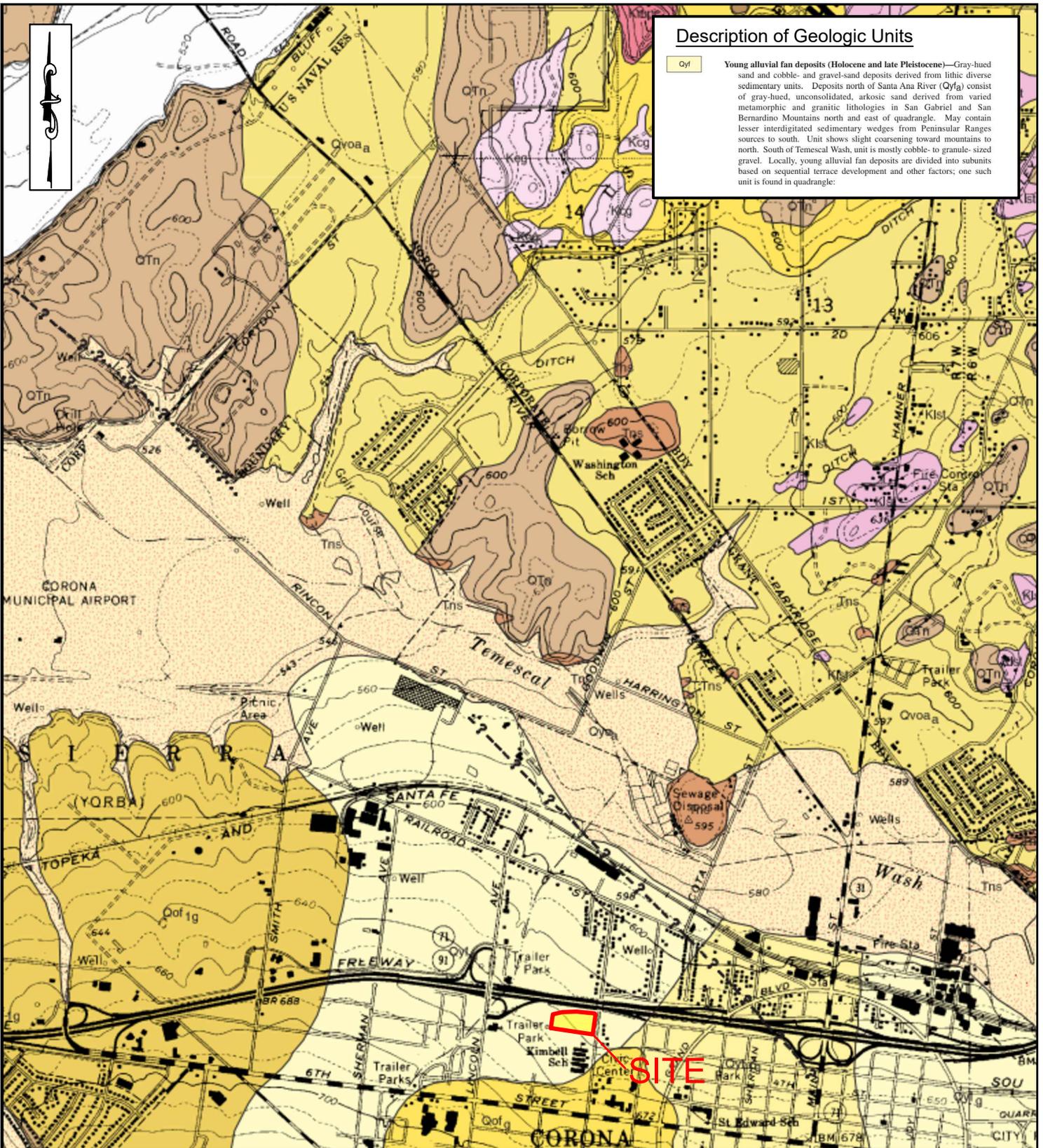
(Locations Approximate)

Map Symbols

- B-5** - Exploratory Boring
(Boring B-6 Not Shown)
- P-1** - Percolation Test

SITE PLAN

PROJECT:	Proposed Multi-Family Residential Development, Corona, California	PROJECT NO.:	33951.1
CLIENT:	Second Street Family LP	ENCLOSURE:	A-2b
LOR GEOTECHNICAL GROUP, INC.		DATE:	October 2023
		SCALE:	1" ≈ 42'



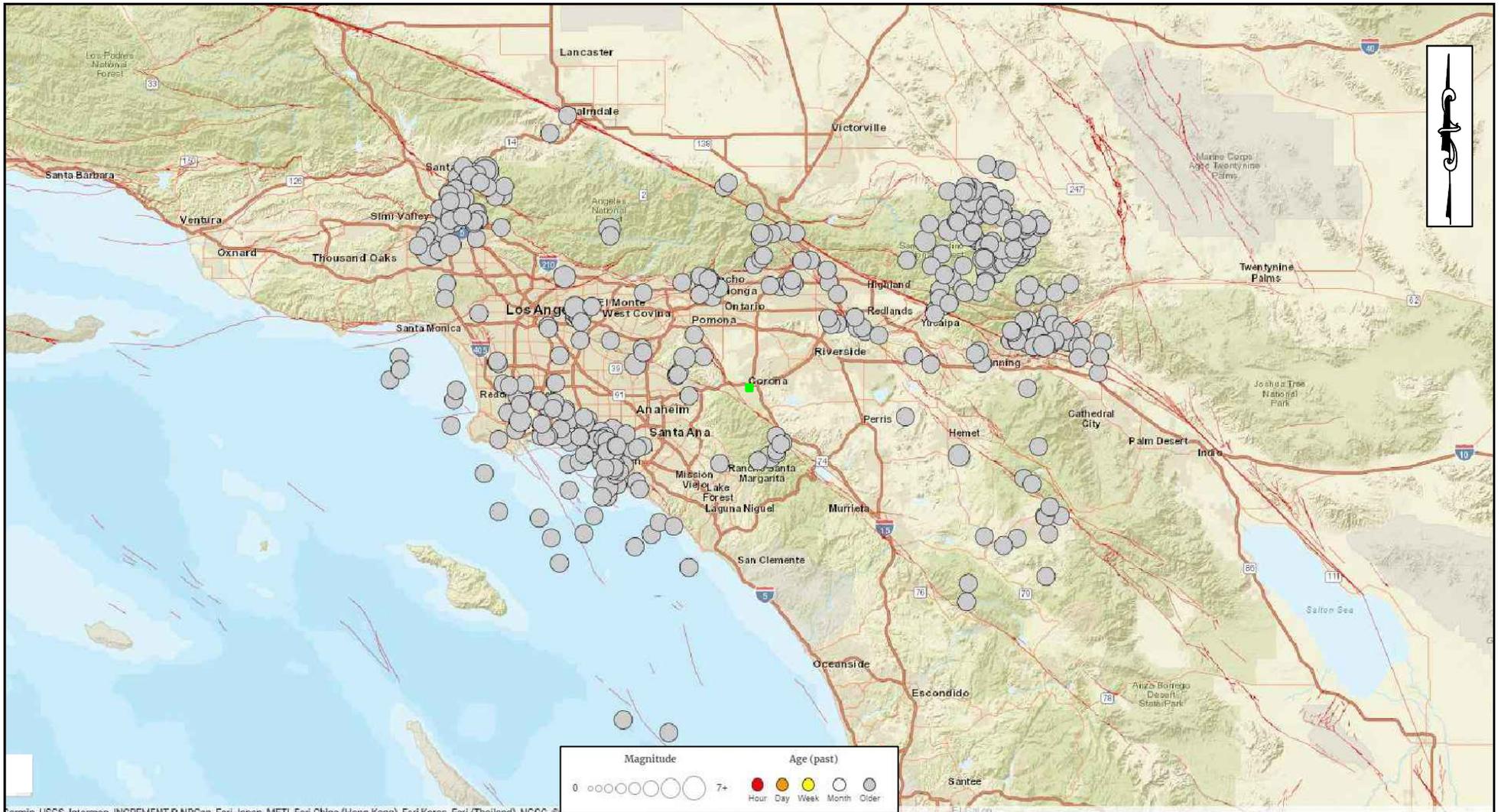
Description of Geologic Units

Qyf Young alluvial fan deposits (Holocene and late Pleistocene)—Gray-hued sand and cobble- and gravel-sand deposits derived from lithic diverse sedimentary units. Deposits north of Santa Ana River (Qyfa) consist of gray-hued, unconsolidated, arkosic sand derived from varied metamorphic and granitic lithologies in San Gabriel and San Bernardino Mountains north and east of quadrangle. May contain lesser interdigitated sedimentary wedges from Peninsular Ranges sources to south. Unit shows slight coarsening toward mountains to north. South of Temescal Wash, unit is mostly cobble- to granule-sized gravel. Locally, young alluvial fan deposits are divided into subunits based on sequential terrace development and other factors; one such unit is found in quadrangle:

REGIONAL GEOLOGIC MAP

(Morton and Gray, 2002)

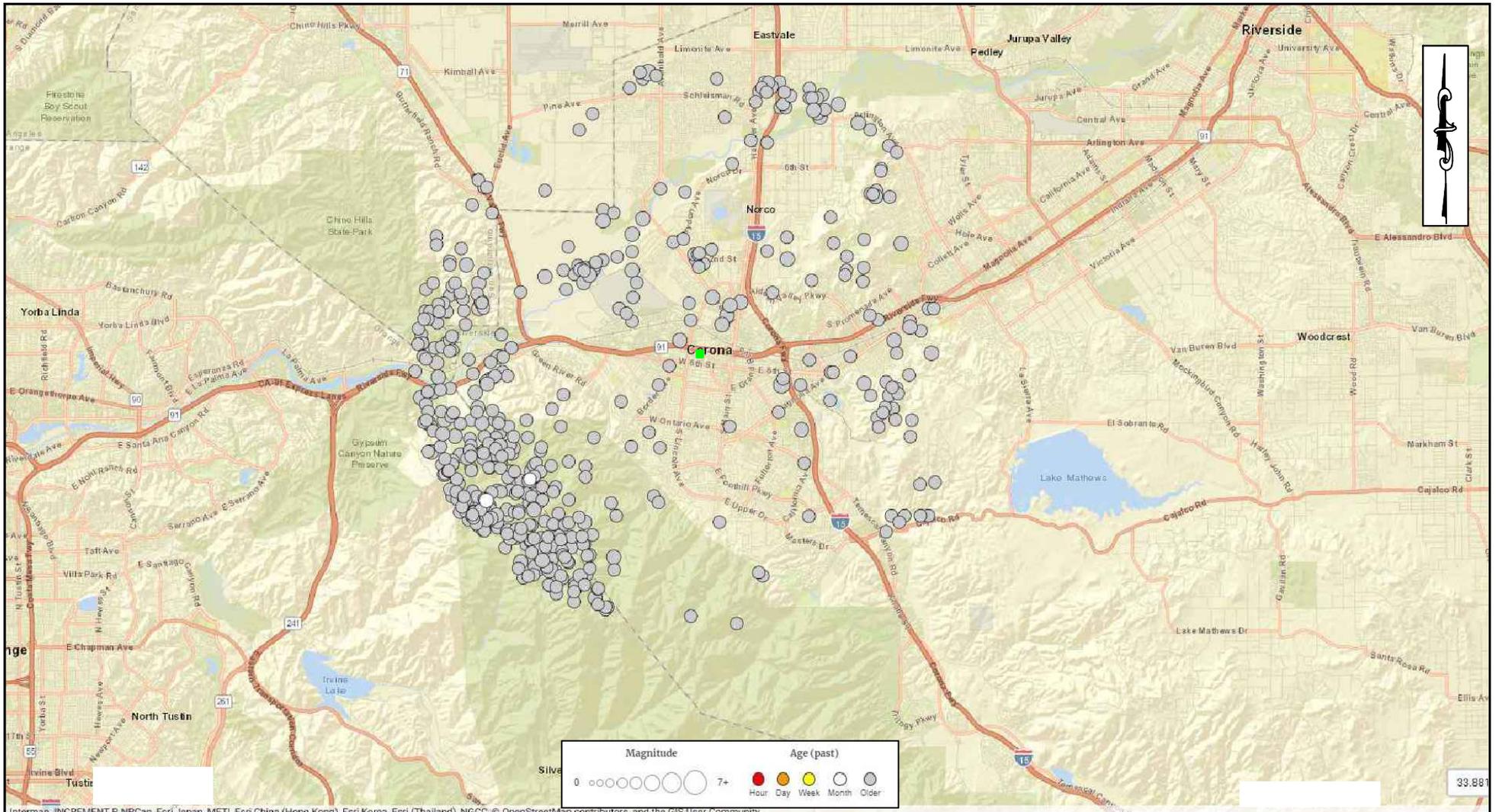
PROJECT: Proposed Multi-Family Residential Development, Corona, California	PROJECT NO.: 33951.1
CLIENT: Second Street Family LP	ENCLOSURE: A-3
LOR GEOTECHNICAL GROUP, INC.	DATE: October 2023, Revised April 2024
	SCALE: 1" ≈ 2,000'



U.S. Geologic Survey (2023) real-time earthquake epicenter map. Plotted are 437 epicenters of instrument-recorded events from 01/01/32 to present (10/05/23) of local magnitude 4+ within a radius of ~62 miles (100 kilometers) of the site. Location accuracy varies. The site is indicated by the green square (■). The selected magnitude corresponds to a threshold intensity value where very light damage potential begins. These events are also generally widely felt by persons. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 100km Radius

PROJECT:	Proposed Multi-Family Residential Development, Corona, California	PROJECT NO.:	33951.1
CLIENT:	Second Street Family LP	ENCLOSURE:	A-4
LOR GEOTECHNICAL GROUP, INC.		DATE:	October 2023
		SCALE:	1" ≈ 40km



U.S. Geologic Survey (2023) real-time earthquake epicenter map. Plotted are 501 epicenters of instrument-recorded events from 01/01/78 to present (10/05/23) of local magnitude 2+ within a radius of ~6.2 miles (10 kilometers) of the site. Location accuracy varies. The site is indicated by the green square (■). The selected magnitude corresponds to a threshold intensity value where very light damage potential begins. These events are also generally widely felt by persons. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 10km Radius

PROJECT:	Proposed Multi-Family Residential Development, Corona, California	PROJECT NO.:	33951.1
CLIENT:	Second Street Family LP	ENCLOSURE:	A-5
LOR GEOTECHNICAL GROUP, INC.		DATE:	October 2023
		SCALE:	1" ≈ 10km

APPENDIX B

Field Investigation Program and Boring Logs

APPENDIX B **FIELD INVESTIGATION**

Subsurface Exploration

Our subsurface exploration of the site consisted of drilling 6 exploratory borings to depths of approximately 11.5 and 51.5 feet below the existing ground surface using a Mobile B-61 drill rig on September 19 and 21, 2023. The approximate locations of the borings are shown on Enclosures A-2a and A-2b within Appendix A.

The drilling exploration was conducted using a Mobile B-61 drill rig equipped with 8-inch diameter hollow stem augers. The soils were continuously logged by a geologist from this firm who inspected the site, created detailed logs of the borings, obtained undisturbed, as well as disturbed, soil samples for evaluation and testing, and classified the soils by visual examination in accordance with the Unified Soil Classification System.

Relatively undisturbed samples of the subsoils were obtained at a maximum interval of 5 feet. The samples were recovered by using a California split barrel sampler of 2.50 inch inside diameter and 3.25 inch outside diameter or a Standard Penetration Sampler (SPT) from the ground surface to the total depth explored. The samplers were driven by a 140 pound automatic trip hammer dropped from a height of 30 inches. The number of hammer blows required to drive the sampler into the ground the final 12 inches were recorded and further converted to an equivalent SPT N-value. Factors such as efficiency of the automatic trip hammer used during this investigation (80%), borehole diameter (8"), and rod length at the test depth were considered for further computing of equivalent SPT N-values corrected for field procedures (N₆₀) which are included in the boring logs, Enclosures B-1 through B-6.

The undisturbed soil samples were retained in brass sample rings of 2.42 inches in diameter and 1.00 inch in height, and placed in sealed plastic containers. Disturbed soil samples were obtained at selected levels within the borings and placed in sealed containers for transport to our geotechnical laboratory.

All samples obtained were taken to our geotechnical laboratory for storage and testing. Detailed logs of the borings are presented on the enclosed Boring Logs, Enclosures B-1 through B-6. A Boring Log Legend is presented on Enclosure B-i. A Soil Classification Chart is presented as Enclosure B-ii.

CONSISTENCY OF SOIL

SANDS

SPT BLOWS

0-4
4-10
10-30
30-50
Over 50

CONSISTENCY

Very Loose
Loose
Medium Dense
Dense
Very Dense

COHESIVE SOILS

SPT BLOWS

0-2
2-4
4-8
8-15
15-30
30-60
Over 60

CONSISTENCY

Very Soft
Soft
Medium
Stiff
Very Stiff
Hard
Very Hard

SAMPLE KEY

Symbol

Description



INDICATES CALIFORNIA
SPLIT SPOON SOIL
SAMPLE

INDICATES BULK
SAMPLE

INDICATES SAND CONE
OR NUCLEAR DENSITY
TEST

INDICATES STANDARD
PENETRATION TEST
(SPT) SOIL SAMPLE

TYPES OF LABORATORY TESTS

- 1 Atterberg Limits
- 2 Consolidation
- 3 Direct Shear (undisturbed or remolded)
- 4 Expansion Index
- 5 Hydrometer
- 6 Organic Content
- 7 Proctor (4", 6", or Cal216)
- 8 R-value
- 9 Sand Equivalent
- 10 Sieve Analysis
- 11 Soluble Sulfate Content
- 12 Swell
- 13 Wash 200 Sieve

BORING LOG LEGEND

PROJECT:	Multi-Family Residential Development, Corona, California	PROJECT NO.:	33951.1R
CLIENT:	Second Street Housing, LP	ENCLOSURE:	B-i
LOR GEOTECHNICAL GROUP, INC.		DATE:	April 2024

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

PARTICLE SIZE LIMITS

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
12"	3"	3/4"	No. 4 (U.S. STANDARD SIEVE SIZE)	No. 10	No. 40	200	

SOIL CLASSIFICATION CHART

PROJECT:	Multi-Family Residential Development, Corona, California	PROJECT NO.:	33951.1R
CLIENT:	Second Street Housing, LP	ENCLOSURE:	B-ii
LOR GEOTECHNICAL GROUP, INC.		DATE:	April 2024

LOG OF BORING B-1

TEST DATA

DEPTH IN FEET	TEST DATA					SAMPLE TYPE	LITHOLOGY	U.S.C.S.
	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)				
0								
11	3, 7, 9, 10		3.9	110.0				
5	10		6.0	106.8			ML	
	32		2.0	128.7			SM	
10	30		5.5	120.0				
15	67		4.0	118.7			SW SM	
20	60		3.6					
25	55		5.1					
30								

DESCRIPTION

@ 0 feet, FILL: SILTY SAND with GRAVEL, approximately 40% gravel to 1 1/2", 10% coarse grained sand, 15% medium grained sand, 15% fine grained sand, and 20% silty fines, brown, dry.
 @ 1 foot, some asphalt and rebar debris.

@ 5 feet, ALLUVIUM: SANDY SILT, approximately 5% gravel to 1/2", 5% coarse grained sand, 15% medium grained sand, 20% fine grained sand, and 55% silty fines with trace clay, red brown, dry.

@ 7 feet, SILTY SAND, approximately 10% gravel to 2", 25% coarse grained sand, 25% medium grained sand, 25% fine grained sand, and 15% silty fines, brown, dry to damp.

@ 10 feet, slight increase in gravel percentage.

@ 15 feet, WELL GRADED SAND with SILT and GRAVEL, approximately 20% gravel to 2", 20% coarse grained sand, 25% medium grained sand, 25% fine grained sand, and 10% silty fines, red brown, damp.

@ 27 feet, refusal, boring moved; refusal at 17' during second boring attempt, boring moved; refusal at 7' during third boring attempt, boring moved; refusal at 20' during fourth boring attempt.

END OF BORING @ 27' (due to refusal)

Fill to 5'
 No groundwater
 No bedrock

PROJECT: Multi-Family Residential Development

PROJECT NO.: 33951.1

CLIENT: Second Street Family LP

ELEVATION: --

LOR GEOTECHNICAL GROUP, INC.

DATE DRILLED: September 19, 2023

EQUIPMENT: Mobile B-61

HOLE DIA.: 8" ENCLOSURE: B-1

LOG OF BORING B-2

TEST DATA								U.S.C.S.	DESCRIPTION
DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY			
0								SM	@ 0 feet, <u>FILL</u> : SILTY SAND, approximately 10% gravel to 1/2", 15% coarse grained sand, 25% medium grained sand, 25% fine grained sand, and 25% silty fines, brown, dry.
21	21		1.8	116.9	█			SW	@ 2 feet, WELL GRADED SAND with GRAVEL, approximately 20% gravel to 1", 25% coarse grained sand, 25% medium grained sand, 25% fine grained sand, and 5% silty fines, light brown, dry.
5	13		4.8	95.5	█			ML	@ 5 feet, <u>ALLUVIUM</u> : SANDY SILT, approximately 10% medium grained sand, 20% fine grained sand, and 70% silty fines, brown, dry, some pinhole porosity.
27	27		4.8	92.1	█				@ 7 feet, slightly coarser grained, trace clay, and thin calcite stringers.
10	42		4.6	120.9	█			SW SM	@ 10 feet, WELL GRADED SAND with SILT and GRAVEL, approximately 20% gravel to 2", 20% coarse grained sand, 25% medium grained sand, 25% fine grained sand, and 10% silty fines, brown, dry.
15	70		4.2	121.7	█				
20	83		1.1	114.0	█				
								END OF BORING @ 21'	
								Fill to 5' No groundwater No bedrock	

PROJECT: Multi-Family Residential Development	PROJECT NO.: 33951.1
CLIENT: Second Street Family LP	ELEVATION: --
	DATE DRILLED: September 21, 2023
	EQUIPMENT: Mobile B-61
	HOLE DIA.: 8" ENCLOSURE: B-2

LOG OF BORING B-3

TEST DATA								LITHOLOGY	U.S.C.S.	DESCRIPTION
DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE					
0		9, 10								@ 0 feet, <u>FILL</u> : SILTY SAND with GRAVEL, approximately 25% gravel to 1 1/2", 10% coarse grained sand, 20% medium grained sand, 20% fine grained sand, and 25% silty fines, brown, dry. @ 2 feet, contains trace clay.
26	26		8.8	116.2						
5	19		9.0	119.2				ML		@ 5 feet, <u>ALLUVIUM</u> SANDY SILT, approximately 5% gravel to 1/2", 5% coarse grained sand, 10% medium grained sand, 15% fine grained sand, and 65% silty fines, red brown, trace thin calcite stringers.
	21		4.3	106.8						@ 7 feet, SILTY SAND with GRAVEL, approximately 20% gravel to 2", 20% coarse grained sand, 20% medium grained sand, 20% fine grained sand, and 20% silty fines, red brown, damp.
10	26									@ 10 feet, no sample recovery.
15	bounce									@ 15 to 16 feet, increasing gravel (and possibly cobbles), difficult drilling, no sample recovery.
20	65		5.7	119.5				SW SM		@ 20 feet, WELL GRADED SAND with SILT and GRAVEL, approximately 25% gravel to 2", 20% coarse grained sand, 20% medium grained sand, 25% fine grained sand, and 10% silty fines with trace clay, damp.
25	92 for 11"		4.7	121.1						
END OF BORING @ 26.42'										
Fill to 5' No groundwater No bedrock										

PROJECT:	Multi-Family Residential Development	PROJECT NO.:	33951.1
CLIENT:	Second Street Family LP	ELEVATION:	--
	DATE DRILLED:	September 21, 2023	
	EQUIPMENT:	Mobile B-61	
	HOLE DIA.:	8"	ENCLOSURE:

LOG OF BORING B-4

TEST DATA

DEPTH IN FEET	TEST DATA						LITHOLOGY	U.S.C.S.
	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE		
0								
11	11		7.7		107.5	█		SM
5	11		8.1		91.0	█		ML
	54		4.2		118.4	█		SW
10	47		5.1		115.2	█		SM
15	80		3.7		126.9	█		
20	56		7.5		125.7	█		
25	58		2.6					
30	64		2.5					
35	71		2.1					
40	55		4.3					
45	18		22.1					ML
50	26		21.3					
55								

DESCRIPTION

@ 0 feet, FILL: SILTY SAND, approximately 10% gravel to 1", 15% coarse grained sand, 25% medium grained sand, 25% fine grained sand, and 25% silty fines, brown, dry.

@ 2 feet, ALLUVIUM: SANDY SILT, approximately 5% coarse grained sand, 15% medium grained sand, 25% fine grained sand, and 55% silty fines, brown, dry.

@ 5 feet, becomes red brown, some pinhole porosity.

@ 7 feet, WELL GRADED SAND with SILT and GRAVEL, approximately 20% gravel to 2", 20% coarse grained sand, 20% medium grained sand, 30% fine grained sand, and 10% silty fines.

@ 20 feet, trace clay in fines.

@ 30 feet, clay no longer present.

@ 40 feet, some iron oxide staining.

@ 45 feet, SILT, approximately 10% fine grained sand and 90% silty fines, brown, moist.

END OF BORING @ 51.5'

Fill to 2'
No groundwater
No bedrock

PROJECT:	Multi-Family Residential Development	PROJECT NO.:	33951.1
CLIENT:	Second Street Family LP	ELEVATION:	--
LOR GEOTECHNICAL GROUP, INC.	DATE DRILLED:	September 21, 2023	
	EQUIPMENT:	Mobile B-61	
	HOLE DIA.:	8"	ENCLOSURE: B-4

LOG OF BORING B-5

TEST DATA

DEPTH IN FEET	TEST DATA						U.S.C.S.
	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	
0							
11	1, 3, 4, 7, 8, 9, 10		19.6	84.9	█	█	SC
5			7.9	100.3	█	█	
29			8.9	116.1	█	█	
10	49		6.8	111.0	█	█	
15	46 for 6"		2.4		█	█	
20	91 for 11"		2.2	124.1	█	█	SW

DESCRIPTION

@ 0 feet, ALLUVIUM: CLAYEY SAND, approximately 10% gravel to 1", 10% coarse grained sand, 15% medium grained sand, 20% fine grained sand, and 45% silty fines with trace clay, red brown, dry, disturbed in upper 10" to 12".

@ 2 feet, some pinhole porosity, slightly coarser grained.

@ 7 feet, contains some thin calcite stringers, trace clay.

@ 12 feet, some gravel (drill rig chatter).

@ 15 feet, abundant gravel in sample, sample rings disturbed.

@ 20 feet, WELL GRADED SAND with GRAVEL, approximately 25% gravel to 3", 20% coarse grained sand, 25% medium grained sand, 25% fine grained sand, and 5% silty fines, brown, dry.

END OF BORING @ 21.42'

No fill
No groundwater
No bedrock

PROJECT: Multi-Family Residential Development

PROJECT NO.: 33951.1

CLIENT: Second Street Family LP

ELEVATION: --

LOR GEOTECHNICAL GROUP, INC.

DATE DRILLED: September 21, 2023

EQUIPMENT: Mobile B-61

HOLE DIA.: 8" ENCLOSURE: B-5

LOG OF BORING B-6

TEST DATA

DEPTH IN FEET	TEST DATA						LITHOLOGY	U.S.C.S.	DESCRIPTION
	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE				
0							SM	@ 0 feet, <u>FILL</u> : SILTY SAND, approximately 5% gravel to 1/2", 20% coarse grained sand, 20% medium grained sand, 20% fine grained sand, and 35% silty fines with trace clay, brown.	
20	20		4.9	100.7			ML	@ 2 feet, <u>ALLUVIUM</u> : SANDY SILT, trace gravel to 1/2", approximately 5% coarse grained sand, 10% medium grained sand, 20% fine grained sand, and 65% silty fines, red brown, dry, some pinhole porosity.	
5	19		3.3	105.4					
10	44		3.4	118.8			SW	@ 10 feet, <u>WELL GRADED SAND</u> with GRAVEL, approximately 20% gravel to 3", 20% coarse grained sand, 25% medium grained sand, 30% fine grained sand, and 5% silty fines, brown, dry.	
END OF BORING @ 11.5'									
Fill to 2' No groundwater No bedrock									

PROJECT:	Multi-Family Residential Development	PROJECT NO.:	33951.1
CLIENT:	Second Street Family LP	ELEVATION:	--
LOR GEOTECHNICAL GROUP, INC.	DATE DRILLED:	September 21, 2023	
	EQUIPMENT:	Mobile B-61	
	HOLE DIA.:	8"	ENCLOSURE: B-6

APPENDIX C

Borehole Percolation Testing Program and Infiltration Rate Test Results

APPENDIX C
BOREHOLE PERCOLATION TESTING PROGRAM
AND INFILTRATION RATE TEST RESULTS

One borehole percolation test was conducted in general accordance with the Deep Percolation Test procedure as outlined in the Design Handbook for Low Impact Development Best Management Practices (RCFCWCD, 2011). Our test was conducted at the requested location and depth as illustrated on Enclosure A-2. Subsequent to drilling, a 3-inch diameter, perforated PVC pipe wrapped in filter fabric was placed within the test hole and 3/4-inch gravel was placed between the outside of the pipe and the hole wall. The test hole was pre-soaked the same day as drilling. Testing took place the next day, September 20, 2023, within 26 hours but not before 15 hours, of the pre-soak. The hole was filled using water from a 200 gallon water tank. Test periods consisted of allowing the water to drop in 30-minute intervals. After each reading, the hole was refilled. Testing was terminated after a total of 12 readings were recorded. The percolation test data was converted to an infiltration rate using the Porchet Method as outlined by the Design Handbook for Low Impact Development Best Management Practices (RCFCWCD, 2011).

Infiltration test results are summarized in the following table:

Test No.	Depth* (ft)	Infiltration Rate** (in/hr)
P-1	15	0.27
* depth measured below existing ground surface ** Porchet Method determined clear water rate		

The results of this testing are presented as Enclosure C-1.

BOREHOLE METHOD PERCOLATION TEST RESULTS

Project: Multi-Family Residential Development
 Project No.: 33951.1
 Soil Classification: (SM) Silty sand
 Depth of Test Hole: 15.0 ft.
 Tested By: A.L.

Test Date: September 20, 2023
 Test Hole No.: P-1
 Effective Hole Dia.*: 4.8 in.
 Date Excavated: August 19, 2023

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	PERCOLATION RATE
			min	hr.	hr.	in.	in.	in.	in.	in.	in.	(min/in)
1	10:45 AM	11:15 AM	30	0.50	0.50	42.00	66.00	180.00	180.00	24.00	126.00	1.3
2	11:16 AM	11:46 AM	30	0.50	1.00	46.00	73.00	180.00	180.00	27.00	120.50	1.1
3	11:47 AM	12:17 PM	30	0.50	1.50	46.00	69.50	180.00	180.00	23.50	122.25	1.3
4	12:18 PM	12:48 PM	30	0.50	2.00	48.00	64.75	180.00	180.00	16.75	123.63	1.8
5	12:49 PM	1:19 PM	30	0.50	2.50	48.00	62.50	180.00	180.00	14.50	124.75	2.1
6	1:20 PM	1:50 PM	30	0.50	3.00	48.00	63.00	180.00	180.00	15.00	124.50	2.0
7	1:51 PM	2:21 PM	30	0.50	3.50	48.00	62.25	180.00	180.00	14.25	124.88	2.1
8	2:22 PM	2:52 PM	30	0.50	4.00	48.00	62.00	180.00	180.00	14.00	125.00	2.1
9	2:53 PM	3:23 PM	30	0.50	4.50	48.00	62.00	180.00	180.00	14.00	125.00	2.1
10	3:24 PM	3:54 PM	30	0.50	5.00	48.00	62.50	180.00	180.00	14.50	124.75	2.1
11	3:55 PM	4:25 PM	30	0.50	5.50	48.00	62.00	180.00	180.00	14.00	125.00	2.1
12	4:26 PM	4:56 PM	30	0.50	6.00	48.00	62.00	180.00	180.00	14.00	125.00	2.1

PERCOLATION RATE CONVERSION (Porchet Method):

H_o 132.00
 H_f 118.00
 ΔH 14.00
 H_{avg} 125.00
 I_t **0.27** in/hr (clear water rate)

* diameter adjusted to an effective diameter due to the loss in volume of water because of gravel packing

APPENDIX D

Laboratory Testing Program and Test Results

APPENDIX D LABORATORY TESTING

General

Selected soil samples obtained from the borings were tested in our geotechnical laboratory to evaluate the physical properties of the soils affecting foundation design and construction procedures. The laboratory testing program performed in conjunction with our investigation included in-place moisture content and dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, expansion index, Atterberg limits, and corrosion. Descriptions of the laboratory tests are presented in the following paragraphs:

Moisture Density Tests

The moisture content and dry density information provides an indirect measure of soil consistency for each stratum, and can also provide a correlation between soils on this site. The dry unit weight and field moisture content were determined for selected undisturbed samples, in accordance with ASTM D 2921 and ASTM D 2216, respectively, and the results are shown on the boring logs, Enclosures B-1 through B-4 for convenient correlation with the soil profile.

Laboratory Compaction

A selected soil sample was tested in the laboratory to determine compaction characteristics using the ASTM D 1557 compaction test method. The results are presented in the following table:

LABORATORY COMPACTION				
Boring Number	Sample Depth (feet)	Soil Description (U.S.C.S.)	Maximum Dry Density (pcf)	Optimum Moisture Content (percent)
B-1	0-3	(SM) Silty Sand with Gravel	137.0	5.5
B-5	0-3	(SC) Clayey Sand	129.0	9.0

Direct Shear Test

Shear tests are performed in general accordance with ASTM D 3080 with a direct shear machine at a constant rate-of-strain (0.04 inches/minute). The machine is designed to test a sample partially extruded from a sample ring in single shear. Samples are tested at varying normal loads in order to evaluate the shear strength parameters, angle of internal friction and cohesion. Samples are tested in remolded condition (90 percent relative compaction per ASTM D 1557) and soaked, to represent the worst case conditions expected in the field.

The results of the shear test on a selected soil sample is presented in the following table:

DIRECT SHEAR TEST				
Boring Number	Sample Depth (feet)	Soil Description (U.S.C.S.)	Apparent Cohesion (psf)	Angle of Internal Friction (degrees)
B-1	0-3	(SM) Silty Sand with Gravel	200	33
B-5	0-3	(SC) Clayey Sand	100	29

Sieve Analysis

A quantitative determination of the grain size distribution was performed for selected samples in accordance with the ASTM D 422 laboratory test procedure. The determination is performed by passing the soil through a series of sieves, and recording the weights of retained particles on each screen. The results of the grain size distribution analyses are presented graphically on Enclosure D-1.

Sand Equivalent

The sand equivalent of selected soils were evaluated using the California Sand Equivalent Test Method, Caltrans Number 217. The results of the sand equivalent tests are presented with the grain size distribution analyses on Enclosure D-1.

R-Value Test

Based on the indicator testing above, a soil sample was selected and tested to determine its R-value using the California R-Value Test Method, Caltrans Number 301. The results of the R-value test is presented on Enclosure D-1.

Expansion Index Test

Remolded samples are tested to determine their expansion potential in accordance with the Expansion Index (EI) test. The test is performed in accordance with the Uniform Building Code Standard 18-2. The test result for a select soil sample is presented in the following table:

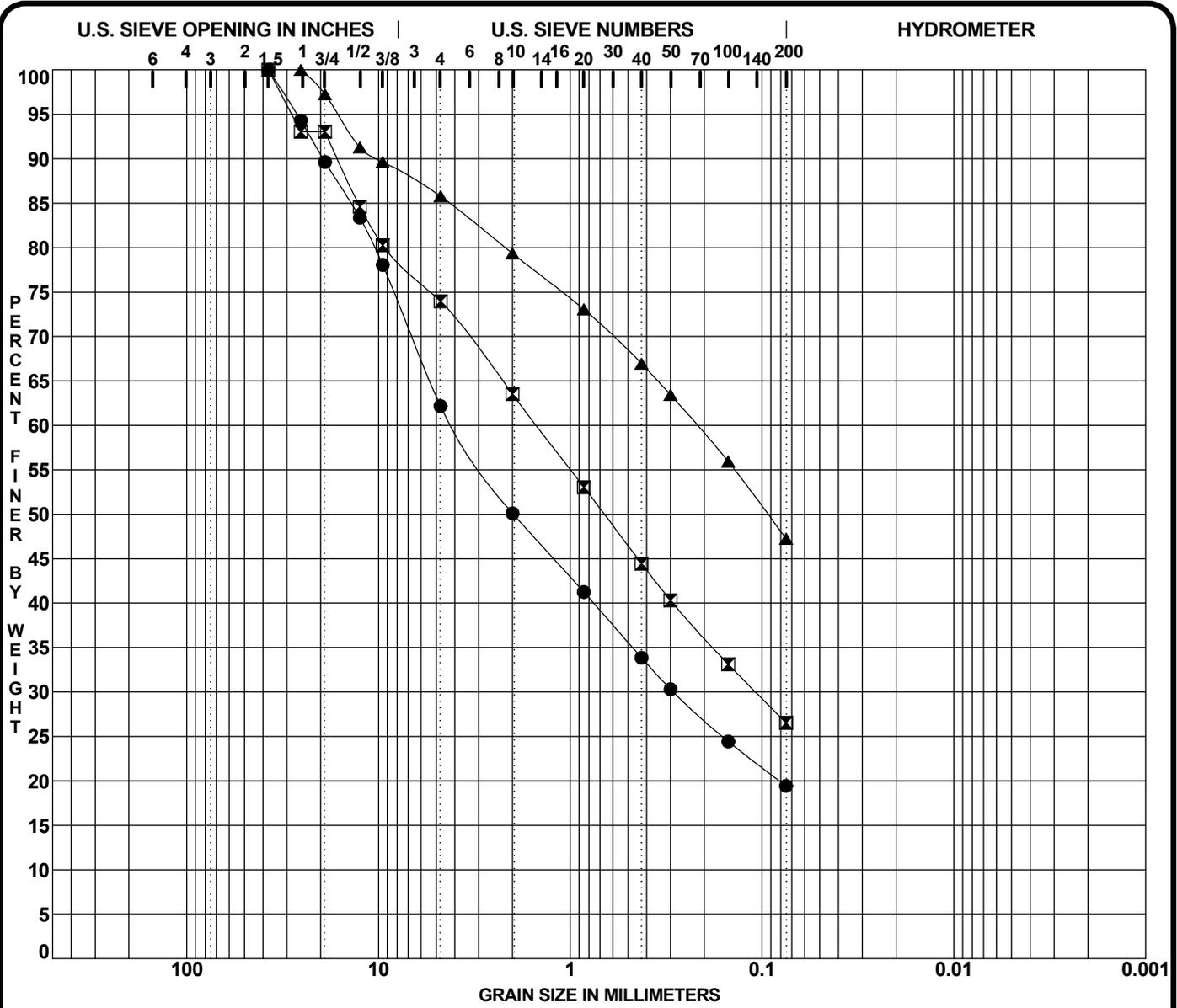
EXPANSION INDEX TEST					
Boring Number	Sample Depth (feet)	Soil Description (U.S.C.S.)	Expansion Index (EI)	Expansion Potential	
B-5	0-3	(SC) Clayey Sand	36	Low	
Expansion Index:		0-20 Very low	21-50 Low	51-90 Medium	91-130 High

Atterberg Limits

A selected sample of the on-site fine grained, low expansion potential soils were tested for their Atterberg limits in accordance with ASTM D 4318. The results of these tests are presented on Enclosure D-2.

Corrosion

Corrosion testing was conducted by our subconsultant, Project X Corrosion Engineering. Test results are enclosed.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Classification		SE	RV	PL	PI	Cc	Cu
● B-1 @ 0-3'	(SM) Silty Sand with Gravel		21	--				
☒ B-3 @ 0-3'	(SM) Silty Sand with Gravel		16	--				
▲ B-5 @ 0-3'	(SC) Clayey Sand		11	27	18	11		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-1 @ 0-3'	37.50	4.07	0.289		37.8	42.7		19.4
☒ B-3 @ 0-3'	37.50	1.50	0.108		26.0	47.4		26.5
▲ B-5 @ 0-3'	25.40	0.22			14.2	38.5		47.3

PROJECT: Multi-Family Residential Development PROJECT NO.: 33951.1
 CLIENT: Second Street Family LP DATE: October 2023

GRADATION CURVES



Results Only Soil Testing for Multi-Family, Corona, California

September 29, 2023

Prepared for:

**Andrew Tardie
LOR Geotechnical
6121 Quail Valley Ct
Riverside, CA
atardie@lorgeo.com**

**Project X Job#: S230928F
Client Job or PO#: 33951.1**

Respectfully Submitted,

Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com





Soil Analysis Lab Results

Client: LOR Geotechnical
 Job Name: Multi-Family, Corona, California
 Client Job Number: 33951.1
 Project X Job Number: S230928F
 September 29, 2023

Bore# / Description	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51	ASTM G200	SM 4500-D	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
		Sulfates SO ₄ ²⁻		Chlorides Cl ⁻		Resistivity As Rec'd Minimum		pH	Redox	Sulfide S ²⁻	Nitrate NO ₃ ⁻	Ammonium NH ₄ ⁺	Lithium Li ⁺	Sodium Na ⁺	Potassium K ⁺	Magnesium Mg ²⁺	Calcium Ca ²⁺	Fluoride F ₂ ⁻	Phosphate PO ₄ ³⁻
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
RV-3 - B-5 - (SM) Silty Sand	0-3	192.4	0.0192	123.1	0.0123	12,730	1,273	7.1	166	ND	77.8	8.5	ND	152.3	11.0	29.8	158.1	5.0	2.5

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
 mg/kg = milligrams per kilogram (parts per million) of dry soil weight
 ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
 Chemical Analysis performed on 1:3 Soil-To-Water extract
 PPM = mg/kg (soil) = mg/L (Liquid)

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops which is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

Project X Job Number S230928 F LOR 33951.1 Multi-Family 1 Full												
IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.												
Company Name: LOR Geotechnical Group, Inc.				Contact Name: Andrew Tardie			Phone No: 951-653-1760					
Mailing Address: 6121 Quail Valley				Contact Email: atardie@lorgeo.com								
Accounting Contact: John Leuer				Invoice Email: atardie@lorgeo.com								
Client Project No: 33951.1				Project Name: Multi-Family, Corona, California								
P.O. #: --		3-5 Day Standard	3 Day Guarantee 50% mark-up	24 Hour RUSH 100% mark-up	METHOD ANALYSIS REQUESTED (Please circle)							
(Business Days) Turn Around Time: <input checked="" type="radio"/>												
For Corrosion Control Recommendations (350g soil sample): NEED (1) Groundwater depth and (2) Soil Sample Locations Map				Default Method	AASHTO T288	AASHTO T289	AASHTO T290	AASHTO T291	SM 2580B	350g Sample	*Req: Min. 3 Samples, site map, and groundwater info	
				ASTM G187	ASTM G51	ASTM D4327	ASTM D4327	ASTM G200	4500A2			ASTM D2216
FOR THERMAL RESISTIVITY PROVIDE (1,500g soil sample): (1) Optimal Moisture % (2) Dry Density{PCF} (3) Desired Compaction Date & Received By:				Default Method	ASTM G187	ASTM G51	ASTM D4327	ASTM D4327	ASTM G200	4500A2	ASTM D2216	SM 2550H
					ASTM D698	DIN 442	ASTM D5334 8-inch	ASTM D5334 8-inch	1,500g Sample			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			
					ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327	ASTM D4327			

APPENDIX E

Seismic Design Spectra

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

ALL values on this page were used for determination of ASCE 7-16 Section 21.3 General Spectrum and are NOT intended to be used for design

Project: Multi-Family Development
Project Number: 33951.1
Client: Second Street Housing LP
Site Lat/Long: 33.8803/-117.5795
Controlling Seismic Source: Elsinore

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	2.070	0.2*(S _{D1} /S _{DS})	T ₀	0.128
Site Class D - 21.3(ii)	F _v	2.5	Design Maps	S ₁	0.777	S _{D1} /S _{DS}	T _s	0.638
0.2*(S _{D1} /S _{DS})	T ₀	0.188	Equation 11.4-1 - F _A *S _s	S _{MS}	2.070	Equation 11.4-4 - 2/3*S _{M1}	S _{D1}	0.881
S _{D1} /S _{DS}	T _s	0.938	Equation 11.4-3 - 2/3*S _{MS}	S _{DS}	1.380	Equation 11.4-2 - F _v *S ₁	S _{M1}	1.321
Fundamental Period (12.8.2)	T	Period	Design Maps	PGA	0.868			
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}	1.2950	Equation 11.8-1 - F _{PGA} *PGA	PGA _M	0.955			
Equation 11.4-2 - F _v *S ₁ ¹	S _{M1}	1.9425	Section 21.5.3	80% of PGA _M	0.764			
¹ - F _v as determined by Section 21.3			Design Maps	C _{RS}	0.915			
			Design Maps	C _{R1}	0.906			

RISK COEFFICIENT

Cr - At Periods <=0.2, Cr=C _{RS}	C _{RS}	0.915
Cr - At Periods >=1.0, Cr=C _{R1}	C _{R1}	0.906

Cr - At Periods between 0.2 and 1.0 use trendline formula to complete	Period	Cr
	0.200	0.915
	0.300	0.914
	0.400	0.913
	0.500	0.912
	0.600	0.911
	0.680	0.910
	1.000	0.906

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

PROBABILISTIC SPECTRA¹
2% in 50 year Exceedence

Project No: 33951.1

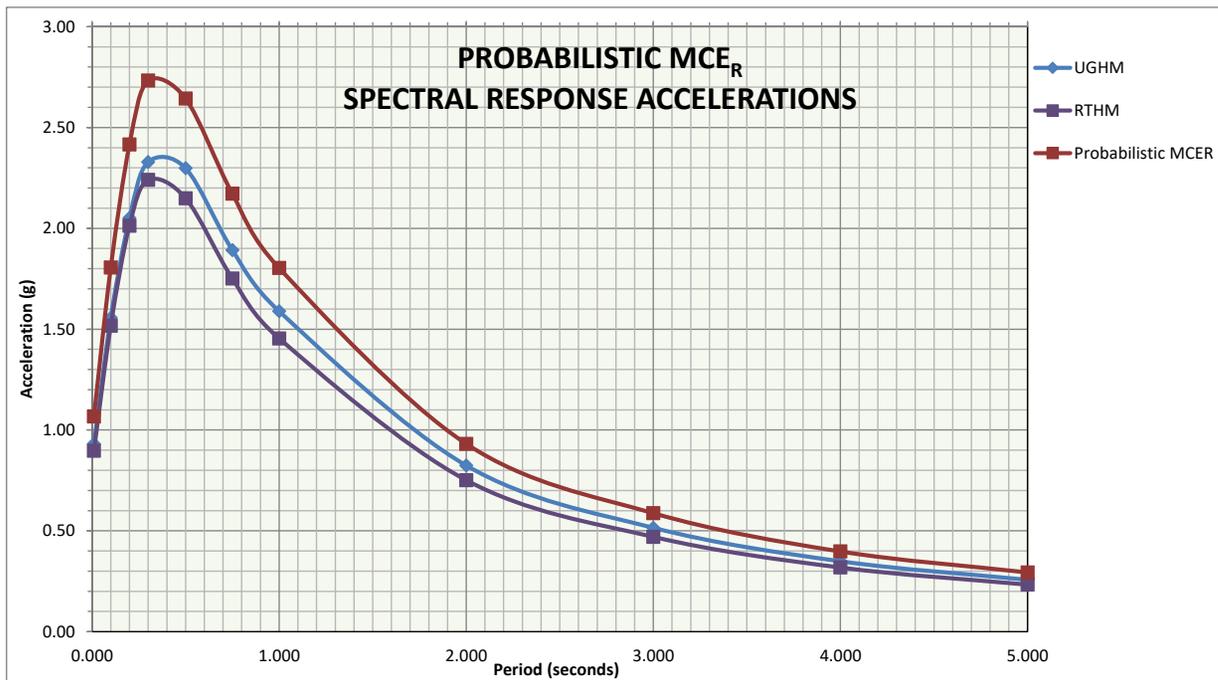
Period	UGHM	RTGM	Max Directional Scale Factor ²	Probabilistic MCE
0.010	0.931	0.897	1.19	1.067
0.100	1.556	1.517	1.19	1.805
0.200	2.051	2.013	1.20	2.416
0.300	2.329	2.240	1.22	2.733
0.500	2.298	2.149	1.23	2.643
0.750	1.892	1.751	1.24	2.171
1.000	1.589	1.454	1.24	1.803
2.000	0.824	0.751	1.24	0.931
3.000	0.515	0.470	1.25	0.588
4.000	0.349	0.318	1.25	0.398
5.000	0.257	0.233	1.26	0.294

¹ Data Sources:

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

² Shahi-Baker RotD100/RotD50 Factors (2014)

Probabilistic PGA: 0.931
 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: Elsinore

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

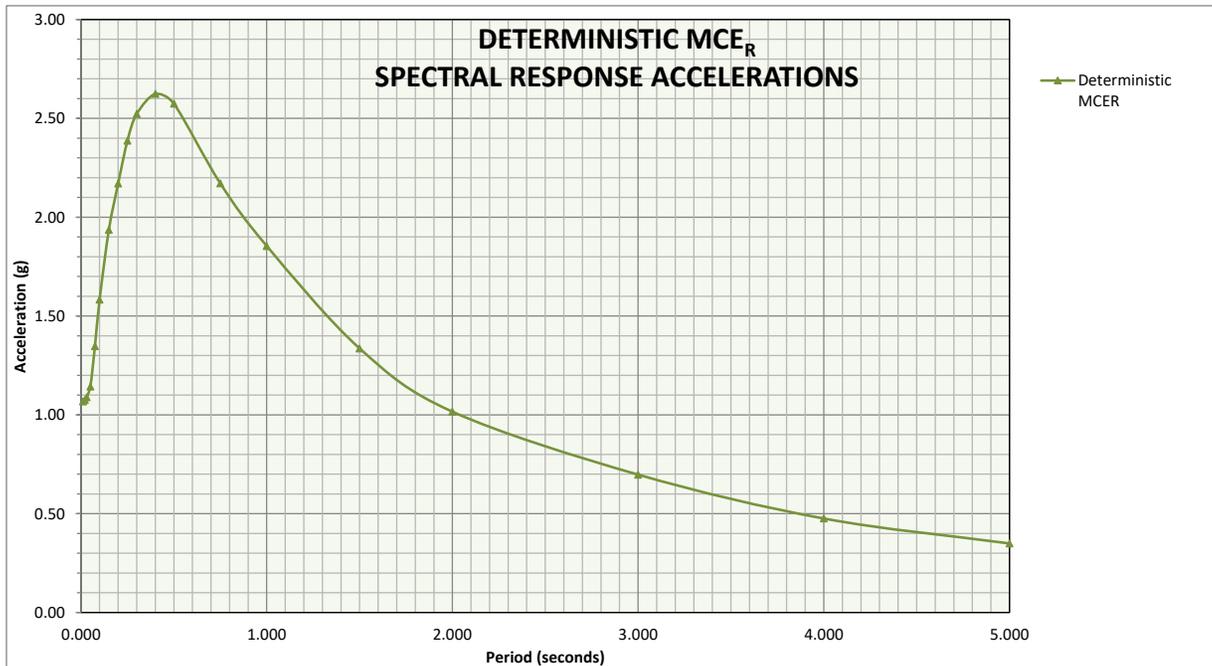
Period	Deterministic PSa Median + 1.σ for 5% Damping	Max Directional Scale Factor ²	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.897	1.19	1.067	1.067
0.020	0.903	1.19	1.075	1.075
0.030	0.915	1.19	1.089	1.089
0.050	0.960	1.19	1.143	1.143
0.075	1.132	1.19	1.347	1.347
0.100	1.330	1.19	1.583	1.583
0.150	1.613	1.20	1.936	1.936
0.200	1.808	1.20	2.170	2.170
0.250	1.973	1.21	2.387	2.387
0.300	2.067	1.22	2.522	2.522
0.400	2.133	1.23	2.624	2.624
0.500	2.093	1.23	2.574	2.574
0.750	1.751	1.24	2.171	2.171
1.000	1.496	1.24	1.854	1.854
1.500	1.078	1.24	1.336	1.336
2.000	0.819	1.24	1.016	1.016
3.000	0.558	1.25	0.697	0.697
4.000	0.380	1.25	0.475	0.475
5.000	0.277	1.26	0.349	0.349

Project No: 33951.1

Is Deterministic $S_{a(max)} < 1.5*F_a$? **NO**
 Section 21.2.2 Scaling Factor: **N/A**
 Deterministic PGA: **0.897**
 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	1.067	1.067	1.067	0.711
0.100	1.805	1.583	1.583	1.055
0.200	2.416	2.170	2.170	1.447
0.300	2.733	2.522	2.522	1.681
0.500	2.643	2.574	2.574	1.716
0.750	2.171	2.171	2.171	1.447
1.000	1.803	1.854	1.803	1.202
2.000	0.931	1.016	0.931	0.621
3.000	0.588	0.697	0.588	0.392
4.000	0.398	0.475	0.398	0.265
5.000	0.294	0.349	0.294	0.207

**ASCE 7-16: Section 21.4
Site Specific**

	Calculated Value	Design Value
SDS:	1.544	1.544
SD1:	1.242	1.242
SMS:	2.317	2.317
SM1:	1.862	1.862
Site Specific PGAm:	0.897	0.897
Site Class:	D measured	

Seismic Design Category - Short* E

Seismic Design Category - 1s* E

* Risk Categories I, II, or III

Period	ASCE 7 SECTION 21.3 General Spectrum	80% General Response Spectrum
0.005	0.574	0.459
0.010	0.596	0.477
0.020	0.640	0.512
0.030	0.684	0.547
0.050	0.773	0.618
0.060	0.817	0.653
0.075	0.883	0.706
0.090	0.949	0.759
0.100	0.993	0.795
0.110	1.037	0.830
0.120	1.081	0.865
0.136	1.152	0.922
0.150	1.214	0.971
0.160	1.258	1.006
0.170	1.302	1.042
0.180	1.346	1.077
0.200	1.380	1.104
0.250	1.380	1.104
0.300	1.380	1.104
0.400	1.380	1.104
0.500	1.380	1.104
0.600	1.380	1.104
0.640	1.380	1.104
0.750	1.380	1.104
0.850	1.380	1.104
0.935	1.380	1.104
0.950	1.363	1.091
1.000	1.295	1.036
1.500	0.863	0.691
2.000	0.648	0.518
3.000	0.432	0.345
4.000	0.324	0.259
5.000	0.259	0.207

Project No: 33951.1

