SOIL
EXPLORATION
COMPANY, INC.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

September 12, 2019

Project No. 1826-01

TO: Ahern Rentals, Inc.
8350 Eastgate Rd.
Henderson, NV 89015

ATTENTION: Cory Rosencranse

SUBJECT: Preliminary Soil Investigation, Liquefaction Evaluation and Infiltration Tests Report, Proposed Construction Equipment Rental Facility, Riverside Drive (APN 156-030-016, -017 and -042), City of Jurupa Valley, California

Introduction

In accordance with your authorization, Soil Exploration Co., Inc. has performed a preliminary soil investigation, liquefaction evaluation and infiltration tests for the subject site (see Figure 1, Site Location Map). The accompanying report presents a summary of our findings, conclusions, recommendations and limitations of our work for construction of the proposed facility, including warehouse, office and associated parking and driveways.

Scope of Work

- Review soils, seismic, geologic, groundwater data and maps in our files.
- Perform exploration of the site by means of three 8" diameter borings, 15 to 50 feet deep, at readily accessible locations.
- Field Engineer (California Registered RCE) for logging of the excavations, sampling of select soils, observation of excavation resistance, record SPT blow counts and water seepage (if any).
- Perform basic laboratory testing on select soil samples, expected to include moisture, density, sieve analysis, direct shear, consolidation, R-value, expansion index and corrosion potential (pH, chlorides, resistivity and water soluble sulfates).
- Perform digitized search of known faults within a 50-mile radius of the site.
- Determine California Building Code (CBC) 2016 seismic parameters for the site.
- Consult with project architect and design engineer.
- Perform four shallow infiltration tests at suggested locations.
- Prepare a report of our findings, conclusions and recommendations for site preparation, including overexcavation/removal depth, allowable bearing value, foundation/slab-on-grade depth/thickness recommendations, excavation characteristics, lateral earth pressures for retaining walls design, pavement thickness estimates for parking/driveways, liquefaction evaluation (factors of safety and total/differential settlement of saturated and unsaturated sands), general earthwork and grading specifications, California Building Code (2016) seismic design coefficients, Cal/OSHA soil classification and infiltration rate in inches/hour.

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Existing Site Condition

The relatively flat, vacant site is located on the north side of Riverside Drive, west of Wineville Avenue, in the City of Jurupa Valley, Riverside County, California. Riverside Drive is a paved road with no curbs, gutter or sidewalks. A chain link fence borders the site on the north, south and west sides. Existing building is located on adjacent property to the east.

The locations of the above and other features are shown on Exploratory Boring and Infiltration Test Location Map, Plates 1A and 1B. The base maps are reduced copies of Conceptual Grading Plans (Sheets 2 and 3 of 3), prepared by Adkan Engineers of Riverside, California.

Proposed Development

We understand that a metal warehouse building and concrete tilt-up office building, both with concrete floor slabs supported on prepared subgrade, and associated parking/driveways are proposed at the site. Based on the relatively flat topography of the site, modest cut or fill grading and no significant cut or fill slopes are proposed.

Field Work

Three exploratory borings were drilled at the site on September 3 and September 6, 2019, utilizing a B-53 and a CME 75 mobile drill rig equipped with 8-inch diameter hollow stem auger. Refer to Plate 1 for boring locations. Standard Penetration Test (SPT) blow counts were recorded at regular intervals and utilized in determining the compactness/consistency of the earth materials.

In general, these borings revealed that the site is underlain by alluvial soils consisting of silty sand, sandy silt and sand with silt (USCS "SM", "ML" and "SP-SM"). In general, the alluvial soils are dry to slightly moist and generally medium dense to very dense. Loose soils were noted in the top 1 foot in Boring B-1 and to 5 feet in Boring B-3. More detailed descriptions of earth materials are presented in Geotechnical Boring Logs in Appendix B of this report.

Based on the USGS Geologic Map of the San Bernardino and Santa Ana Quadrangles, the site area is underlain with young eolian deposits (see Figure 2).

Laboratory Testing

Laboratory tests were performed for selected soil samples. The tests consisted primarily of natural moisture contents, dry density, sieve analysis, R-value, consolidation, direct shear and corrosion potential (pH, chlorides, resisitivity and water soluble sulfates). Laboratory test results are presented in Appendix C and with Geotechnical Boring Logs in Appendix B.

Groundwater

Groundwater was not encountered in our exploratory borings to maximum explored depth of 50 feet below ground surface at the time this work was performed. Please note that a groundwater study is not within the scope of this work. However referenced Carson and Matti map indicates groundwater in the vicinity of the site to be 150 to 200 feet below ground surface.

Liquefaction Evaluation

Soil liquefaction is a process by which loose, saturated, fine granular (poorly graded) deposits, such as fine sands, lose a significant portion of their shear strength due to pore water pressure buildup resulting from cyclic loading, such as that caused by an earthquake. In general, liquefaction potential is higher when the groundwater table is less than 30 feet below ground surface. Soil liquefaction can lead to foundation bearing failures and excessive settlements.

Based on Riverside County GIS map, the site is located in an area of moderate liquefaction potential (see Figure 3).

Summary of geotechnical conditions for the boring B-3 are as follows:

Depth (ft)	Class (USCS)	SPT Count (blows/foot)	Moisture (%)	Passing No. 200 Sieve (%)	Compactness/ Consistency
2.5	SM	9	3.0	18	Loose
5	SM	20	6.6	38	Medium dense
10	SM	20	-	-	Medium dense
15	SM	44	2.0	14	Dense
20	SM	68	-	-	Very dense
25	SM	12/50	-	-	Very dense
30	SM	50/2"	-	-	Very dense
35	SP-SM	40	6.0	8	Dense
40	SP-SM	50/5"	-	-	Very dense
45	SP-SM	40	-	-	Dense
50	SP-SM	33	-	-	Dense

Liquefaction Analysis/Seismic Settlement: LiquefyPro

Liquefaction susceptibility using Standard Penetration Test data and laboratory grain size test results were analyzed using LiquefyPro software (Version 5.5g). Liquefaction analysis performed for this evaluation included: [1] evaluation of soil consistency and compactness influencing liquefaction, [2] correction of penetration resistance data to convert measured SPT N-values to standard N_{60}-values, [3] calculating the earthquake induced stress ratio (CSR), [4] calculating cyclic resistance ratio (CRR), [5] assume water table at 175 feet below the ground surface, and [6] evaluation of liquefaction potential by calculating a factor of safety against liquefaction (FS), by dividing CRR by CSR. The software output is presented in Appendix F.

The main observations of the results are as follows:

- Onsite soils at the site in general have a Safety Factor of 5.0 against liquefaction. Indicated total settlement of saturated and unsaturated sands is 0.00 and 0.18 inches, respectively, with total settlement of saturated and unsaturated sands of 0.18 in., with differential settlement of 0.091 to 0.120 inch.

- Liquefaction also involves lateral or horizontal displacement (lateral spreading) of essentially intact blocks of surficial soils on slopes or toward a free-face slope such as river or canal bank. The potential for and magnitude of lateral spreading is dependent upon many conditions, including the presence of a relatively thick, continuous, potentially liquefiable sand layer and high slopes. Subsurface information obtained for this study indicates that loose sands are not present and high slopes are not anticipated. Based on currently available procedures, the site does not appear to be susceptible to (lateral spread) ground surface disruption during a moderate seismic event.

Seismicity/Faulting

The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone or County of Riverside fault zone.

A computer search of all known Quarternary major faults within 50 miles of the site from USGS National Seismic Hazard Maps is presented in Appendix D. Please note that it is probable that not all-active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Conclusions

- All debris, vegetation, weeds, existing old foundations, buried abandoned structures, buried utility/irrigation lines, undocumented fills, deleterious materials, etc. would require clearance from the proposed building/grading areas.

- The onsite soils, exclusive of oversize materials (larger than 6 inches, if any), debris and deleterious materials, etc., can be used as compacted fill.

- Overexcavation and recompaction of surficial soils should be anticipated to provide adequate and uniform support for the proposed structures.

- Subsequent to site preparation, use of shallow spread footing foundation appears feasible for the proposed construction.

- Near surface earth materials encountered during our subsurface exploration can be excavated with normal grading equipment in good working condition.

- Based on observation and classification, the expansion potential of the near-surface sandy soils at the site is expected to be very low (EI<20).

- The site is located approximately 9.46 miles from the Chino fault. The site is located in a region of generally high seismicity, as is all of Southern California. During its design life, the site is expected to experience moderate to strong ground motions from earthquakes on regional and/or nearby causative faults.

- There is a 2 percent probability in 50 years (2475 year return period) that peak ground acceleration at the site will exceed 0.5g (see Appendix D).

- Based on Riverside County RCIT GIS map, the site is located within a zone of moderate liquefaction. However no groundwater, seepage, wet or loose soil conditions were encountered in our exploratory boring locations drilled to a maximum depth of 50 feet. Based on our findings, the liquefaction potential at the site is very low.

- The flooding potential of the site should be verified by the design civil engineer and considered in planning, design and construction.

Recommendations

Site Preparation and Grading

Site Clearance

All grading should be performed in accordance with the City of Jurupa Valley Grading Ordinance and our General Earthwork and Grading Specifications presented in Appendix E, except as modified within the text of this report.

The grading/building area should be cleared of all debris, abandoned utility lines, underground structures, weeds, vegetable matter, undocumented fills, deleterious materials, etc. Cavities created during site clearance should be backfilled in a controlled manner.

Overexcavation/Grading

Subsequent to site clearance and debris removal, building areas extending at least 5 feet beyond the building lines in plan (including canopies, exterior walls, etc.) where practical should be overexcavated to remove near surface loose soils. Based on our exploration, we anticipate removals to extend to at least 5 feet below existing ground surface. Any loose, porous soils, etc. should be completely removed and recompacted if encountered in bottom of the grading areas. After the required removals, the bottom of the overexcavation should be scarified to a depth of at least 12 inches, watered to near optimum moisture and recompacted by utilizing heavy rubber tired equipment to at least 90 percent of the maximum dry density as determined by ASTM D1557-12, prior to placement of engineered fills.

New Pavement Areas

New pavement, ramps and driveway areas should be scarified to a depth of at least 12 inches, watered as necessary, and compacted to at least 95 percent relative compaction. The areas of pylon/sign foundations should be cleared form all vegetation and roots prior to construction. If loose soils are encountered in bottom of footing excavations, these soils should be removed and replaced with lean concrete or the footings deepened as necessary.

Compacted Fills/Imported Soils

Any soil to be placed as fill, whether presently onsite or import, should be approved by the soil engineer or his representative prior to their placement. All onsite soils to be used as fill should be cleansed of any roots or other deleterious materials. Cobbles larger than 6 inches in diameter should not be placed in the vicinity of foundations and utility lines. All fills should be placed in 6 to 8 inch loose lifts, watered or aerated to near optimum moisture content, mixed and compacted to at least 90 percent relative compaction. This is relative to the maximum dry density determined by ASTM D1557-12 Test Method.

Any imported soils should be sandy (preferably (USCS "SM" or "SW" and very low in expansion potential, EI<20) and approved by the soil engineer. The soil engineer or his representative should observe the placement of fill and take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained.

Foundation Design/Allowable Bearing Value

Based on the above site preparation recommendations, very low expansion potential of soils and anticipated loads, an allowable bearing pressure of 2000 psf is recommended for the design of footings. This bearing pressure has been established based on the assumption that the footings will be embedded at least 24-inches below lowest adjacent firm grade and into the compacted fill mat, and measure at least 18-inches in width. This bearing value may be increased by 400 psf for each additional foot of width and/or depth to a maximum of 3000 psf. A further one-third increase in bearing value may be used when considering short term wind or seismic loads.

Continuous footings should be reinforced with at least two No. 5 bars at the top and two at the bottom. Please note foundation design is under the purview of structural design engineer and structural considerations may have other more stringent requirements, which would govern.

Concrete Slabs-On-Grade

Concrete floor slabs supported on prepared subgrade should be at least 4 inches thick. Slabs to receive flooring should be underlain by at least 10-mil thick Visqueen moisture barrier underlain by 2 inches of clean rolled sand. Appropriate recommendations should be made by the project architect if crack sensitive floor covering is placed directly on the concrete slab.

All floor slabs should be reinforced with at least No. 3 rebar at 18-inches on center each way. Care should be taken by the contractor to insure that reinforcement is placed at slab mid-height. The use of concrete spacers to raise reinforcement of slabs is highly recommended. However, floor slab thickness and reinforcement should be evaluated by the structural engineer and designed in compliance with applicable codes for the proposed loading. Thicker slabs (6 inches or thicker) should be considered for warehouse/storage and use of forklift, etc.

All concrete flatwork, including slabs subgrade, should be verified to contain 1.2 times the soil optimum moisture content to a depth of 12 inches prior to placement of slab building materials. Moisture content should be tested in the field by the soil engineer.

Special Considerations

Excess soils generated from foundation excavations should not be placed on slabs subgrade without proper moisture and compaction. Slab subgrade should be verified to contain 1.2 times the soil optimum moisture content to a depth of 12 inches prior to placement of slab building materials. The addition of fiber mesh in the concrete and careful control of water/cement ratios may lessen the potential for slab cracking. In hot or windy weather, the contractor must take appropriate curing precautions after the placement of concrete. The use of mechanically compacted low slump concrete (not exceeding 4 inches at the time of placement) is recommended.

Concrete Joints

The joints spacing for concrete slabs should be determined by the project architect. Joints should be laid out top form approximately square panels (equal transverse and longitudinal joint spacing). Rectangular panels, with the long dimension no more than one-and-one-half times the short, may be used when square panels are not feasible. The depth of longitudinal and transverse joints should be one-fourth the depth of the slab thickness.

Joint layout should be adjusted so that the joints will line up with the corners of structures, small foundations and other built-in structures. Acute angles or small pieces of slab curves as a result of joints layout should not be permitted.

Concrete Curing

Fresh concrete should be cured by protecting it against loss of moisture, rapid temperature change and mechanical injury for at least 3 days after placement. Moist curing, waterproof paper, white polyethylene sheeting, white liquid membrane compound, or a combination thereof may be used. After finishing operations have been completed, the entire surface of the newly place concrete should be covered by whatever curing medium is applicable to local conditions and approved by the engineer. The edges of concrete slabs exposed by the removal of forms should be protected immediately to provide these surfaces with continuous curing treatment equal to the method selected for curing the slab surfaces. The contractor should have at hand, and ready to install before actual placement begins, the equipment needed for adequate curing of the concrete.

Lateral Earth Pressures/Retaining Walls

The following lateral equivalent fluid earth pressures and soil parameters in conjunction with the allowable bearing value of 2000 psf may be used for design of retaining walls with free draining level compacted backfills. Wall backfills should be compacted to at least 90 percent relative compaction. We recommend that drainage for retaining walls should be provided in accordance with Plate 2 of this report.

Active Earth Pressure (P_a)	35 pcf (EFP), drained, unbraced yielding walls
At Rest Pressure (P_0)	60 pcf (EFP), drained, braced non-yielding (part of building walls)
Allowable Lateral Bearing Value	300 pcf (EFP), drained, maximum of 3000 psf (fill or firm native soil)
Horizontal Coefficient of Friction (μ)	0.35
Unit Soil Weight (γ_t)	120 pcf

Soil resistance developed against lateral structural movement can be obtained from the passive pressure and friction coefficient indicated above. For the calculation of passive resistance to lateral loads, the upper 12 inches of material in areas not protected by concrete flatwork or pavement should not be considered. These values may be increased by one-third when considering loads of short duration, including wind or seismic loads. The total resistance may be taken as the sum of the friction and passive resistance provided that the passive portion does not exceed two-thirds of the total resistance.

Expansion Index and Corrosion/Soluble Sulfates

Based on observation and soil classification, the expansion potential of the near surface sandy soils is anticipated to be very low (EI<20). Since soils will be mixed during grading, expansion index at select locations should be verified subsequent to completion of grading.

Results of tests performed by Cal Land Engineering, Inc. of Brea, California on a select soil sample indicate negligible soluble sulfate exposure (less than 0.1 percent water soluble sulfates by weight), pH of 7.95, chlorides of 196 ppm and resistivity of 4,900 ohm-cm (see Appendix C). Based on resistivity test results, soil is corrosive to ferrous metals/pipes. Concrete, mix, placement and curing for concrete should comply with ACI guidelines. Tentatively we recommend Type II cement and concrete slump not exceeding 4 inches at the time of placement. If critical, these should be further verified by your structural or a corrosion engineer.

Seismic Consideration

The site is located approximately 9.46 miles from the Chino fault. Moderate to strong ground shaking can be expected at the site and there is a 2 percent probability in 50 years (2475 year return period) that the peak ground acceleration at the site will exceed 0.5g. The site soil profile is Class D. The structural engineer should consider City/County local codes, California Building Code (CBC) 2016 seismic data presented in this report (Appendix D), the latest requirements of the Structural Engineers Association of Southern California and any other pertinent data in selecting design parameters.

Groundwater

No groundwater and/or seepage were encountered during our subsurface work. The potential for rain or irrigation water perched on soil or locally seeping through from adjacent areas cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. In addition, changes in local or regional water and management patterns, or both, can significantly raise the water table or create zones of perched water. We therefore recommend that landscape irrigation be kept to the minimum necessary to maintain plant vigor and any leaking pipes/sprinklers, etc. should be promptly repaired. The depth to the groundwater may fluctuate with seasonal changes and from one year to the next. We have no way of predicting future groundwater levels or perched water due to increase in surface water infiltration from rainfall or from landscape irrigation. Subdrains, horizontal drains, toe drains, French drains, heel drains or other devices may be recommended in future for graded areas that exhibit nuisance water seepage or perched water conditions.

Tentative Pavement Design

On the basis of laboratory classification and testing, we are of the opinion that the tentative new pavement design may be based on an R-value on the order of 70 corresponding to near surface soils (see Appendix C). Considering this and based on typical traffic indices, the recommended pavement sections are outlined as follows:

AREA	TRAFFIC INDEX	PAVEMENT THICKNESS (AC over AB)
Parking	4	3" AC/4" AB
Driveways	5.5 to 6	3" AC/6" AB or 4" AC/4" AB

Final pavement design shall be based on R-value testing of the subgrade soils at the completion of rough grading.

The upper at least 12 inches of the subgrade soils below new pavements should be compacted to at least 90 percent relative compaction. Imported Class 2 base should conform to Caltrans Standard Specifications and should be compacted to at least 95 percent of the maximum dry density. Maximum dry densities should be determined by the Standard Test Method designated ASTM D1557-12.

Erosion Control/Drainage/Planter Areas

The near surface sandy soils are subject to erosion. Positive drainage should be provided around the perimeter of all structures and all foundations toward streets or approved drainage devices. In addition, finish subgrade adjacent to exterior footings should be sloped down and away to facilitate surface drainage. Roof drainage should be collected and directed away from foundations via non-erosive devices. Water, either natural or by irrigation, should not be permitted to pond or saturate the foundation soils.

The developer should be made aware of the potential problems, which may develop when drainage is altered. Ponded water, leaking irrigation systems, over-watering or other conditions which could lead to ground saturation should be avoided. Area drainage collection should be directed toward the existing street or approved drainage devices.

Cal/OSHA Classification/Trench Excavations/Backfills

In general Cal/OSHA classification of onsite soils appears to be Type C.

Temporary trench excavations deeper than 5 feet should be shored or sloped at 1:1 or flatter in compliance with Cal/OSHA requirements:

a.) The shoring should be designed by a qualified engineer experienced in the shoring design.

b.) The tops of any temporary unshored excavations should be barricaded to prevent vehicle and storage loads within a 1:1 line projected upward from the bottom of the excavation or a minimum of 5 feet, whichever is greater. If the temporary construction embankments, including shored excavations, are to be maintained during the rainy season, berms are suggested along the tops of the excavations where necessary to prevent runoff from entering the excavation and eroding the slope faces.

c.) The soils exposed in the excavations should be inspected during excavation by the soils engineer so that modifications can be made if variations in the soil conditions occur.

d.) All unshored excavations should be stabilized within 30 days of initial excavation.

Backfills in the utility trenches should be compacted to at least 90 percent relative compaction. Onsite earth materials will be suitable for backfills. Clean sandy materials with sand equivalent value of at least 30 must be utilized for the pipe bedding and shading zone. Placement of the trench backfill in lifts and compaction by mechanical effort should be anticipated.

Foundation Plans Review/Additional Observations and Testing/Quality Control

Soil Exploration Company, Inc. should review the foundation plans and observe and/or test during the following stages of construction:

- During site clearance and removal of any obstructions.
- During all overexcavations, in-place processing of soils and all fill placement and compaction.
- During preparation, moisture conditioning, and compaction of subgrades/base for slabs-on-grade and pavement.
- Following footing excavations and prior to placement of footings materials.
- During all trench backfills and compaction.
- When any unusual conditions are encountered.

Final Report

A final grading control report, including geotechnical data gathered, should be prepared when rough grading is completed. The report should include all laboratory test results, a map showing all removal depths, location and depth/elevation of field density tests, test methods and final foundation and pavement design recommendations.

Limitation of Investigation

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar locations. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The field and laboratory test data are believed representative of the project site; however, soil conditions can vary significantly. As in most projects, conditions revealed during grading may be at variance with preliminary findings. If this condition occurs, the possible variations must be evaluated by the Project Geotechnical Engineer and adjusted as required or alternate design recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractor carry out such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

This report was prepared for the client based on client's needs, directions and requirements at the time. This report is not authorized for use by and is not to be relied upon by any party except the client with whom Soil Exploration Co., Inc. contracted for the work. Use of, or reliance on, this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Soil Exploration Co., Inc. from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Soil Exploration Co., Inc.

Closure

If you should have any questions regarding this report, please do not hesitate to call our office. We appreciate this opportunity to be of service.

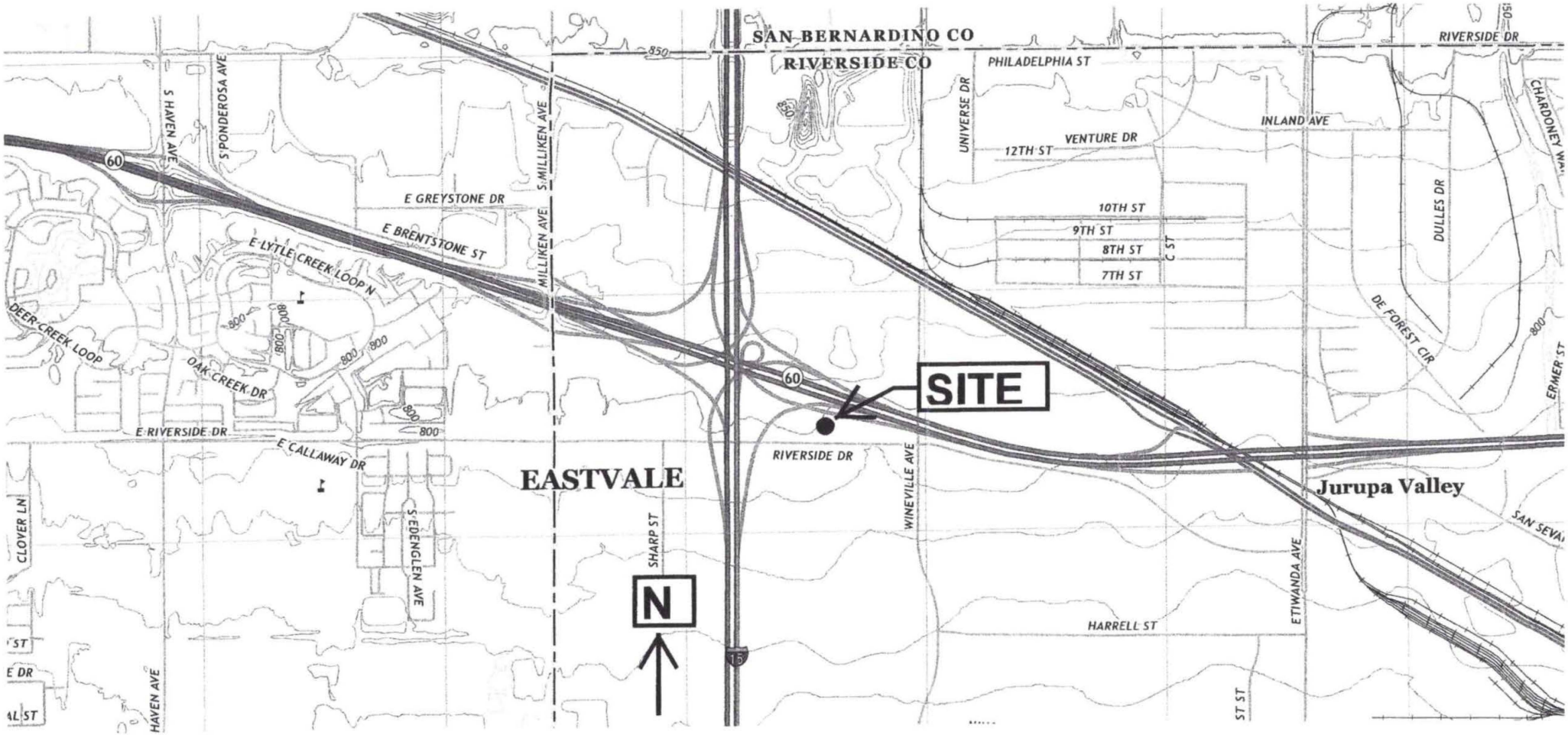
Very truly yours,
Soil Exploration Co., Inc.

Gene K. Luu, PE 53417
Project Engineer

Distribution: [1] Addressee (coryr@ahern.com)
[1] Adkan Engineers, Attn: Mitch Adkison (madkison@adkan.com)

Attachments:

Figure 1	Site Location Map
Figure 2	USGS Geologic Map
Figure 3	Riverside County GIS Map
Figure 3	U.S. Geological Survey Faults Map
Plates 1A & 1B	Exploratory Boring and Infiltration Test Location Maps
Plate 2	Retaining Wall Backfill and Subdrain Detail
Appendix A	References
Appendix B	Geotechnical Boring Logs
Appendix C	Laboratory Test Results
Appendix D	USGS National Seismic Hazard Maps-Source Parameters and CBC (2016) Seismic Parameters
Appendix E	General Earthwork and Grading Specifications
Appendix F	Liquefaction Analysis Summary
Appendix G	Infiltration Test Procedure and Results



USGS/U.S. Topo/Guasti Quadrangle, Riverside County, California, 2018.

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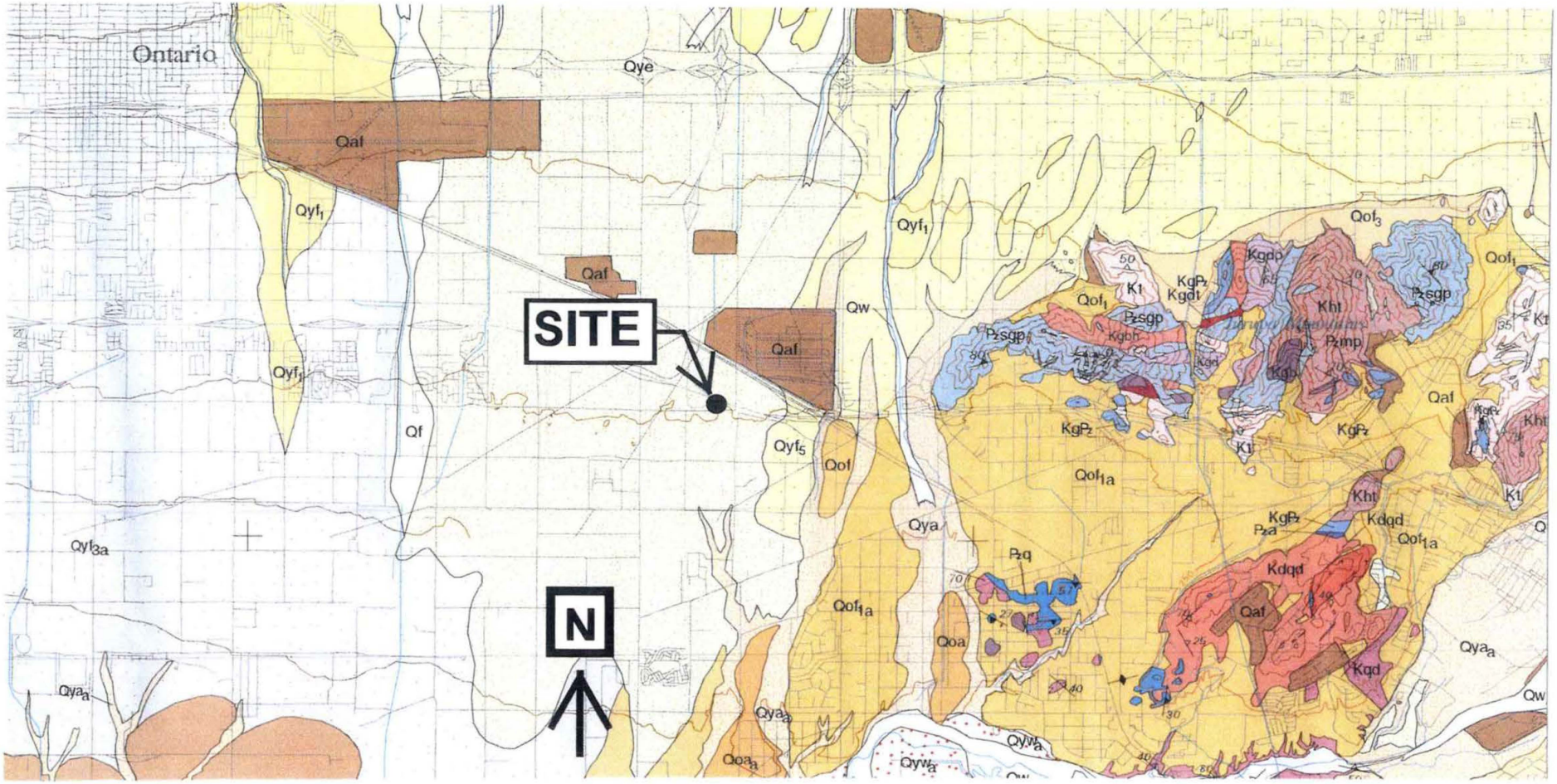
Figure 1



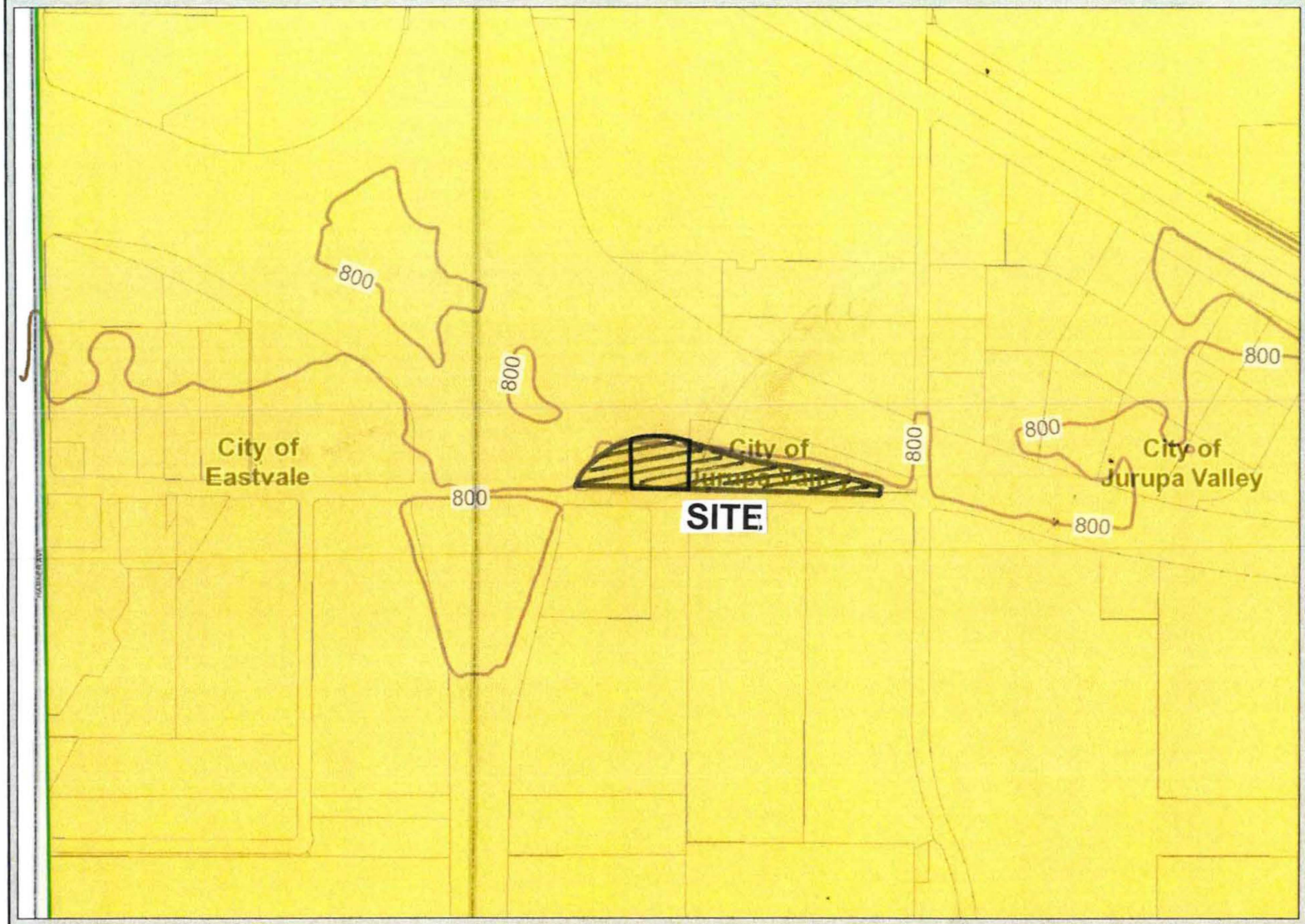
Base Map: USGS Geologic Map of the San Bernardino and Santa Ana 30'x60' Quadrangles, California, 2006.

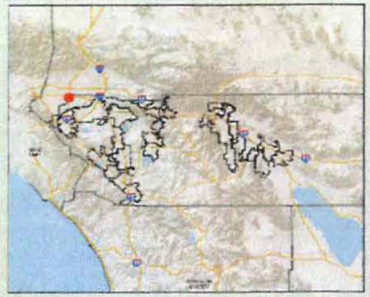
LEGEND:

Qye: Young eolian deposits (Holocene and Pleistocene) – Very fine- to medium-grained sand, unconsolidated, dune morphology apparent.

Riverside Drive **City of Jurupa Valley, California**	**Soil Exploration Co., Inc.** **Project No.: 1826-01** **Date: September 12, 2019** **Figure: 2**

My Map





Legend

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- Liquefaction
  - <all other values>
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  - INTERCHANGE
  - INTERSTATE
  - OFFRAMP
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  - USHWY
- counties
- cities
- hydrographylines
- waterbodies
  - Lakes
  - Rivers

RCIT

0 1,038 2,077 Feet

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

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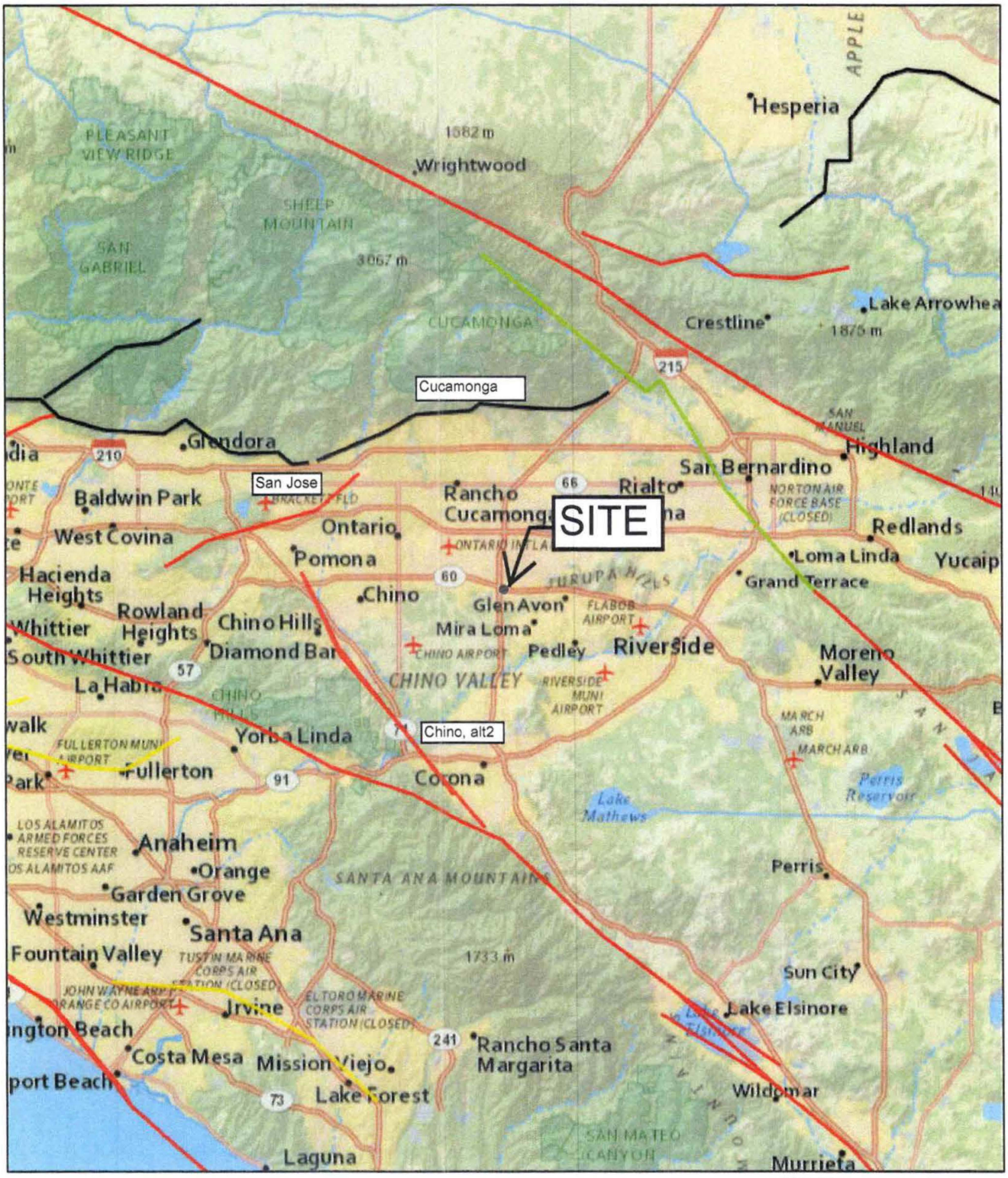
Notes

Figure 3

U.S. Geological Survey 2008 Faults



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0 5 10 20 km

NSHM 2008 Fault Sources

- Strike slip
- Normal
- Thrust
- Reverse
- Unassigned

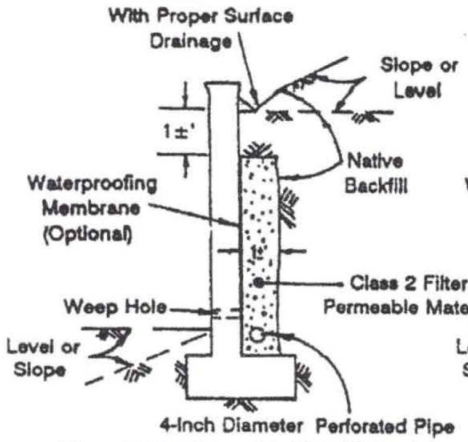
N

Figure 4

USGS, National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

SUBDRAIN OPTIONS FOR NATIVE MATERIAL BACKFILL

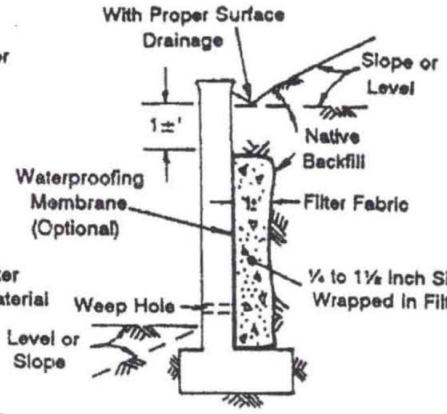
OPTION N2: Pipe Surrounded with Class 2 Material



Class 2 Filter Permeable Material Grading Per Caltrans Specifications

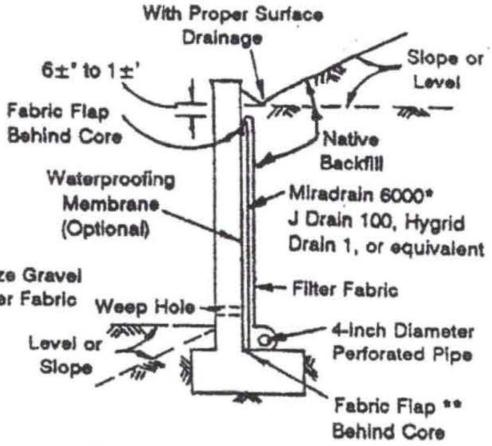
Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

OPTION N1: Gravel Wrapped in Filter Fabric



Proper Outlet Should be Provided for Gravel Subdrain (See Notes)

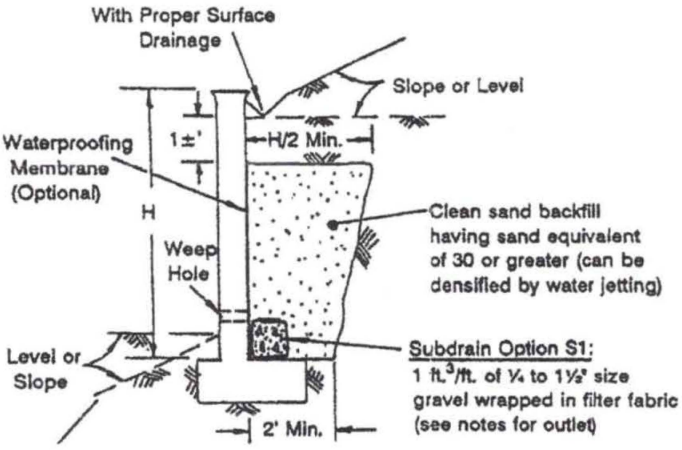
OPTION N3: Geotextile Drain

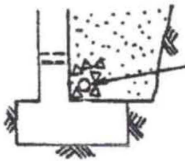


*Miradrain 6000 or J Drain 100 for non-waterproofed walls; Miradrain 6200 or J Drain 200 for completed waterproofed walls

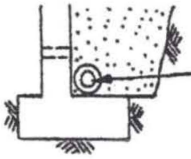
**Peel back the bottom fabric flap, place pipe next to core, wrap fabric around pipe and tuck behind core.

SUBDRAIN OPTIONS FOR CLEAN SAND BACKFILL





Subdrain Option S2:
4" diameter perforated pipe surrounded with 1 ft.³/ft. of Class 2 filter material per Caltrans specifications as above



Subdrain Option S3:
4" diameter perforated pipe wrapped in filter fabric

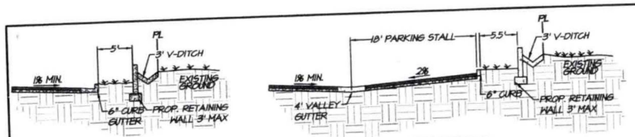
Notes:

- Pipe type should be ASTM D1527 Acrylonitrile Butediene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down.
- Filter fabric should be Mirafi 140N, 140NS, Supac 4NP, Amoco 4545, Trevira 1114, or approved equivalent.
- All drains should have a gradient of 1 percent minimum.
- Outlet portion for gravel subdrain should have a 4"-diameter pipe with the perforated portion inserted into the gravel approximately 2' minimum and the nonperforated portion extending approximately 1' outside the gravel. Proper sealing should be provided at the pipe insertion enabling water to run from the gravel portion into rather than outside the pipe.
- Waterproofing membrane may be required for a specific retaining wall such as a stucco or basement wall.
- Weephole should be 2" minimum diameter and provided at 25' minimum in length of wall. If exposure is permitted, weephole should be located at 3±" above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to discharge through the curb face or equivalent should be provided, or for a basement-type wall, a proper subdrain outlet system should be provided. Open vertical masonry joints (i.e., omit mortar from joints of first course above finished grade) at 32" maximum intervals may be substituted for weepholes. Screening such as with a filter fabric should be provided for weepholes/open joints to prevent earth materials from entering the holes/joints.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

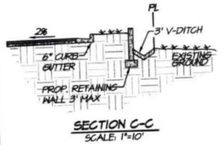
Soil Exploration Co. Inc.

Plate: 2



SECTION A-A
SCALE: 1"=10'

SECTION B-B
SCALE: 1"=10'



SECTION C-C
SCALE: 1"=10'

CONSTRUCTION NOTES

1. INSTALL X" AC PAVEMENT OVER X" BASE PER SOILS REPORT
2. CONSTRUCT 0" CURB PER COUNTY OF RIVERSIDE STD. 204
3. CONSTRUCT 6" CURB AND GUTTER PER COUNTY OF RIVERSIDE STD. 200
4. CONSTRUCT 4' WIDE VALLEY GUTTER PER DETAIL ON SHEET 3
5. CONSTRUCT CONCRETE SIDEWALK PER COUNTY OF RIVERSIDE STD. 401 - WIDTH PER PLAN
6. CONSTRUCT COMMERCIAL DRIVEWAY PER COUNTY OF RIVERSIDE STD. 207A
7. INSTALL ADA PARKING STRIPING PER DETAILS ON SHEET 3
8. INSTALL PARKING STRIPING
9. CONSTRUCT RETAINING WALL - HEIGHT PER PLAN
10. INSTALL WHEEL STOP PER DETAIL ON SHEET 3
11. CONSTRUCT DEEPENED FOOTING - DEPTH PER PLAN
12. CONSTRUCT 3' WIDE V-DITCH
13. INSTALL UNDER SIDEWALK DRAIN PER COUNTY OF RIVERSIDE STD. 309
14. INSTALL 4' CURB CUT
15. CONSTRUCT 7' WIDE INFILTRATION TRENCH - SEE WQMP FOR DETAILS
16. INSTALL 18" STORM DRAIN - SEE WQMP FOR DETAILS
17. INSTALL 10" SEWER LINE
18. INSTALL SEWER MANHOLE
19. INSTALL 6" SEWER LATERAL
20. INSTALL 2" WATER LATERAL
21. INSTALL TRUNCATED DOMES
22. INSTALL 6" CURB PER COUNTY OF RIVERSIDE STD. 200
23. INSTALL 6" FIRE SERVICE LINE

PROPOSED WAREHOUSE FF=799.0

PROPOSED OFFICE BUILDING FF=799.0

B-1 B-2 B-3

I-1 (9.6 in/hr)

I-2 (2.3 in/hr)

CHAIN LINK FENCE

RIVERSIDE DRIVE

PROP. RETAINING WALL

PROP. SIGN PER ARCHITECT PLAN

PROP. V-DITCH

PROPERTY LINE

NATURAL GROUND FLOWLINE

TRASH ENCLOSURE PER SEPARATE PLAN

EX. PROPERTY LINE TO BE MERGED PER SEPARATE DOCUMENT

PROP. ABOVE GROUND DOUBLE WALLED FUEL TANK WITH CONTAINMENT SUMP, AS REQUIRED BY UCSD

PROP. DEEPENED FOOTING

PROP. INFILTRATION TRENCH

FENCE W/ PLASTER PER LS PLAN (TYP.)

GATE W/ PLASTER PER LS PLAN (TYP.)

EX. BOLLARDS TO BE RELOCATED

EX. BD. # A.V. TO BE RELOCATED

EX. TREES TO BE REMOVED (TYP.)

EX. STRIPING

EX. 16" WATER PER UCSD DWG. NO. BB-2023 PROTECT IN PLACE

EX. 30" WATER PER CHINO BASIN DESALTER AUTHORITY PROTECT IN PLACE

EX. UNDERGROUND TELEPHONE LINES PROTECT IN PLACE

EX. PP TO BE RELOCATED

RESTRICT DRIVEWAY ACCESS TO PRIVATE VEHICLES ONLY

EQUIPMENT AREA

EX. C/G

EX. R/W

PROP. C/G

PROP. R/W

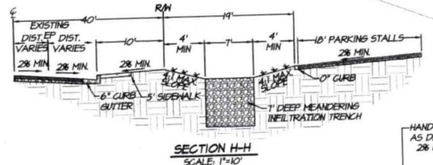
A.P.N. 156-030-014

R-1-1/2

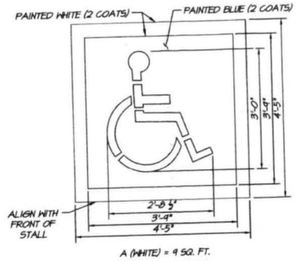
SEE SHEET 3

0 15 30 60 90 120

SCALE: 1" = 30'

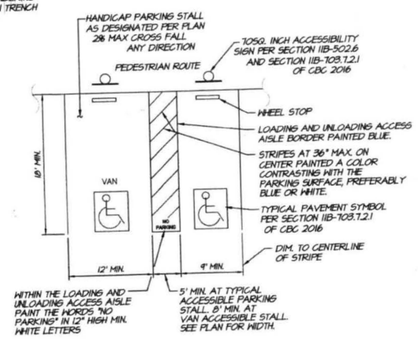


SECTION H-H
SCALE: 1"=10'

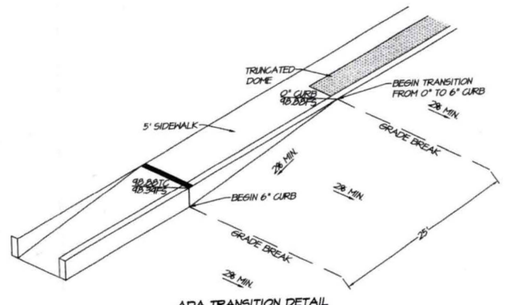


A (WHITE) = 9 SQ. FT.
A (BLUE) = 14 SQ. FT.

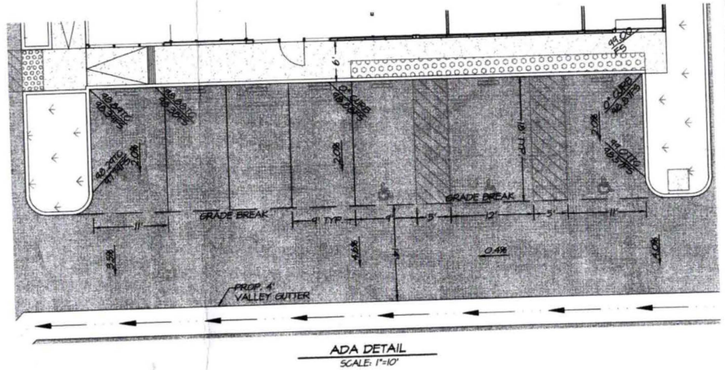
INTERNATIONAL SYMBOL OF ACCESSIBILITY MARKING
NTS



7 ADA PARKING STALL DETAIL
PER



ADA TRANSITION DETAIL
NTS



ADA DETAIL
SCALE: 1"=10'

CITY OF JURUPA VALLEY BUSINESS TAX ACCT. No. 00094 EXP. 9/7/19

EXPLORATORY BORING & INFILTRATION TEST LOCATION MAP PLATE 1A

LEGEND

B-3 ● Approximate Location of Boring
I-4 ▲ Approximate Location of Infiltration Test

Soil Exploration Co., Inc.

Project No. 1826-01 | September 12, 2019

NO WORK SHALL BE DONE ON THIS SITE UNTIL BELOW AGENCY IS NOTIFIED OF INTENTION TO GRADE OR EXCAVATE.
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CITY OF JURUPA VALLEY
8930 LIMONITE AVE.
JURUPA VALLEY, CA 92509
TEL: (951) 332-6464
EMAIL: ENGINEERING@JURUPAVALLEY.ORG

IMPORTANT NOTE:
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MARK	DATE	INITIAL	REC.	APPR	DATE

REGISTERED PROFESSIONAL ENGINEER
MITCHELL JAY ADKISON
NO. 75731
EXP. 6-30-20
CIVIL
STATE OF CALIFORNIA

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: Mitchell Jay Adkison, R.C.E. 75731 Exp. 6.30.20 Date:

CITY OF JURUPA VALLEY

CONCEPTUAL GRADING PLANS
RIVERSIDE DRIVE & WINEVILLE ROAD
AHERN RENTALS

CONCEPTUAL GRADING

ACCT. NO.

SHEET 2 OF 3

CITY I. D. NO.

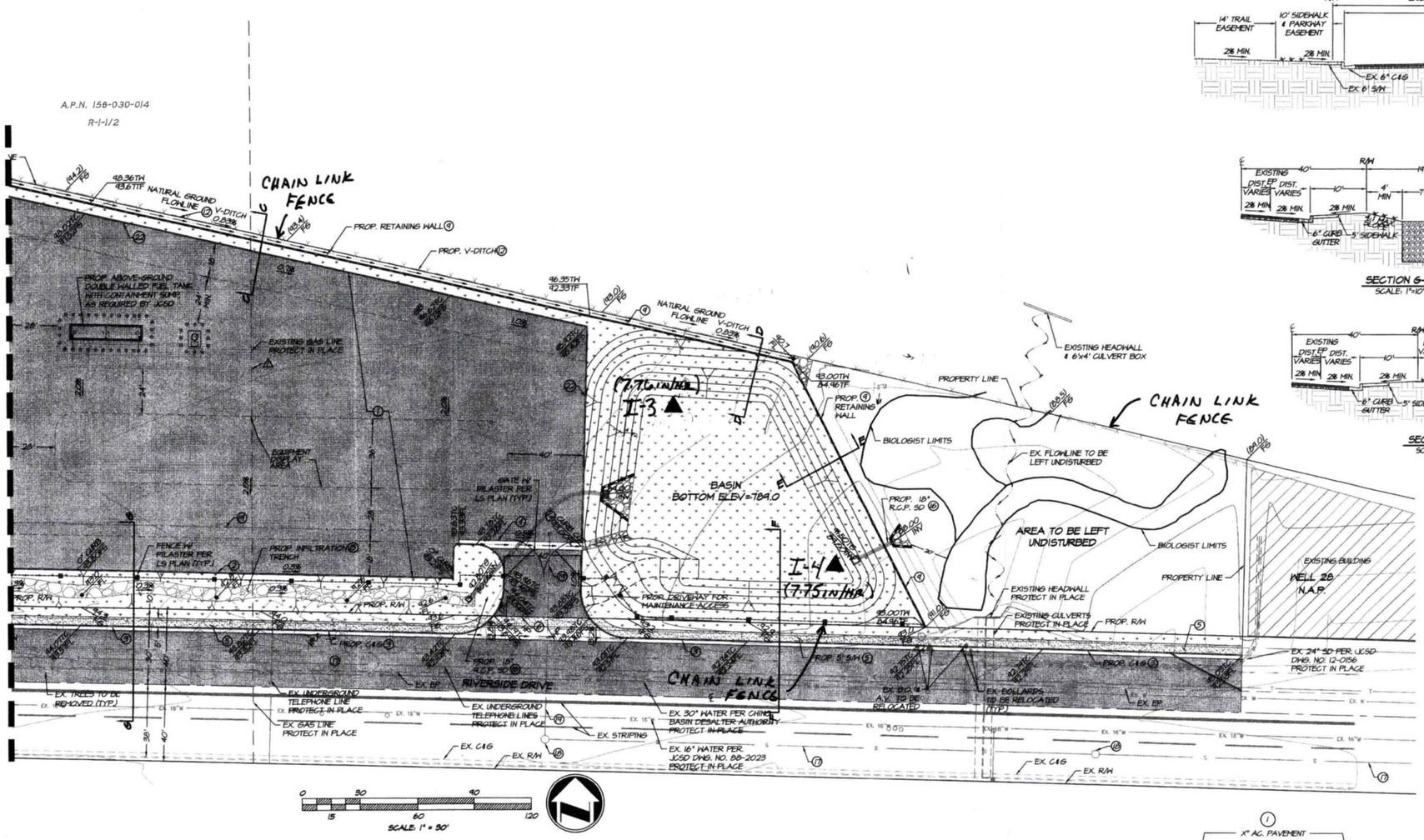
FILE PATH: U:\PROJECTS\AHERN\400\PLANNING\CONCEPTUAL GRADING\AHERN CGP 021719.DWG

PLOT TIME: 7/17/2019 9:07 AM

A.P.N. 158-030-014

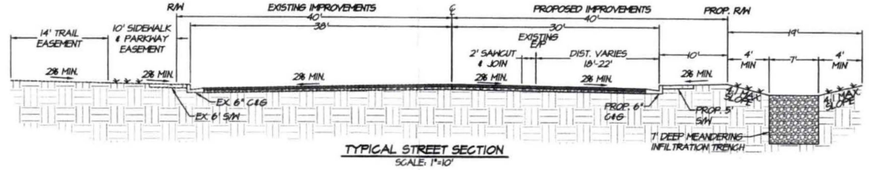
R-1-1/2

SEE SHEET 2



0 15 30 60 90 120

SCALE: 1" = 50'

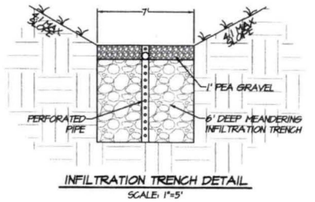


TYPICAL STREET SECTION

SCALE: 1"=10'

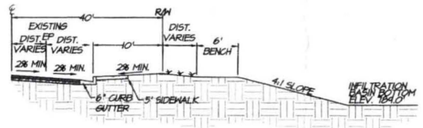
SECTION G-G

SCALE: 1"=10'



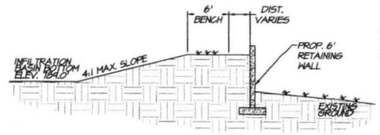
INFILTRATION TRENCH DETAIL

SCALE: 1"=5'



SECTION F-F

SCALE: 1"=10'



SECTION E-E

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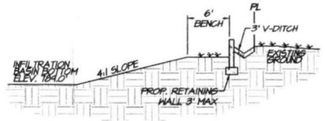
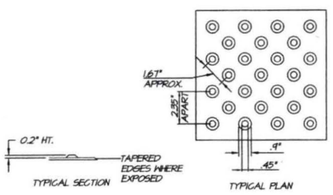


SECTION D-D

SCALE: 1"=10'

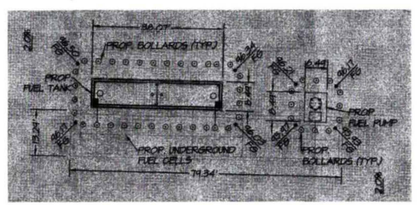


② TRUNCATED DOME DETAIL

NTS

PLEASE REFER TO SECTION 11B-705 AND SECTION 11B-705.1.2 OF CBC 2016 FOR DETECTABLE WARNING LOCATIONS

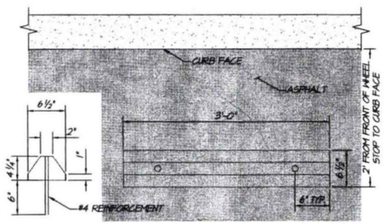
*NOTE: DETECTABLE WARNING SURFACES BY ARMOR TILE OR APPROVED EQUAL. CAST IN PLACE.



FUEL & MAINTENANCE AREA DETAIL

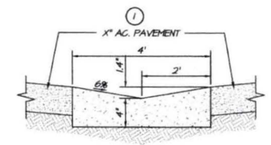
SCALE: 1"=20'

ABOVE-GROUND FUEL TANK SHALL BE DOUBLE WALLED AND UTILIZE A CONTAINMENT SUMP, AS REQUIRED BY JURUPA VALLEY SERVICES DISTRICT



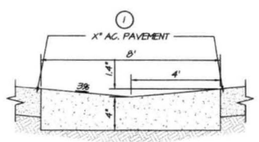
⑩ WHEEL STOP DETAIL

NTS



④ VALLEY GUTTER DETAIL

NTS



④ FLARED VALLEY GUTTER DETAIL

NTS

NOTE: FLARED VALLEY GUTTER TO BE USED WHERE ADA PATH CROSSES GUTTER

EASEMENT NOTES

⚠ AN EASEMENT IN FAVOR OF STATE OF CALIFORNIA FOR INSTALLATION, REPLACEMENT, REPAIR, REMOVAL, AND MAINTENANCE OF A STEEL GAS LINE AS SHOWN BY DOCUMENT RECORDED SEPTEMBER 4, 1964 AS INSTRUMENT NUMBER 1964-90240.

CONSTRUCTION NOTES & QUANTITIES

1. INSTALL X" AC PAVEMENT OVER X" BASE PER SOILS REPORT
2. CONSTRUCT 0" CURB PER COUNTY OF RIVERSIDE STD. 204
3. CONSTRUCT 6" CURB AND GUTTER PER COUNTY OF RIVERSIDE STD. 200
4. CONSTRUCT 4' WIDE VALLEY GUTTER PER DETAIL ON SHEET 3
5. CONSTRUCT CONCRETE SIDEWALK PER COUNTY OF RIVERSIDE STD. 401 - WIDTH PER PLAN
6. CONSTRUCT COMMERCIAL DRIVEWAY PER COUNTY OF RIVERSIDE STD. 207A.
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8. INSTALL PARKING STRIPING
9. CONSTRUCT RETAINING WALL - HEIGHT PER PLAN
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11. CONSTRUCT DEEPENED FOOTING - DEPTH PER PLAN
12. CONSTRUCT 3' WIDE V-DITCH
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14. INSTALL 4' CURB CUT
15. CONSTRUCT 7' WIDE INFILTRATION TRENCH - SEE WQMP FOR DETAILS
16. INSTALL 18" STORM DRAIN - SEE WQMP FOR DETAILS
17. INSTALL 10" SEWER LINE
18. INSTALL SEWER MANHOLE
19. INSTALL 6" SEWER LATERAL
20. INSTALL 2" WATER LATERAL
21. INSTALL TRUNCATED DOMES
22. INSTALL 6" CURB PER COUNTY OF RIVERSIDE STD. 200
23. INSTALL 6" FIRE SERVICE LINE

NO WORK SHALL BE DONE ON THIS SITE UNTIL BELOW AGENCY IS NOTIFIED OF INTENTION TO GRADE OR EXCAVATE.
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JURUPA VALLEY, CA 92509
TEL: (951) 332-6464
EMAIL: ENGINEERING@JURUPAVALLEY.ORG

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MARK	DATE	INITIAL

EXPLORATORY BORING & INFILTRATION TEST LOCATION MAP PLATE 1B

LEGEND

B-3 ● Approximate Location of Boring

I-4 ▲ Approximate Location of Infiltration Test

Soil Exploration Co., Inc.

Project No. 1826-01 | September 12, 2019

REC.	APPR	DATE

REGISTERED PROFESSIONAL ENGINEER MITCHELL JAY ADKISON NO. 75731 EXP. 6-30-20 CIVIL STATE OF CALIFORNIA

CITY OF JURUPA VALLEY BUSINESS TAX ACCT. No. 00094 EXP. 9/7/19

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 · Fax:(951) 688-0599

Under the Supervision of: Mitchell Jay Adkison, R.C.E. 75731 Exp. 6.30.20 Date:

CITY OF JURUPA VALLEY

CONCEPTUAL GRADING PLANS
RIVERSIDE DRIVE & WINEVILLE ROAD
AHERN RENTALS

CONCEPTUAL GRADING

ACCT. NO.

SHEET 3 OF 3

CITY I. D. NO.

FILE PATH: I:\PROJECTS\AHERN\14425\PLANNING\CONCEPTUAL GRADING\14425 CG 01.DWG

PLOT TIME: 7/14/2019 9:17 AM

APPENDIX A

REFERENCES

- CDMG, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, Dated February 1998.
- USGS Geologic Map of the San Bernardino and Santa Ana 30'x60' Quadrangles, California, 2006.
- Riverside County GIS Map.
- U.S. Geological Survey Faults 2014.
- Riverside County Stormwater Quality Best Management Practice, Design Handbook for Low Impact Development, Dated June 2014.

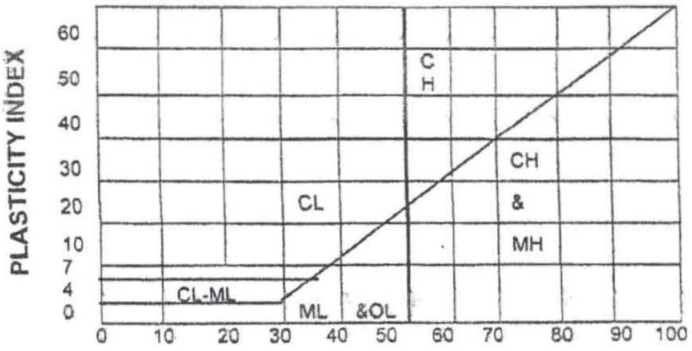
APPENDIX B

MAJOR DIVISIONS		SYMBOLS		TYPICAL NAMES
COARSE-GRAINED SOILS (More than ½ of soil < No. 200 sieve)	GRAVELS (More than ½ of coarse fraction > No. 4 sieve size)	GW		Well-graded gravels or gravel-sand mixtures, little or no fines
		GP		Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM		Silty gravels, gravel-sand-silt mixtures
		GC		Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than ½ of coarse fraction < No. 4 sieve size)	SW		Well-graded sands or gravely sands, little or no fines
		SP		Poorly graded sands or gravelly sands, little or no fines
		SM		Silty sands, sand-salt mixtures
		SC		Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than ½ of soil < No. 200 sieve)	SILTS & CLAYS LL < 50	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL		Organic silts and organic silty clays of low plasticity.
	SILTS & CLAYS LL > 50	MH		Inorganic silts, caceous or diatonaceous fine sandy or silty soils, elastic silts
		CH		Inorganic clays of medium to high plasticity, organic silty clays, organic silts
		OH		Organic clays of medium to high plasticity, organic silty clays, organic silts
	HIGHLY ORGANIC SOILS	Pt		Peat and other highly organic soils

CLASSIFICATION CHART

(UNIFIED SOIL CLASSIFICATION SYSTEM)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDER	ABOVE 12"	ABOVE 305
COBBLES	3" to 12"	305 to 76.2
GRAVEL	3" to No. 4	762 to 4.76
COARSE	3" TO ¾"	76.2 to 19.1
FINE	¾"to No. 4	19.1 to 4.76
SAND	No. 4 to 200	4.76 to 0.074
COARSE	No. 4 to 10	4.76 to 2.00
MEDIUM	No. 10 to 40	2.00 to 0.420
FINE	No. 40 to 200	0.420 to 0.074
SILT & CLAY	BELOW No. 200	BELOW 0.074



GRAIN SIZE CHART

PLASTICITY CHART

Ring Sample	Bag Sample	NR No Recovery	Classification in accordance with ASTM D2487 Description and visual observation in accordance with ASTM D2488 All Sieve Sizes shown are US Standard SPT Refusal is defined as one of the following: 10 blows for no apparent displacement 50 blows for less than 6 inches advancement 100 blows for 6 to 18 inches advancement
SPT Sample	Seepage		

GEOTECHNICAL BORING LOGS

Drill Hole No. B-1

Date: Sept. 3, 2019
Drilling Company: Larry Harklerode
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 1826-01
Type of Rig: B-53
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	Qye: Young eolian deposits **SILTY SAND:** Light brown, fine to medium grained,
2							dry, top 1 foot loose
3		■	21/28/30	121.4	2.2		Dry, dense % Passing No. 200 Sieve = 10
4							
5							
6		■	8/12/15	-	-		Dry, medium dense
7							
8							
9							
10							
11		☒	8/12/16	-	4.7		Yellowish/light brown, fine grained, dry, medium dense % Passing No. 200 Sieve = 44
12							
13							
14							
15							
16		☒	7/11/14	-	-		Light gray/olive, dry, medium dense
17							
18							
19							
20							
21		☒	18/28/30	-	-		Dry, very dense, gravel
22							
23							
24							TOTAL DEPTH = 25 FEET NO GROUNDWATER
25							NO CAVING BORING BACKFILLED

Soil Exploration Co., Inc.

GEOTECHNICAL BORING LOGS

Drill Hole No. B-2

Date: Sept. 3, 2019
Drilling Company: Larry Harklerode
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 1826-01
Type of Rig: B-53
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						ML	Qye: Young eloian deposits
2							**SANDY SILT:** Yellowish/light brown, dry, medium dense
3		X	6/10/17	-	9.1		Dry, medium dense
4							
5							
6		X	9/10/14	-	6.3		Yellow, dry, medium dense
7							
8							
9							
10							
11		X	7/16/25	-	-	SP-SM	**SAND WITH SILT:** Light gray, dry, dense, gravel
12							
13							
14							
15							
16							TOTAL DEPTH = 15 FEET NO GROUNDWATER NO CAVING BORING BACKFILLED
17							
18							
19							
20							
21							
22							
23							
24							
25							

GEOTECHNICAL BORING LOGS

Drill Hole No. B-3

Date: Sept. 6, 2019
Drilling Company: One Way Drilling
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 1826-01
Type of Rig: CME 75
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
1						SM	Qye: Young eloian deposits
2							**SILTY SAND:** Light brown, fine to medium grained, dry, medium dense, loose
3		X	2/2/7	-	3.0		Dry, loose % Passing No. 200 Sieve = 18
4							
5							
6		X	6/8/12	-	6.6		Yellow, dry, medium dense % Passing No. 200 Sieve = 38
7							
8							
9							
10							
11		X	6/12/8	-	-		Gray, fine to coarse grained, dry, medium dense, gravel
12							
13							
14							
15							
16		X	16/23/21	-	2.0		Dry, dense % Passing No. 200 Sieve = 14
17							
18							
19							
20							
21		X	16/26/42	-	-		Dry, very dense
22							
23							
24							
25							

Soil Exploration Co., Inc.

GEOTECHNICAL BORING LOGS

Drill Hole No. B-3

Date: Sept. 6, 2019
Drilling Company: One Way Drilling
Hole Diameter: 8" **Drive Weight:** 140 lbs. **Drop:** 30"

Project No. 1826-01
Type of Rig: CME 75
Elevation: Existing Ground

DEPTH (feet)	TYPE OF TEST	SAMPLE TEST	BLOWS PER 6 INCH	DRY DENSITY (%)	MOISTURE (%)	SOIL CLASSIFICATION USCS	GEOTECHNICAL DESCRIPTION LOGGED BY: GL SAMPLED BY: GL
26		X	12/50	-	-	SM	Dry, very dense
27							
28							
29							
30							
31		X	18/50/2"	-	-		Dry, very dense
32							
33							
34							
35							
36		X	8/16/24	-	6.0	SP-SM	**SAND WITH SILT:** Yellowish/light brown, fine to medium grained, slightly moist, dense
37							% Passing No. 200 Sieve = 8
38							
39							
40							
41		X	20/50/5"	-	-		Slightly moist, very dense
42							
43							
44							
45							
46		X	12/20/20	-	-		Slightly moist, dense
47							
48							Slightly moist, dense
49							TOTAL DEPTH = 50 FEET
50		X	18/12/21	-	-		NO GROUNDWATER NO CAVING BORING BACKFILLED

Soil Exploration Co., Inc.

APPENDIX C

Riverside Drive
City of Jurupa Valley,California

LABORATORY TEST RESULTS

SIEVE SIZE	B-1 @ 2' % PASSING	B-1 @ 10' % PASSING	B-3 @ 2' % PASSING	B-3 @ 5' % PASSING	B-3 @ 15' % PASSING	B-3 @ 35' % PASSING
3/4"	-	-	-	-	100	-
1/2"	-	-	-	-	90	-
3/8"	-	-	-	-	86	100
No. 4	-	100	100	100	72	98
No. 8	100	99.5	99	99	63	92
No. 16	96	98.5	95	95	55	80
No. 30	88	96	87	86	46	56
No. 50	72	91	72	71	35	35
No. 100	39	73	44	53	24	20
No. 200	10	44	18	38	14	8
SIEVE ANALYSIS TEST DATA						

Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental & Civil Engineering

September 13, 2019

Soil Exploration Company Inc.
7535 Jurupa Avenue, Unit C
Riverside, California 92504

Attn: Mr. Gene Luu

RE: LABORATORY TEST RESULTS/REPORT
Client: Ahern Rentals
Project: Corrosion Potential
Project No.: 1826-01
QCI Job No.: 19-183-009b

Gentlemen:

We have completed the testing program conducted on sample for above project. The tests were performed in accordance with testing procedures as follows:

TEST	METHOD
Corrosion Potential	CT- 417, CT- 422, CT- 532 (643)

Enclosed is Summary of Laboratory Test Results.

We appreciate the opportunity to provide testing services to Soil Exploration Company Inc. Should you have any questions, please call the undersigned.

Sincerely yours,
Cal Land Engineering, Inc. (CLE)
dba Quartech Consultants (QCI)

Giovani Valdivia
Project Engineer

Enclosure

Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental, and Civil Engineering

Soil Exploration Company Inc.
7535 Jurupa Avenue, Suite C
Riverside, California 92504

QCI Project No.: 19-183-009b
Date: September 13, 2019
Summarized by: GV

Client: Ahern Rentals
Project: Corrosion Potential
Project No.: 1826-01

Corrosivity Test Results

Sample ID	Sample Depth (ft)	pH CT-532 (643)	Chloride CT-422 (ppm)	Sulfate CT-417 % By Weight	Resistivity CT-532 (643) (ohm-cm)
B-1	0-2.5'	7.95	196	0.002	4,900

ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949)336-6544

TO:

Southwest Inspection & Testing, Inc.
441 Commercial Way
La Habra, CA 90631-6168

DATE: 09/09/2019

P.O. NO: Transmittal

LAB NO: C-3205

SPECIFICATION: CA 301

MATERIAL: Brown, F. Silty Sand

Client: Soil Exploration Company, Inc.
Client Project No.: 1826-01
Project Name: Ahern Rentals, Inc.
Date sampled: 09/03/2019

ANALYTICAL REPORT
"R" VALUE

BY EXUDATION	BY EXPANSION
71	N/A

RESPECTFULLY SUBMITTED

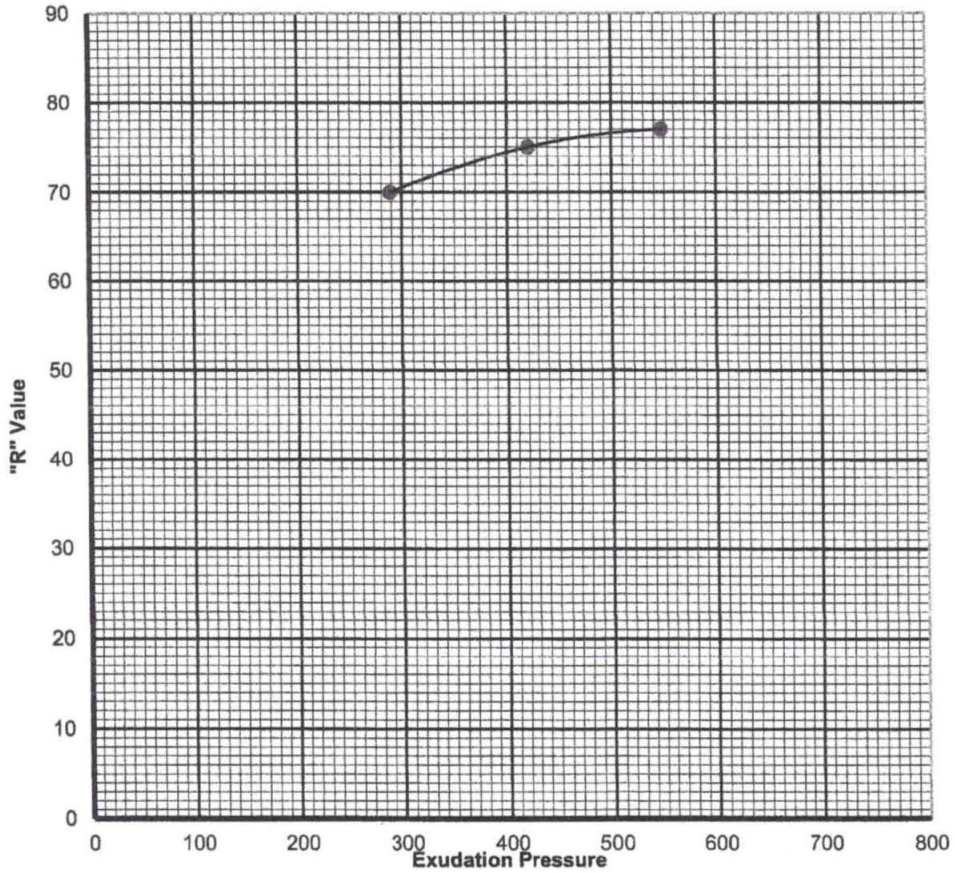
WES BRIDGER LAB MANAGER

"R" VALUE CA 301

Client: Southwest Inspection & Testing, Inc. **ATL No.:** C 3205 **Date:** 9/9/2019
Client Reference No.: 1826-01
Sample: Soil Exploration R Value **Soil Type:** Brown, F. Silty Sand

TEST SPECIMEN		A	B	C	D
Compactor Air Pressure	psi	350	350	300	
Initial Moisture Content	%	0.4	0.4	0.4	
Moisture at Compaction	%	13.0	13.4	13.8	
Briquette Height	in.	2.47	2.46	2.49	
Dry Density	pcf	108.3	107.6	106.2	
EXUDATION PRESSURE	psi	547	420	288	
EXPANSION dial	(x .0001)	0	0	0	
Ph at 1000 pounds	psi	15	18	21	
Ph at 2000 pounds	psi	28	30	35	
Displacement	turns	3.45	3.69	3.89	
"R" Value		77	75	70	
CORRECTED "R" VALUE		77	75	70	

Final "R" Value	
BY EXUDATION: @ 300 psi	**71**
BY EXPANSION: TI = 5.0	**N/A**



Cal Land Engineering, Inc.
dba Quartech Consultants
Geotechnical, Environmental & Civil Engineering

September 18, 2019

Soil Exploration Company Inc.
7535 Jurupa Avenue, Unit C
Riverside, California 92504

Attn: Mr. Gene Luu

RE: LABORATORY TEST RESULTS/REPORT
Project Address: Ahem Rentals
Project No.: 1826-01
QCI Job No.: 19-183-009d

Ladies and Gentlemen:

We have completed the testing program conducted on sample for above project. The tests were performed in accordance with testing procedures as follows:

TEST	METHOD
Consolidation	ASTM D2435
Direct Shear	ASTM D3080

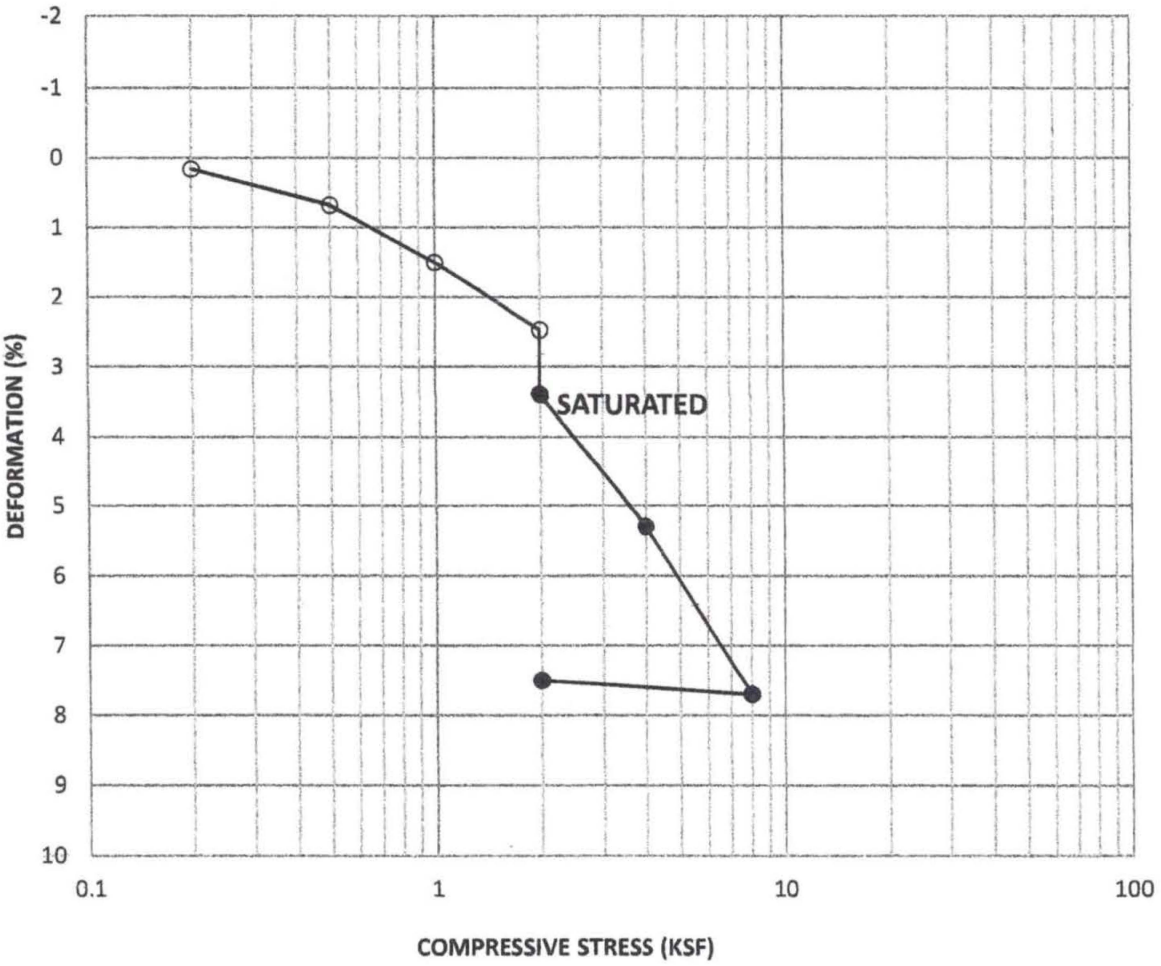
Enclosed is Summary of Laboratory Test Results.

We appreciate the opportunity to provide testing services to Soil Exploration Company Inc. Should you have any questions, please call the undersigned.

Sincerely yours,
Cal Land Engineering, Inc. (CLE)
dba Quartech Consultants (QCI)

Guillermo E Troncoso IV
Project Engineer

Enclosure



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SOIL TYPE	INIT. MOISTURE CONTENT (%)	INIT. DRY DENSITY (PCF)	INIT. VOID RATIO
○	B-1	N/A	5	SM	3.0	107.2	0.572

CalLand Engineering, Inc
dba Quartech Consultants
Geotechnical, Environmental & Civil Engineering Services

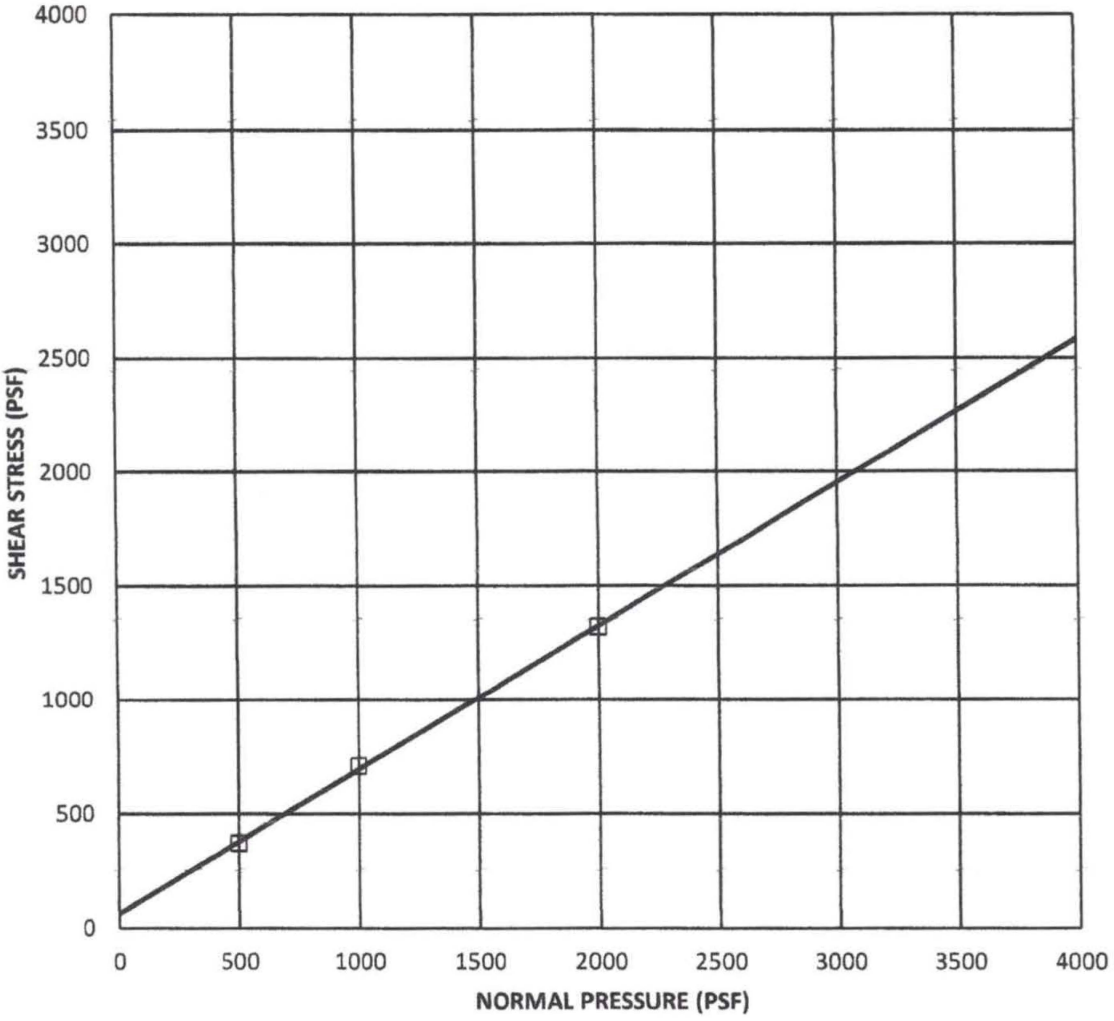
Project Address:
Ahem Rentals
Job Number:
1826-01

CONSOLIDATION

(ASTM D2435)

9/19

FIGURE 2



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	COHESION (PSF)	FRICTION ANGLE (DEG)
□	B-1	N/A	5.0	RING	SM	66	32

Vertical Loads (PSF)	Moisture Content Before Test (%)	Moisture Content After Test (%)
500	3	20.9
1000	3	20.7
2000	3	20.4

CalLand Engineering, Inc

dba Quartech Consultants

Geotechnical,

Project Address:
Ahem Rentals
Project Number:
1826-01

DIRECT SHEAR

(ASTM D3080)

9/19

FIGURE 3

APPENDIX D

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)
9.46	Chino, alt 2	CA	1	65	SW	strike slip	0	14
9.52	Chino, alt 1	CA	1	50	SW	strike slip	0	9
10.28	Cucamonga	CA	5	45	N	thrust	0	8
10.58	San Jose	CA	0.5	74	NW	strike slip	0	15
12.72	Elsinore;W	CA	2.5	75	NE	strike slip	0	14
12.72	Elsinore;W+GI	CA	n/a	81	NE	strike slip	0	14
12.72	Elsinore;W+GI+T	CA	n/a	84	NE	strike slip	0	14
12.72	Elsinore;W+GI+T+J+CM	CA	n/a	84	NE	strike slip	0	16
12.72	Elsinore;W+GI+T+J	CA	n/a	84	NE	strike slip	0	16
13.28	Sierra Madre Connected	CA	2	51		reverse	0	14
13.28	Sierra Madre	CA	2	53	N	reverse	0	14
13.37	Elsinore;GI+T	CA	5	90	V	strike slip	0	14
13.37	Elsinore;GI+T+J+CM	CA	n/a	86	NE	strike slip	0	16
13.37	Elsinore;GI	CA	5	90	V	strike slip	0	13
13.37	Elsinore;GI+T+J	CA	n/a	86	NE	strike slip	0	17
13.77	San Jacinto;SBV+SJV+A	CA	n/a	90	V	strike slip	0	16
13.77	San Jacinto;SBV	CA	6	90	V	strike slip	0	16
13.77	San Jacinto;SBV+SJV	CA	n/a	90	V	strike slip	0	16

13.77	San Jacinto;SBV+SJV+A+C	CA	n/a	90	V	strike slip	0	17
13.77	San Jacinto;SBV+SJV+A+CC	CA	n/a	90	V	strike slip	0	16
13.77	San Jacinto;SBV+SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15
13.77	San Jacinto;SBV+SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
17.24	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
17.24	S. San Andreas;SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13
17.24	S. San Andreas;SM+NSB+SSB+BG	CA	n/a	81		strike slip	0	13
17.24	S. San Andreas;SM+NSB+SSB+BG+CO	CA	n/a	83		strike slip	0.1	13
17.24	S. San Andreas;BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
17.24	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0.1	13
17.24	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0.1	13
17.24	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0.1	13
17.24	S. San Andreas;BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
17.24	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14
17.24	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13
17.24	S. San Andreas;NSB	CA	22	90	V	strike slip	0	13
17.24	S. San Andreas;NM+SM+NSB+SSB+BG+CO	CA	n/a	84		strike slip	0.1	13
17.24	S. San Andreas;NM+SM+NSB+SSB+BG	CA	n/a	83		strike slip	0	14
17.24	S. San Andreas;NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13
17.24	S. San Andreas;NM+SM+NSB	CA	n/a	90	V	strike slip	0	13
17.24	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0	14

17.24	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
17.24	S. San Andreas;CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
17.24	S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	85		strike slip	0.1	13
17.24	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
17.24	S. San Andreas;BB+NM+SM+NSB+SSB+BG	CA	n/a	84		strike slip	0	14
17.24	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13
17.24	S. San Andreas;NSB+SSB+BG+CO	CA	n/a	79		strike slip	0.2	12
17.24	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	85		strike slip	0	14
17.24	S. San Andreas;CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14
17.24	S. San Andreas;CC+BB+NM+SM+NSB	CA	n/a	90	V	strike slip	0	14
17.24	S. San Andreas;SM+NSB	CA	n/a	90	V	strike slip	0	13
17.68	San Jacinto;SJV+A+C	CA	n/a	90	V	strike slip	0	17
17.68	San Jacinto;SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
17.68	San Jacinto;SJV+A	CA	n/a	90	V	strike slip	0	17
17.68	San Jacinto;SJV+A+CC	CA	n/a	90	V	strike slip	0	16
17.68	San Jacinto;SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15
17.68	San Jacinto;SJV	CA	18	90	V	strike slip	0	16
20.32	Puente Hills (Coyote Hills)	CA	0.7	26	N	thrust	2.8	15
20.40	Cleghorn	CA	3	90	V	strike slip	0	16
20.47	S. San Andreas;NM+SM	CA	n/a	90	V	strike slip	0	14
20.47	S. San Andreas;CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14
20.47	S. San Andreas;SM	CA	29	90	V		0	13

						strike slip		
20.47	S. San Andreas;CC+BB+NM+SM	CA	n/a	90	V	strike slip	0	14
20.47	S. San Andreas;BB+NM+SM	CA	n/a	90	V	strike slip	0	14
20.47	S. San Andreas;PK+CH+CC+BB+NM+SM	CA	n/a	90	V	strike slip	0.1	13
20.60	S. San Andreas;SSB+BG+CO	CA	n/a	77		strike slip	0.2	12
20.60	S. San Andreas;SSB+BG	CA	n/a	71		strike slip	0	13
20.60	S. San Andreas;SSB	CA	16	90	V	strike slip	0	13
23.00	Clamshell-Sawpit	CA	0.5	50	NW	reverse	0	14
25.84	Elsinore;T+J	CA	n/a	86	NE	strike slip	0	17
25.84	Elsinore;T+J+CM	CA	n/a	85	NE	strike slip	0	16
25.84	Elsinore;T	CA	5	90	V	strike slip	0	14
25.91	North Frontal (West)	CA	1	49	S	reverse	0	16
26.61	San Jacinto;A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15
26.61	San Jacinto;A+CC	CA	n/a	90	V	strike slip	0	16
26.61	San Jacinto;A+C	CA	n/a	90	V	strike slip	0	17
26.61	San Jacinto;A	CA	9	90	V	strike slip	0	17
26.61	San Jacinto;A+CC+B	CA	n/a	90	V	strike slip	0.1	15
27.37	Raymond	CA	1.5	79	N	strike slip	0	16
27.74	San Joaquin Hills	CA	0.5	23	SW	thrust	2	13
27.82	Puente Hills (Santa Fe Springs)	CA	0.7	29	N	thrust	2.8	15
32.01	Elysian Park (Upper)	CA	1.3	50	NE	reverse	3	15
33.53	Puente Hills (LA)	CA	0.7	27	N	thrust	2.1	15
34.96	Newport Inglewood Connected alt 2	CA	1.3	90	V	strike slip	0	11

35.05	Newport-Inglewood, alt 1	CA	1	88		strike slip	0	15
35.05	Newport Inglewood Connected alt 1	CA	1.3	89		strike slip	0	11
35.74	Verdugo	CA	0.5	55	NE	reverse	0	15
36.37	Newport-Inglewood (Offshore)	CA	1.5	90	V	strike slip	0	10
39.90	Hollywood	CA	1	70	N	strike slip	0	17
42.84	Santa Monica Connected alt 2	CA	2.4	44		strike slip	0.8	11
42.94	S. San Andreas;BG+CO	CA	n/a	72		strike slip	0.3	12
42.94	S. San Andreas;BG	CA	n/a	58		strike slip	0	13
44.84	Helendale-So Lockhart	CA	0.6	90	V	strike slip	0	13
44.86	Palos Verdes	CA	3	90	V	strike slip	0	14
44.86	Palos Verdes Connected	CA	3	90	V	strike slip	0	10
46.55	Sierra Madre (San Fernando)	CA	2	45	N	thrust	0	13
46.87	San Gabriel	CA	1	61	N	strike slip	0	15
47.38	Pinto Mtn	CA	2.5	90	V	strike slip	0	16
47.98	North Frontal (East)	CA	0.5	41	S	thrust	0	16
49.85	Santa Monica Connected alt 1	CA	2.6	51		strike slip	0	16
49.85	Santa Monica, alt 1	CA	1	75	N	strike slip	0	18

2016 CBC – SEISMIC PARAMETERS		
Site Coordinates	**Latitude**	**Longitude**
	34.0193	**-117.5459**
Mapped Spectral Response Acceleration	**S_S = 1.500**	**S_1 = 0.600**
Site Coefficients (Class "D")	**F_a = 1.00**	**F_v = 1.50**
Maximum Considered Earthquake (MCE) Spectral Response Acceleration	**S_{MS} = 1.500**	**S_{M1} = 0.900**
Design Spectral Response Acceleration Parameters	**S_{DS} = 1.000**	**S_{D1} = 0.600**
Seismic Design Category	**D**	
Peak Ground Acceleration (PGA)	**0.5g**	

References:

- Earthquake.usgs.gov/research/hazmaps/design
- 2016 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Section 1613, Earthquake Loads

APPENDIX E

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL INTENT

These specifications present general procedures and requirements for grading and earthwork as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installations of subdrains, and excavations. The recommendations contained in the geotechnical report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations which could supersede these specifications or the recommendations of the geotechnical report.

2.0 EARTHWORK OBSERVATIONS AND TESTING

Prior to the commencement of grading, a qualified geotechnical consultant (soils engineer and engineering geologist, and their representatives) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. It will be necessary that the consultant provide adequate testing and observations so that he may determine that the work was accomplished as specified. It shall be the responsibility of the contractor to assist the consultant and keep him apprised of work schedules and changes so that he may schedule his personnel accordingly.

It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and approved grading plans. If, in the opinion of the consultant, unsatisfactory conditions, such as questionable soil, poor moisture conditions, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the consultant will be empowered to reject the work and recommend that construction be stopped until the unsatisfactory conditions are rectified.

Maximum dry density tests used to determine the degree of compaction will be performed in accordance with the American Society of Testing and Materials, test method ASTM D1557-12.

3.0 PREPARATION OF AREAS TO BE FILLED

3.1 Clearing and Grubbing

All brush, vegetation, and debris shall be removed or piled and otherwise disposed of.

3.2 Processing

The existing ground which is determined to be satisfactory for support of fill shall be scarified to a minimum depth of 6 inches. Existing ground which is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until the soils are broken down and free of large clay lumps or clods and until the working surface is reasonably uniform and free of uneven features which would inhibit uniform compaction.

3.3 Overexcavation

Soft, dry, spongy, highly fractured or otherwise unsuitable ground, extending to such depth that surface processing cannot adequately improve the condition, shall be overexcavated down to firm ground, approved by the consultant.

3.4 Moisture Conditioning

Overexcavated and processed soils shall be watered, dried-back, blended, and/or mixed, as required to attain a uniform moisture content near optimum.

3.5 Recompaction

Overexcavation and processed soils which have been properly mixed and moisture-conditioned shall be recompacted to a minimum relative compaction of 90 percent.

3.6 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal : vertical), the ground shall be stepped or benched. The lowest bench shall be a minimum of 15 feet wide, shall be at least 2 feet deep, shall expose firm materials, and shall be approved by the consultant. Other benches shall be excavated in firm materials for a minimum width of 4 feet. Ground sloping flatter than 5:1 (horizontal : vertical) shall be benched or otherwise overexcavated when considered necessary by the consultant.

3.7 Approval

All areas to receive fill, including processed areas, removal areas and toe-of-fill benches shall be approved by the consultant prior to fill placement.

4.0 FILL MATERIAL

4.1 General

Material to be placed as fill shall be free of organic matter and other deleterious substances, and shall be approved by the consultant. Soils of poor gradation, expansion, or strength characteristics shall be placed in areas designated by consultant or shall be mixed with other soils to serve as satisfactory fill material.

4.2 Oversize

Oversize materials defined as rock, or other irreducible material with maximum dimension greater than 12 inches, shall not be buried or placed in fills, unless the location, materials, and disposal methods are specifically approved by the consultant. Oversize disposal operations shall be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet vertically of finish grade or within the range of future utilities or underground construction, unless specifically approved by the consultant.

4.3 Import

If importing of fill material is required for grading, the import material shall meet the requirements of Section 4.1.

5.0 FILL PLACEMENT and COMPACTION

5.1 Fill Lifts

Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding 6 inches in compacted thickness. The consultant may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

5.2 Fill Moisture

Fill layers at a moisture content less than optimum shall be watered and mixed, and wet fill layers shall be aerated by scarification or shall be blended with drier material. Moisture conditioning and mixing of fill layers shall continue until the fill material is at a uniform moisture content at or near optimum.

5.3 Compaction of Fill

After each layer has been evenly spread, moisture-conditioned, and mixed, it shall be uniformly compacted to not less than 90 percent of maximum dry density. Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

5.4 Fill Slopes

Compacting of slopes shall be accomplished, in addition to normal compacting procedures, by backrolling of slopes with sheepsfoot rollers at frequent increments of 2 to 3 feet in fill elevation gain, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be at least 90 percent.

5.5 Compaction Testing

Field-tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests shall be at the consultant's discretion. In general, the tests will be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of embankment.

6.0 SUBDRAIN INSTALLATION

Subdrain systems, if required, shall be installed in approved ground to conform to the approximate alignment and details shown on the plans or herein. The subdrain location or materials shall not be changed or modified without the approval of the consultant. The consultant, however, may recommend and upon approval, direct changes in subdrain line, grade or material. All subdrains should be surveyed for line and grade after installation and sufficient time shall be allowed for the surveys, prior to commencement of filling over the subdrain.

7.0 EXCAVATION

Excavations and cut slopes will be examined during grading. If directed by the consultant, further excavation or overexcavation and refilling of cut areas shall be performed, and/or remedial grading of cut slopes shall be performed. Where fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope shall be made and approved by the consultant prior to placement of materials for construction of the fill portion of the slope.

8.0 TRENCH BACKFILLS

Trench excavations for utility pipes shall be backfilled under engineering supervision.

After the utility pipe has been laid, the space under and around the pipe shall be backfilled with clean sand or approved granular soil to a depth of at least one foot over the top of the pipe. The sand backfill shall be uniformly jetted into place before the controlled backfill is placed over the sand.

The onsite materials, or other soils approved by the soil engineer, shall be watered and mixed as necessary prior to placement in lifts over the sand backfill.

The controlled backfill shall be compacted to at least 90 percent of the maximum dry density as determined by the ASTM D1557-12 test method.

Field density tests and inspection of the backfill procedures shall be made by the soil engineer during backfilling to see that proper moisture content and uniform compaction is being maintained. The contractor shall provide test holes and exploratory pits as required by the soil engineer to enable sampling and testing.

APPENDIX F

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: UNTITLED
Title: PROJECT NAME: Anhern Rentals Inc.
Subtitle: Proj No. 1826-01

Surface Elev.=Exisring Ground
Hole No.=B-3
Depth of Hole= 50.00 ft
Water Table during Earthquake= 175.00 ft
Water Table during In-Situ Testing= 175.00 ft
Max. Acceleration= 0.5 g
Earthquake Magnitude= 6.80

Input Data:

Surface Elev.=Exisring Ground
Hole No.=B-3
Depth of Hole=50.00 ft
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1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1
   Plot one CSR curve (fs1=1)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	9.00	120.00	28.00
5.00	20.00	120.00	38.00
10.00	20.00	120.00	14.00
15.00	44.00	120.00	14.00
20.00	68.00	120.00	14.00
25.00	100.00	120.00	14.00
30.00	100.00	120.00	14.00
35.00	40.00	120.00	8.00
40.00	100.00	120.00	8.00
45.00	40.00	120.00	8.00
50.00	33.00	120.00	8.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.18 in.
Total Settlement of Saturated and Unsaturated Sands=0.18 in.
Differential Settlement=0.091 to 0.120 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.29	0.32	5.00	0.00	0.18	0.18
5.00	2.57	0.32	5.00	0.00	0.17	0.17
10.00	2.57	0.32	5.00	0.00	0.16	0.16
15.00	2.57	0.31	5.00	0.00	0.14	0.14
20.00	2.57	0.31	5.00	0.00	0.13	0.13
25.00	2.57	0.31	5.00	0.00	0.12	0.12
30.00	2.52	0.30	5.00	0.00	0.11	0.11
35.00	2.44	0.29	5.00	0.00	0.09	0.09
40.00	2.38	0.28	5.00	0.00	0.07	0.07
45.00	2.31	0.26	5.00	0.00	0.05	0.05
50.00	0.31	0.25	5.00	0.00	0.00	0.00

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

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

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1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user

request factor of safety)

F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

APPENDIX G

Infiltration Test (Percolation Test Procedure)

The tests were performed in accordance with referenced Riverside County Stormwater Quality Best Management Practice Design Handbook for Low Impact Development, dated June 2014.

Four 8-inch diameter, 6-feet and 5-feet deep test holes (I-1, I-2, I-3 and I-4) were drilled at suggested locations. The soil at the test locations was visually classified as silty sand and sand with silt (USCS "SM" and "SP-SM"). To mitigate any possible caving or sloughing of the test holes, a 6-inch diameter perforated pipe was placed in the hole. The bottom of the hole was covered with 2 inches of gravel.

The testing was conducted after presoaking. Two consecutive measurements showed that 6 inches of water seeped away in less than 25 minutes. The test was therefore run an additional one hour with measurements taken at 10 minute intervals. Water level was adjusted to 20 inches above the bottom of the test hole after each measurement. The drop that occurred during the final reading was used for design rate purposes.

Infiltration Test/Tabulated Test Results

Test No.	Depth of Test (feet)	Earth Material	Infiltration Rate (in/hr)
I-1	6	Silty Sand (SM)	9.5
I-2	6	Silty Sand (SM)	2.3
I-3	5	Silty Sand (SM)	7.76
I-4	5	Sand with Silt (SP-SM)	7.75

We recommend that a suitable factor of safety should be applied to the rate in design of the system.

Conclusions

- Based on the test results, the site is suitable for stormwater infiltration.
- Because the stormwater infiltration is setback at least 60 feet from the adjacent foundations, the potential impact to the proposed structures is considered to be very low.
- Based on the consolidation test results, hydrocollapse potential of soils is very low.

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: Ahern Rentals INC Project No.: 18269
Test Hole No.: I-1 Date Excavated: 9-6-19
Depth of Test Hole: 6 FEET Soil Classification: SM
Diameter: 8" Presoak: Yes
Tested By: ED Date: 9-6-19

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	1:45 50 2:10 50	25	52	72	20	Y
2	2:15:18 2:40 18	25	"	"	20	Y

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	3:22 22	3:32 22	10	52	64.5		
2	3:32 13	3:43 13	"	"	64.5		
3	3:45 15	3:55 15	"	"	"		
4	4:30 12	4:41 12	"	"	"	12.5	
5	4:13:24	4:23:24	"	"	"	12.5	
6	4:25:35	4:35:35	"	"	"	"	9.5
7							
8							
9							
10							
11							
12							

COMMENTS:
Infiltration Rate = $\frac{4 \times 60 \times 12.5}{10(4+(20+(20-12.5)))} = 9.5$ in/hr

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: Stern Rentals inc. Project No.: 182601
Test Hole No.: T 2 Date Excavated: 9-6-19
Depth of Test Hole: 6 FEET. Soil Classification: SM
Diameter: 8" Presoak: yes
Tested By: BD Date: 9-6-19

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	1:14 30 1:39 30	25	52	59	7	Y
2	1:46 35 2:11 35	25	"	58.5	6.5	Y

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	2:04 19	2:24 19	10	52	55.875	3.875	
2	2:25 30	2:35 30	10	"	"	"	
3	2:38 40	2:48 40	10	"	"	"	
4	2:49 14	2:59 14	10	"	"	"	
5	2:30:25	2:40:25	"	"	"	"	
6	2:43:36	2:53:36	"	"	"	3.875	2.3
7							
8							
9							
10							
11							
12							

COMMENTS:
Infiltration Rate: $\frac{4 \times 60 \times 3.875}{10(4+(20+(20-3.875)))} = 2.3$ in/hr

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: Khem Rentals LLC Project No.: 1826-01 Date: 9/6/19
Test Hole No.: I-5 Tested By: _____ Date: "
Depth of Test Hole, DT: 5' USCS Soil Classification: SM
Diameter: 8" Presoak: Yes

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Change in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	8:10:09 8:35:09	25	40	60	20	Y
2	8:39:01 9:04:01	"	"	58.875	18.875	"

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	9:09:40	9:19:40	10	40	52.625	12.625	
2	9:20:49	9:30:49	"	"	51.875	11.875	
3	9:31:12	9:41:12	"	"	51.5	11.5	
4	9:43:32	9:53:32	"	"	50.75	10.75	
5	9:59:50	10:09:50	"	"	"	"	
6	10:11:12	10:21:12	"	"	"	"	7.76
7							
8							
9							
10							
11							
12							

COMMENTS:
Infiltration Rate = $\frac{4 \times 60 \times 10.75}{10(4+(20+(20-10.75)))} = 7.76$ in/hr

INFILTRATION TEST DATA
(Boring Percolation Test Procedure)

Project: Ahern Rentals Inc. Project No.: 18260l
Test Hole No.: I-4 Date Excavated: 9-9-19
Depth of Test Hole: 5 FEET Soil Classification: SP-SM
Diameter: 8" Presoak: Yes
Tested By: RD Date: 9/6/19

SANDY SOIL CRITERIA TEST

Trial No.	Time	Time Interval (min)	Initial Water Level (inches)	Final Water Level (inches)	Δ in Water Level (inches)	Greater Than or Equal to 6" (Y/N)
1	11:30:18 12:55:18	25	40	60	20	Y
2	12:10:37 12:35:37	25	"	39.6	19½	Y

Use Normal Sandy (Circle One) Soil Criteria

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	Do Initial Depth to Water(in.)	Df Final Depth to Water(in.)	ΔD Change in Water Level (in.)	Infiltration Rate (in./hr.)
1	12:36:58	12:46:58	10	40	52.0	12.0	
2	12:47:42	12:57:42	10	"	50.75	10.75	
3	12:57:58	1:07:37	10	"	"	"	
4	1:08:45	1:18:45	10	"	"	"	
5	1:19:01	1:29:01	10	"	"	"	
6	1:30:12	1:40:12	10	"	"	"	7.75
7							
8							
9							
10							
11							
12							

COMMENTS:
Infiltration Rate = $\frac{4 \times 60 \times 10.75}{10(4+(20+(20-10.75)))} = 7.75$ in/hr