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March 20, 2018 Project No. 17H-0307-0/01

Sun Holland, LLC
27127 Calle Arroyo, Suite 1909
San Juan Capistrano, CA 92675

Attention: Mr. Bill Lo

Subject: Geotechnical Investigation and Infiltration Testing
Tentative Tract Map 37439
Southeast of Leon Road and Holland Road
Riverside County, California

Mr. Lo:

In accordance with your request, a geotechnical investigation has been completed for the above referenced property. The results of the investigation are presented in the accompanying report, which includes a description of site conditions, results of our field exploration, field infiltration testing, laboratory testing, conclusions, and recommendations. This report has been prepared for specific application to this project, in accordance with generally accepted geotechnical engineering practice.

We appreciate this opportunity to be of service to you. If you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully submitted,

RMA GeoScience

Alan Gehri

ALAN E. GEHRI
No. 9275

Alan Gehri, PG 9275
Project Geologist

HAIYAN HARRY LIU
C81463
Exp. 9/30/2019

Haiyan Liu, PE, C81463
Project Engineer

Mark Swiatek

Mark Swiatek
President

Distribution: Addressee (3)

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GEOTECHNICAL INVESTIGATION AND INFILTRATION TESTING
TENTATIVE TRACT MAP 37439
SOUTHEAST OF LEON ROAD AND HOLLAND ROAD
RIVERSIDE COUNTY, CALIFORNIA

For

Sun Holland, LLC
27127 Calle Arroyo, Suite 1909
San Juan Capistrano, CA 92675

March 20, 2018

Project No. 17H-0307-0/01

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1.00 Introduction

1.01 Purpose

A geotechnical investigation has been completed at the subject site. The purpose of the investigation is to evaluate the geotechnical conditions at the site in relation to our understanding of the proposed development of the subject property.

1.02 Scope of the Investigation

The general scope of this investigation included the following:

- Review of published and unpublished geologic, seismic, groundwater, and geotechnical literature.
- Examination of aerial photographs and topographic maps.
- Contacting of Underground Service Alert (USA) to locate onsite utility lines.
- Logging, sampling, and backfilling of four (4) exploratory test pits excavated with a backhoe on the subject property for the residential development; and five (5) exploratory borings excavated with an 8" hollow-stem auger on the tract immediately to the west, spaced evenly along the proposed Riverside County Flood Control channel.
- Field testing for groundwater infiltration rate of underlying soils in all 4 test pits on the proposed residential development.
- Laboratory testing of representative soil samples.
- Geotechnical evaluation of the compiled data, including logs of 26 exploratory trenches and 19 exploratory borings prepared by previous consultants.
- Preparation of this report presenting our findings, conclusions, and recommendations.

Our scope of work did not include a preliminary site assessment for the potential of hazardous materials onsite.

1.03 Site Location and Description

The site of the proposed residential development is located at the southeast corner of Leon Road and Holland Road in the Winchester area of Riverside County, California. It is bounded to the north by Holland Road, to the east by Eucalyptus Road, to the south by Craig Avenue, to the west by Leon Road, and surrounded on all sides by flat ungraded properties with minimal improvements other than several farmhouses located at least 250 feet to the west and a cluster of greenhouses located immediately to the east. The property consists of 160 acres of relatively flat, tilled agricultural land with a total relief of approximately 9 feet, sloping gently to the southwest. Two small granite outcrops are visible in the southwest corner of the property, which showed significant resistance to digging by a backhoe.

The site of the proposed Riverside County Flood Control channel lies immediately to the west of the proposed residential development, and is also composed of flat agricultural land that is being used primarily growing crops, but contains several farmhouses and a dairy farm in the eastern portion.

The site is located in an area that has not been evaluated by the California Geological Survey for seismic hazards such as liquefaction and landslide hazards. It is not located in an Alquist-Priolo Fault Zone or a Riverside County Fault Zone (Riverside County General Plan Safety Element, 2015). Its central geographic position is 33.6671° north latitude and -117.1151° west longitude.

1.04 Site Land Use and History

Based on aerial photographs dating back to 1938 that were reviewed for this study, the property has always been vacant land used for agricultural purposes, with no onsite improvements or structures.

1.05 Planned Development

According to the tentative tract map and flood control plans provided to us, it is our understanding that a new residential development is planned for tract 37439, and a Riverside County Flood Control channel is planned for the tract immediately to the west.

Preliminary site plans for the residential development show 574 homes with associated street improvements, flood control channels along the perimeter and through the center of the site with box culverts to allow water passage under proposed streets, and a 5-acre park in the center. No retaining walls are currently planned onsite. The approximate limits of the planned development are shown on the Boring and Test Pit Location Map 1, Plate 1.

Plans for the flood control channels show the proposed channel will be up to 210 to 250 feet wide and a little over a mile long with 4H:1V slopes on both sides leading up to 15 feet wide unpaved access roads and 10 feet wide concrete channels.

The conclusions and recommendations contained in this report are based on our understanding of the currently proposed utilization of the project site, as derived from site plans and verbal information supplied to us.

1.06 Investigation Methods

Our investigation consisted of office research, field exploration, field infiltration testing, laboratory testing, review of the compiled data, and preparation of this report. It has been performed in a manner consistent with generally accepted engineering and geologic principles and practices, and has incorporated applicable requirements of California Building Code. Definitions of technical terms and symbols used in this report include those of the ASTM International, the California Building Code, and commonly used geologic nomenclature.

Technical supporting data are presented in the attached appendices. Appendix A presents a description of the methods and equipment used in performing the field exploration, test data for our field infiltration testing, and logs of our subsurface exploration. Appendix B presents a description of our laboratory testing and the test results. General Earthwork and Grading Specifications are presented in Appendix C. Appendix D presents referenced test pit/boring logs from other company. References are presented in Appendix E.

2.00 Findings

2.01 Geologic Setting

The site is located within the Perris Block of the Southern California Batholith, a large block of granitic bedrock that was formed during Cretaceous time, approximately 90 to 100 million years ago. While internally unfaulted and considered structurally stable, the Perris Block is bounded on the west by the Elsinore Fault zone and on the east by the San Jacinto Fault zone. Rocks in the region of the site consist of Cretaceous-age Quartz Diorite, as mapped by Dibblee (2003). Small outcrops of the granitic bedrock are visible on the site, and larger outcrops are visible in the hills to the northeast.

Locally, the site is located between the Menifee Valley to the west and Domenigoni Valley to the east, which are characterized by stratified sequences of moderately consolidated alluvial sand, silt and clay.

The subject site is underlain by well-consolidated clayey sand alluvium, which is underlain at depth by quartz diorite bedrock. Outcrops of the bedrock that have been weathered to low relief are exposed in the southwest corner of the property. The earth materials encountered in our investigation are described below.

2.02 Earth Materials

Topsoil/Disturbed Native Soil (Af)

Tilled agricultural topsoil was exposed in all borings and test pits to a depth of approximately 2-3 feet below existing ground surface. The topsoil consists of light brown, silty fine sand that contains small quantities of organics from fertilization. The maximum depth of topsoil/fill encountered onsite was 3 feet.

Native Alluvial Soil (Qal)

Native soil, exposed in all 4 test pits and 5 exploratory borings excavated by RMA Geoscience, as well as the 26 test pits and 19 borings excavated by previous consultants, consists of reddish brown to dark brown, clayey fine to medium sand that is in a moist to damp and dense to very dense condition, and grades to coarser material at depth. Minor porosity was observed in more clayey materials. Maximum depth of soil encountered during our investigation was 21 feet, and maximum depth documented in reports by previous consultants is 50 feet (GeoCon, 2005).

Quartz Diorite (Kdvg)

Bedrock was not encountered in our test pits or borings, but is exposed at the surface in the southwest corner of the site, and highly weathered bedrock is documented at a depth of 35 feet in boring B-5 by EcoTech (2004). The bedrock consists of light gray to whitish gray, medium-grained quartz diorite. The rock is mostly massive with some minor fracturing on the exposed face, and was slowly excavated by a backhoe with considerable difficulty. Removal of the bedrock will likely require heavy construction equipment.

The earth materials encountered in the exploratory test pits excavated at the site are described in greater detail on the logs contained in Appendix A.

2.03 Expansive Soils

Based on our laboratory data the earth materials exposed in the exploratory borings have a very low expansion potential, however some medium expansion (EI>50) soils may be encountered at completion of grading. We recommended that as grading progresses, each building pad be evaluated for its expansive potential. We should re-evaluate the foundation design parameters thereafter.

2.04 Surface and Groundwater Conditions

No groundwater was encountered in any of the test pits that were excavated at the site to a maximum depth of 9 feet below existing grade or the borings that were excavated to 21 feet below existing grade. No groundwater was encountered by previous consultants in borings excavated to 50 feet below existing grade (2004). No springs or seeps were observed on site at the time of our investigation.

2.05 Faults

The proposed site is not located within an Alquist-Priolo Earthquake Fault Zone, and there are no known active faults that traverse the property. However, there are faults in close enough proximity to the site to cause moderate to intense ground shaking during the lifetime of the proposed development. Additionally, the site has experienced earthquake-induced ground shaking in the past and can be expected to experience further shaking in the future. Regional faults in the vicinity of the site that are capable of producing a moment magnitude exceeding 6.0 are listed in the following table.

Fault Name	Approximate Distance (km)	Source Type (A,B,C)	Maximum Magnitude (Mw)	Slip Rate (mm/yr)	Fault Type (SS, DS, BT)
Elsinore-Temecula	16.9	B	6.8	5.00	SS
San Jacinto -San Jacinto Valley	18.8	B	6.9	12.00	SS
San Jacinto-Anza	20.0	A	7.2	12.00	SS
Elsinore-Glen Ivy	21.7	B	6.8	5.00	SS
Elsinore-Julian	33.7	A	7.1	5.00	SS
San Jacinto -San Bernardino	40.4	B	6.7	12.00	SS
San Andreas	44.2	A	7.4	24.00	SS

2.06 Flooding Potential

According to Federal Emergency Management Agency (Flood Insurance Rate Map #06065C2090G), the site is located in an area of Flood Zone X, which is an area where the likelihood of flood hazards is considered minimal.

2.07 Liquefaction

The site is located in an area that has not been evaluated by the California Geological Survey for liquefaction hazard. Due to the dense, cohesive soils underlying the site and lack of groundwater encountered to at least 50 feet below ground surface, liquefaction potential is considered minimal.

2.08 Landslides

The site is located in an area that has not been evaluated by the California Geological Survey for landslide hazards. Evidence of landsliding was not encountered during our subsurface investigation. Due to the flat relief of the site, the potential for landsliding is considered minimal.

2.09 Infiltration Testing

Four (4) field soil infiltration tests were performed in the test pits excavated at the four corners of the proposed residential development, using the Double-Ring Infiltrometer method (ASTM Test Method D 3385). The locations of the field infiltration tests are shown on Plate 1.

The infiltrometer equipment consisted of two graduated plastic cylinders, two aluminum rings, Mariotte tubes, shutoff values, and plastic tubing to connect the cylinders and aluminum rings. The cylinders were connected to special supports to prevent tipping and to maintain proper height. The aluminum rings were 12 and 24 inches in diameter and 20 inches high. The Mariotte tubes were used to maintain a constant water level in the aluminum rings. Infiltration rate of water during the test was determined by monitoring volume changes in the calibrated cylinders. Testing was continued until a relatively uniform infiltration rate was obtained.

The infiltration tests were conducted in alluvial soils at a depth of approximately 8-9 feet below the existing ground surface. Soils at test locations consisted very dense, clayey to silty sand.

The testing yielded the following final infiltration rates:

Location	Infiltration Rate (inches/hour)
TP-1	0.03
TP-2	0.04
TP-3	0.03
TP-4	0.04

Field infiltration test result sheets are included in Appendix A.

3.00 Conclusions and Recommendations

3.01 General Conclusion

Based on specific data and information contained in this report, our understanding of the project and our general experience in engineering geology and geotechnical engineering, it is our professional judgment that the proposed development is geologically and geotechnically feasible. This is provided that the recommendations presented below are fully implemented during design, grading and construction.

The undisturbed native soil described in section 2.02 is suitable for support of structural fill, provided that all topsoil and disturbed native soils are removed to at least one foot into the undisturbed native soil prior to placement of compacted fill, or a minimum of two feet below planned footings, whichever is greater.

3.02 General Earthwork and Grading

All earthwork and grading should be performed in accordance with Section 3.03 of this report, County of Riverside requirements, and all applicable governmental agency requirements. It should be noted that all references to maximum dry density, optimum moisture content, and relative compaction are based on ASTM D 1557 laboratory test procedures. Recommendations contained in Appendix C are general specifications for typical grading projects and may not be entirely applicable to this project.

3.03 Earthwork Shrinkage and Subsidence

Shrinkage is the decrease in volume of soil upon removal and recompaction expressed as a percentage of the original in-place volume. Subsidence occurs as natural ground is densified to receive fill. These factors account for changes in earth volumes that will occur during grading. Our estimates are as follows:

- Shrinkage factor = 10% to 12% for soil removed and replaced as compacted fill.
- Subsidence factor = 0.1 foot.

The degree to which fill soils are compacted and variations in the in-situ density of existing soils will influence earth volume changes. Consequently, some adjustments in grades near the completion of grading could be required to balance the earthwork.

3.04 Removal Recommendations

In areas where grading is planned all topsoil and disturbed native soil should be removed, as well as the upper one (1) foot of undisturbed native soil, or to two (2) feet below the bottom of planned footings, whichever is greater. Based on the information obtained during our investigation, these removals can be expected to extend to approximately four (4) feet below existing grade. Overexcavation should extend a minimum of five (5) feet outside the limits of proposed foundations. Materials that are removed are suitable for reuse as compacted fill as long as they are processed in accordance with the grading guidelines present in this report.

All vegetation, trash and debris should be cleared from the grading area and removed from the site. Tree stumps, branches and roots will need to be hauled from the site and may not be placed in fills. In addition, any other soils indentified to contain chemical contamination should not be used for compacted fill unless such use is approved by environmental studies.

Following the over-excavation indicated above, a designated representative for the Project Geotechnical Engineer must review the exposed ground surface and determine if any additional over-excavation is required. The over-excavated ground surface in all areas determined to be satisfactory for the support of fills must be scarified to a minimum depth of 12 inches. The moisture content of the scarified zone shall be adjusted to within 2% of the optimum moisture content. The scarified zone must then be uniformly compacted to at least 90% relative compaction. Removed and/or over-excavated soils may be moisture-conditioned and re-compacted as engineered fill. Fill material should be placed in nearly horizontal layers, uniformly moisture conditioned to within 2% of optimum moisture content, and then compacted in layers that do not exceed approximately 6 inches in thickness.

All concrete flatwork and paved areas shall be underlain by a minimum of 12 inches of soil compacted to a minimum of 90% relative compaction (ASTM: D1557). The exposed soils beneath all over-excavations should be scarified an additional 12 inches, moisture conditioned and compacted to a minimum of 90% relative compaction

(ASTM: D1557).

3.05 Slopes

All fill and cut slopes should be constructed at inclinations of 2 horizontal to 1 vertical or flatter.

3.06 Seismic Design Parameters

Seismic design parameters have been developed in accordance with Section 1613 of the 2016 California Building Code (CBC) using the online U.S. Geological Survey Seismic Design Maps Calculator (Version 3.1.0, ASCE 7-10 Standard) and a site location based on latitude and longitude. The calculator generates probabilistic and deterministic maximum considered earthquake spectral parameters represented by a 5-percent damped acceleration response spectrum having a 2-percent probability of exceedance in 50 years. The deterministic response accelerations are calculated as 150 percent of the largest median 5-percent damped spectral response acceleration computed on active faults within a region, where the deterministic values govern. The calculator does not, however, produce separate probabilistic and deterministic results. The parameters generated for the subject site are presented as follows:

2016 California Building Code (CBC) Seismic Parameters

Parameter	Value
Site Location	Latitude = 33.6671 degrees Longitude = -117.1151 degrees
Site Class	Site Class = D Soil Profile Name: Stiff Alluvial Soil
Mapped Spectral Accelerations (Site Class B)	S_s (0.2- second period) = 1.500g S_1 (1-second period) = 0.600g
Site Coefficients (Site Class D)	F_a = 1.0 F_v = 1.5
Maximum Considered Earthquake Spectral Accelerations (Site Class D)	S_{MS} (0.2- second period) = 1.500g S_{M1} (1-second period) = 0.900g
Design Earthquake Spectral Accelerations (Site Class D)	S_{DS} (0.2- second period) = 1.000g S_{D1} (1-second period) = 0.600g

The above table shows that the mapped spectral response acceleration parameter for a 1-second period (S_1) is less than 0.75g. Therefore, for Occupancy Category II the Seismic Design Category is D (CBC Table 1604.5 and Section 1613.5.6). Consequently, as required for Seismic Design Categories C through F by CBC Section 1803.5.11, slope instability, liquefaction, total and differential settlement and surface displacement due to faulting or seismically induced flooding have been evaluated (see Section 3.10).

Peak earthquake ground acceleration adjusted for site class effects (PGA_M) has been determine in accordance with ASCE 7-10 Section 11.8.3 as follows: $PGA_M = F_{PGA} \times PGA = 1.0 \times 0.500 = 0.5g$.

3.07 Liquefaction and Secondary Earthquake Hazards

Potential secondary seismic hazards that can affect land development project include liquefaction, tsunamis, seiches, seismically induced settlement, seismically induced flooding and seismically induced landsliding.

Liquefaction

Liquefaction is a phenomenon where earthquake-induced ground vibrations increase the pore pressure in saturated, granular soils until it is equal to the confining, overburden pressure. When this occurs, the soil can completely lose its shear strength and enter a liquefied state. In order for liquefaction to occur, three criteria must be met: underlying loose, coarse-grained (sandy) soils, a groundwater depth of less than about 50 feet, and a potential for seismic shaking from nearby large-magnitude earthquake. The site is underlain by dense to very dense, cohesive alluvial soils with groundwater depth greater than 50 feet below ground surface; therefore, the risk of liquefaction occurring during a design seismic event is considered very low.

Tsunamis and Seiches

Tsunamis are sea waves that are generated in response to large-magnitude earthquakes. When these waves reach shorelines, they sometimes produce coastal flooding. Seiches are the oscillation of large bodies of standing water, such as lakes, that can occur in response to ground shaking. Tsunamis do not pose hazards due to the inland location of the site. According to the County of Riverside Safety Element of the General Plan the site is not located in a special flood hazard area, therefore seiches do not pose a hazard to the subject site.

Seismically Induced Settlement

Seismically induced settlement occurs most frequently in areas underlain by loose, granular sediments. Damage as a result of seismically induced settlement is most dramatic when differential settlement occurs in areas with large variations in the thickness of underlying sediments. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement. Since the site is underlain by dense, cohesive alluvial soils, seismically induced settlement is considered a minimal design concern during a design seismic event.

Seismically Induced Flooding

According to the Safety Element of the County of Riverside General Plan, the site lies within a dam hazard zone due to its proximity to Diamond Valley Lake. Consequently seismically induced flooding at the site is considered a potential hazard.

Seismically Induced Landsliding

Based on the fact that there are no existing slopes on or near the site, and the site is underlain by dense, cohesive alluvial soil, seismically induced landsliding is not considered a concern with respect to the subject site.

3.08 Foundations

Isolated spread footings and/or continuous wall footings are recommended to support the proposed single-family residences. If the planned footings are established in engineered fill with low expansion index (EI<50), footings may be designed using the following allowable soil bearing values:

- Continuous Footings:

Footings having a minimum width of 12 inches and 15 inches for one- and two-stories, respectively, and a minimum depth of 15 inches and 18 inches for one- and two-stories, respectively, below the lowest adjacent grades have an allowable bearing capacity of 2,000 pounds per square foot (psf) for engineered fill.

- Isolated Spread Footings:

  Footings having a minimum width of 24 inches and a minimum depth of 18 inches below the lowest adjacent grade have an allowable bearing capacity of 2,000 pounds per square foot (psf) for engineered fill.

- Retaining Wall Footings:

  Footings for retaining walls should be founded in compacted fill or dense alluvial soils at a minimum depth of 15 inches and have a minimum width of 12 inches. Footings may be designed using the allowable bearing capacity and lateral resistance values recommended for continuous footings. However, when calculating passive resistance, the upper 6 inches of the footings should be ignored in areas where the footings will not be covered with concrete flatwork or asphalt pavement.

The above bearing capacities represent an allowable net increase in soil pressure over existing soil pressure and may be increased by one-third for short-term wind or seismic loads. The maximum expected settlement of footings designed with the recommended allowable bearing capacity is expected to be on the order of ½ inch with differential settlement on the order of ¼ inch across a 30 foot span.

Soils at the site are generally granular with a very low expansion potential. Therefore, reinforcement of footings for expansive soil is not required. However, in view of the seismic setting, a nominal reinforcement consisting of one #4 bar placed within 3 inches of the top of footings and another placed within 3 inches of the bottom of footings is recommended. The structural engineer may require heavier reinforcement.

All footing excavations should be observed by the geotechnical consultant to verify that they have been excavated into competent soils. The foundation excavations should be observed prior to the placement of forms, reinforcement steel, or concrete. These excavations should be evenly trimmed and level. Prior to concrete placement, any loose or soft soils should be removed. Excavated soils should not be placed in slab or footing areas unless properly compacted.

Footings may experience an overall loss in bearing capacity or an increased potential to settle where located in close proximity to existing or future utility trenches. Furthermore, stresses imposed by the footings on the utility lines may cause cracking, collapse and/or a loss of serviceability. To reduce this risk, footings should extend below a 1:1 plane projected upward from the closest bottom corner of the trench.

3.09 Lateral Load Resistance

Lateral loads may be resisted by soil friction and the passive resistance of the soil. The following parameters are recommended.

- Allowable Passive Earth Pressure = 250 pcf (equivalent fluid weight).
- Allowable Coefficient of Friction (soil to footing) = 0.3
- Retaining structures should be designed to resist the following lateral active earth pressures:

Surface Slope of Retained Materials (Horizontal:Vertical)	Equivalent Fluid Weight (pcf)
Level	37
5:1	39
4:1	40
3:1	42
2:1	52

These active earth pressures are only applicable if the retained earth is allowed to strain sufficiently to achieve the active state. The required minimum horizontal strain to achieve the active state is approximately 0.0025H. Retaining structures should be designed to resist an at-rest lateral earth pressure if this horizontal strain cannot be achieved.

- At-rest Lateral Earth Pressure for level backfill = 58 pcf (equivalent fluid weight)

The Mononobe-Okabe method is commonly utilized for determining seismically induced active and passive lateral earth pressures and is based on the limit equilibrium Coulomb theory for static stress conditions. This method entails three fundamental assumptions (e.g., Seed and Whitman, 1970): Wall movement is sufficient to ensure either active or passive conditions, the driving soil wedge inducing the lateral earth pressures is formed by a planar failure surface starting at the heel of the wall and extending to the free surface of the backfill, and the driving soil wedge and the retaining structure act as rigid bodies, and therefore, experiences uniform accelerations throughout the respective bodies (U.S. Army Corps of Engineers, 2003, Engineering and Design - Stability Analysis of Concrete Structures).

- Seismic Lateral Earth Pressure for level backfill = 20 pcf (equivalent fluid weight).

The seismic lateral earth pressure given above is an inverted triangle, and the resultant of this pressure is an increment of force which should be applied to the back of the wall at 2/3 of the wall height and also applied as a reduction of force to the front of the wall in the upper 1/3 of the footing depth. Per CBC Section 1803.5.12 dynamic seismic lateral earth pressures shall be applied to foundation walls and retaining walls supporting more than 6 feet of backfill. Dynamic seismic lateral earth pressures may also be applied to shorter walls at the discretion of the structural engineer. The dynamic seismic lateral earth pressure will act in addition to the static active earth pressure given above.

3.10 Interior Slabs on Grade

We recommend the use of non-structural slab-on-grade floors for structures supported on properly compacted fill placed in accordance with the recommendations contained in this report. These floor slabs should have a minimum thickness of 4 inches and should be divided into squares or rectangles using weakened plane joints (contraction joints), each with maximum dimensions not exceeding 15 feet. Contraction joints should be made in accordance with American Concrete Institute (ACI) guidelines. Slab-on-grade floors should be reinforced with at least the reinforcement required to control cracking due to shrinkage and temperature stresses or with a minimum of 6x6-10/10 welded wire fabric placed at mid- height of the slab. Due to the difficulty of installing and maintaining welded wire fabric in the middle of concrete slabs-on- grade during construction, consideration should be given to using steel reinforcement consisting of steel rebar (i.e. No. 3 bars) placed 24 inches on-center in both directions in lieu of welded wire fabric.

Special care should be taken on floors slabs to be covered with thin-set tile or other inflexible coverings. Alternatively, inflexible flooring may be installed with unbonded fabric or liners to prevent reflection of slab cracks through the flooring.

A moisture vapor retarder/barrier is recommended beneath all slab-on-grade floors that will be covered by moisture- sensitive flooring materials such as vinyl, linoleum, wood, carpet, rubber, rubber-backed carpet, tile, impermeable floor coatings, adhesives, or where moisture-sensitive equipment, products, or environments will exist. We recommend that design and construction of the vapor retarder or barrier conform to the 2016 California Building Code (CBC) and pertinent sections of American Concrete Institute (ACI) guidance documents 302.1R-04, 302.2R-06 and 360R-10.

The moisture vapor retarder/barrier should be designed by the Project Architect or Structural Engineer, but at a minimum should consist of a 10 mils thick polyethylene with a maximum perm rating of 0.3 in accordance with ASTM E 1745. Seams in the moisture vapor retarder/barrier should be overlapped no less than 6 inches or in accordance with the manufacturer’s recommendations. Joints and penetrations should be sealed with the manufacturer’s recommended adhesives, pressure-sensitive tape, or both. The contractor must avoid damaging or puncturing the vapor retarder/barrier and repair any punctures with additional polyethylene properly lapped and sealed.

ACI guidelines allow for the placement of the moisture vapor retarder/barrier either directly beneath floor slabs or below an intermediate granular soil layer. Placing the moisture retarder/barrier directly beneath the floor slab will eliminate potential problems caused by water being trapped in a granular fill layer. Concrete slabs poured directly on a vapor retarder/barrier, however, can experience increased shrinkage cracking and curling due to differential rates of curing through the thickness of the slab. Therefore, for concrete placed directly on the vapor retarder, we recommend a maximum water cement ratio of 0.45 and the use of water-reducing admixtures to increase workability and decrease bleeding. Full depth construction joints and control joints should be provided to control cracking and slab thickness and reinforcement as recommended by the Structural Engineer to resist the effects of curling.

If granular soil is placed over the vapor retarder/barrier, we recommend that the layer be at least 2 inches thick in accordance with traditional practice in southern California. Granular fill should consist of clean fine graded materials with 10 to 30% passing the No. 100 sieve and free from clay or silt. The granular layer should be uniformly compacted and trimmed to provide the full design thickness of the proposed slab. The granular fill layer should not be left exposed to rain or other sources of water such as wet-grinding, power washing, pipe leaks or other processes, and should be dry at the time of concrete placement. Granular fill layers that become saturated should be removed and replaced prior to concrete placement.

An additional layer of sand may be placed beneath the vapor retarder/barrier at the developer’s discretion to minimize the potential of the retarder/barrier being punctured by underlying soils.

Prior to the placement of the moisture barrier and sand, the subgrade soils underlying the slab should be observed by the geotechnical consultant to verify that all under-slab utility trenches have been properly backfilled and compacted, that no loose or soft soils are present, and that the slab subgrade has been properly compacted to a minimum of 90 percent relative compaction within the upper 12 inches.

3.11 Miscellaneous Concrete Flatwork

Miscellaneous concrete flatwork and walkways should be designed with a minimum thickness of 4 inches. Large slabs should be reinforced with a minimum of #4 rebar placed 24 inches on-center in both directions. The reinforcement must be placed at mid-height in the slab. Control joints should be constructed to create squares or rectangles with a maximum spacing of 12 feet. Walkways should be separated from foundations with a thick expansion joint filler. Control joints should be constructed into non-reinforced walkways at a maximum of 5 feet spacing. The Project Civil Engineer should provide design details and specifications for all exterior concrete flatwork including the thickness of slabs, required reinforcement, and joint spacing.

Concrete driveways and any other concrete flatwork that will be subject to vehicular traffic, should be at least 5 inches thick and reinforced with at least #4 rebar placed 18” on-center in both directions in the middle of the slab. These slabs should be underlain by at least 8 inches of Class 2 Aggregate Base compacted to a relative compaction of at least 95 percent. The location and spacing of construction and contraction joints should also be determined by the Project Civil Engineer.

The subgrade soils beneath all miscellaneous concrete flatwork should be moisture conditioned and compacted in accordance with Section 3.3 of this report.

3.12 Cement Type and Corrosion Potential

Soluble sulfate tests indicate the on-site soils have a sulfate in water concentration of 0.02% by weight. These results indicate that concrete at the subject site will have a negligible exposure to water-soluble sulfate in the soil. Our preliminary recommendations for concrete exposed to sulfate-containing soils are presented in the table below.

RECOMMENDATIONS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOILS

Sulfate Exposure	Water Soluble Sulfate (SO_4) in Soil (% by Weight)	Sulfate (SO_4) in Water (ppm)	Cement Type (ASTM C150)	Maximum Water-Cement Ratio (by Weight)	Minimum Compressive Strength (psi)
Negligible	0.00 - 0.10	0-150	--	--	2,500
Moderate	0.10 - 0.20	150-1,500	II	0.50	4,000
Severe	0.20 - 2.00	1,500-10,000	V	0.45	4,500
Very Severe	Over 2.00	Over 10,000	V plus pozzolan or slag	0.45	4,500

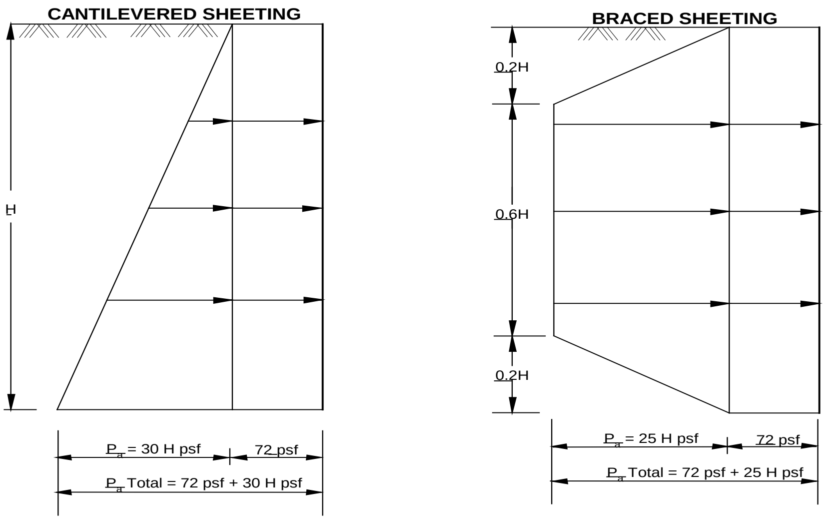
Use of alternate combinations of cementitious materials may be permitted if the combinations meet design recommendations contained in American Concrete Institute guideline ACI 318-11.

The soils were also tested for soil reactivity (pH). The test results indicate that the on-site soils have a soil reactivity (pH) of 7.7 and an electrical resistivity of 1,386 ohm-cm. A neutral or non-corrosive soil has a pH value ranging from 5.5 to 8.4. Generally, soils that could be considered moderately corrosive to ferrous metals have resistivity values of about 3,000 ohm-cm to 10,000 ohm-cm. Soils with resistivity values less than 3,000 ohm-cm can be considered corrosive and soils with resistivity values less than 1,000 ohm-cm can be considered extremely corrosive.

Based on our analysis, it appears that the underlying onsite soils are corrosive to ferrous metals. We recommend that a corrosion design consultant, experienced in the field of corrosion design, provide solutions to mitigate potential for damage to buried metal or ferrous materials that come in contact with the onsite soils.

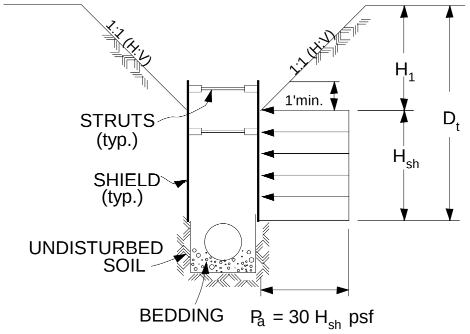
3.13 Temporary Slopes

Excavation of utility trenches will require either temporary sloped excavations or shoring. Sloping and shoring requirements should conform to Cal/OSHA standards for sandy soils. Our recommendations for lateral earth pressures to be used in the design of cantilevered and/or braced shoring are presented below. These values incorporate a uniform lateral pressure of 72 psf to provide for the normal construction loads imposed by vehicles, equipment, materials, and workmen on the surface adjacent to the trench excavation. However, if vehicles, equipment, materials, etc., are kept a minimum distance equal to the height of the excavation away from the edge of the excavation, this surcharge load need not be applied.



SHORING DESIGN: LATERAL SHORING PRESSURES

Design of the shield struts should be based on a value of 0.65 times the indicated pressure, Pa, for the approximate trench depth. The wales and sheeting can be designed for a value of 2/3 the design strut value.



HEIGHT OF SHIELD, H_{sh} = DEPTH OF TRENCH, D_t , MINUS DEPTH OF SLOPE, H_1

TYPICAL SHORING
DETAIL

Placement of the shield may be made after the excavation is completed or driven down as the material is excavated from inside of the shield. If placed after the excavation, some overexcavation may be required to allow for the shield width and advancement of the shield. The shield may be placed at either the top or the bottom of the pipe zone. Due to the anticipated thinness of the shield walls, removal of the shield after construction should have negligible effects on the load factor of pipes. Shields may be successively placed with conventional trenching equipment.

Vehicles, equipment, materials, etc. should be set back away from the edge of temporary excavations a minimum distance of 15 feet from the top edge of the excavation. Surface waters should be diverted away from temporary excavations and prevented from draining over the top of the excavation and down the slope face. During periods of heavy rain, the slope face should be protected with sandbags to prevent drainage over the edge of the slope, and a visqueen liner placed on the slope face to prevent erosion of the slope face.
Periodic observations of the excavations should be made by the geotechnical consultant to verify that the soil conditions have not varied from those anticipated and to monitor the overall condition of the temporary excavations over time. If at any time during construction conditions are encountered which differ from those anticipated, the geotechnical consultant should be contacted and allowed to analyze the field conditions prior to commencing work within the excavation.

Cal/OSHA construction safety orders should be observed during all underground work.

3.14 Utility Trench Backfill

The onsite fill soils will not be suitable for use as pipe bedding for buried utilities. All pipes should be bedded in a sand, gravel or crushed aggregate imported material complying with the requirements of the Standard Specifications for Public Works Construction (Greenbook) Section 306-1.2.1. Crushed rock products that do not contain appreciable fines should not be utilized as pipe bedding and/or backfill. Bedding materials should be densified to at least 90% relative compaction (ASTM D1557). The geotechnical consultant should review and approve of proposed bedding materials prior to use.

The on-site soils are expected to be suitable as trench backfill provided they are screened of organic matter, boulders and cobbles over 6 inches in diameter. Trench backfill should be densified to at least 90% relative compaction (ASTM D1557). On-site granular soils with a sand equivalent value of 15 or greater may be water densified initially per Greenbook Specifications. Supplemental mechanical compaction methods will be required to attain the required 90% relative compaction.

All utility trench backfill within street right of way, utility easements, under or adjacent to sidewalks, driveways, or building pads should be observed and tested by the geotechnical consultant to verify proper compaction. Trenches excavated adjacent to foundations should not extend within the footing influence zone defined as the area within a line projected at a 1:1 drawn from the bottom edge of the footing. Trenches crossing perpendicular to foundations should be excavated and backfilled prior to the construction of the foundations. The excavations should be backfilled in the presence of the geotechnical engineer and tested to verify adequate compaction beneath the proposed footing. Cal/OSHA construction safety orders should be observed during all underground work.

3.15 Preliminary Pavement Sections

Based on the soil encountered during our geotechnical exploration, we estimate that the R-value is 30. Structural sections were designed using the procedures outlined in Chapter 630 of the California Highway Design Manual (Caltrans, 2008). This procedure uses the principle that the pavement structural section must be of adequate thickness to distribute the load from the design Traffic Index (TI) to the subgrade soils in such a manner that the stresses from the applied loads do not exceed the strength of the soil (R- value). : Recommended structural sections are as follows:

- Local Streets/Cul-De-Sac (TI=4.0, R-Value=30):
  3 inches of asphaltic concrete over
  4 inches of crushed aggregate or miscellaneous base*

- Residential Streets (TI=5.0, R-Value=30):
  3 inches of asphaltic concrete over
  6 inches of crushed aggregate or miscellaneous base*

- Residential Collector (TI=6.0, R-Value=30):
  4 inches of asphaltic concrete over
  7 inches of crushed aggregate or miscellaneous base*

- Minor Arterial Streets (TI=8.0, R-Value=30):
  5 inches of asphaltic concrete over
  11 inches of crushed aggregate or miscellaneous base*

*Recommended minimum thickness of aggregate or miscellaneous base.

Portland cement concrete (PCC) pavements for areas which are not subject to traffic loads may be designed with a minimum thickness of 4.0 inches of Portland cement concrete on compacted native soils. If traffic loads are anticipated, PCC pavements should be designed for a minimum thickness of 6.0 inches of Portland cement concrete on 4.0 inches of crushed aggregate or miscellaneous base.

Prior to paving, the subgrade should be prepared in accordance with this report. At a minimum, the upper 12 inches of subgrade soils should be at or above optimum moisture content and compacted to a minimum of 95% relative compaction. All aggregate base courses should also be moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% relative compaction.

R-value tests should be performed at the completion of grading and final pavement section design developed at that time.

3.16 Drainage and Moisture Proofing

Surface drainage should be directed away from the proposed structures into suitable drainage devices. Neither excess irrigation nor rainwater should be allowed to collect or pond against building foundations. Surface waters should be diverted away from the tops of slopes and prevented from draining over the top of slopes and down the slope face.

Retaining structures should be drained to prevent the accumulation of subsurface water behind the walls. Backdrains should be installed behind all retaining walls exceeding 3 feet in height. All backdrains should outlet to suitable drainage devices. Retaining wall less than 3 feet in height should be provided with backdrains or weep holes. Dampproofing and/or waterproofing should also be provided on all retaining walls.

3.17 Geotechnical Observations

All footing excavations should be observed by the geotechnical consultant to verify that they have been excavated into competent earth materials. The foundation excavations should be observed prior to the placement of forms, reinforcement steel, or concrete. These excavations should be evenly trimmed and level. Prior to concrete placement, any loose or soft soils should be removed. Excavated soils should not be placed on slab or footing areas unless properly compacted.

Prior to the placement of the moisture barrier and sand, the subgrade soils underlying the slab should be observed by the geotechnical consultant to verify that all under-slab utility trenches have been properly backfilled and compacted, that no loose or soft soils are present, and that the slab subgrade has been properly compacted to a minimum of 90 percent relative compaction within the upper 12 inches.

Footings may experience an overall loss in bearing capacity or an increased potential to settle where located in close proximity to existing or future utility trenches. Furthermore, stresses imposed by the footings on the utility lines may cause cracking, collapse and/or a loss of serviceability. To reduce this risk, footings should extend below a 1:1 plane projected upward from the closest bottom of the trench.

Slabs on grade and walkways should be brought to a minimum of 2% and a maximum of 6% above their optimum moisture content for a depth of 18 inches prior to the placement of concrete. The geotechnical consultant should perform insitu moisture tests to verify that the appropriate moisture content has been achieved a maximum of 24 hours prior to the placement of concrete or moisture barriers.

Placement of planned retaining wall backdrains should be observed prior to backfilling.

3.18 Plan Review

Once formal foundation plans are prepared for the subject property, this office should review the plans from a geotechnical viewpoint, comment on changes from the plan used during preparation of this report and revise the recommendations of this report where necessary.

3.19 Onsite Stormwater Disposal

Due to the very low rate of infiltration, it is our opinion that onsite stormwater disposal is not a feasible option at the planned depths. We recommend use of a soil infiltration rate of 0.03 cm/hr (0.01 in/hr) for design of the storm water system, which includes the minimum factor of safety correction required by the Riverside County Flood Control and Water Conservation District.

Design Infiltration Rate $I_D = I_M/(CF) = (0.03 \text{ in/hr})/(3) = 0.01 \text{ in/hr}$

The purpose of the factor of safety is to account for degradation of soil conditions by fine grained materials carried by runoff and other similar conditions that can occur during storms or between periods of maintenance. As a minimum, the factor of safety and design of the infiltration system should follow procedures in the current Riverside County Design Handbook for Low Impact Development Best Management Practices. Homeowners and the Homeowner's Association (HOA) should be notified of all required maintenance procedures for the pretreatment system in order to minimize the possibility of siltation and reduced infiltration rate.

Compaction of soil below the proposed storm water infiltration system could significantly lower infiltration rates and could make the tested rate inapplicable. Compaction of soil below the infiltration system could destroy soil structure and thus seriously impact the infiltration system's performance. Proper oversight is needed during construction to ensure that natural soils at the bottom of the infiltration system are not compacted and that the stormwater system excavation does not deviate from the proposed design depth. If the bottom of the stormwater system excavation is deeper than the design depth, the geotechnical engineer should be immediately contacted to provide additional recommendations. Loose fill soil should not be placed above naturally occurring soils at the bottom of the storm water system excavation, as saturation of such soils could result in settlement that might adversely impact the storm water system and overlying improvements.

It should be noted that intentional discharge of storm water into the soil underlying a development can lead to a variety of geotechnical distress issues. Saturation of the underlying soils can lead to loss of structural support, causing movement of foundations and other improvements due to settlement, collapse, internal erosion, expansion, or any other potential processes.

4.00 Closure

The findings, conclusions and recommendations in this report were prepared in accordance with generally accepted engineering and geologic principles and practices. No other warranty, either expressed or implied, is made. This report has been prepared for Sun Holland, LLC to be used solely for design purposes. Anyone using this report for any other purpose must draw their own conclusions regarding required construction procedures and subsurface conditions.

The geotechnical and geologic consultant should be retained during the earthwork and foundation phases of construction to monitor compliance with the design concepts and recommendations and to provide additional recommendations as needed. Should subsurface conditions be encountered during construction that are different from those described in this report, this office should be notified immediately so that our recommendations may be re-evaluated.

FIGURES

Google Maps 33°40'01.6"N 117°06'54.4"W

Imagery ©2017 Google, Map data ©2017 Google 1000 ft

Figure 1

RMA GeoScience

Site Location Map

Tentative Tract 37439

RMA Job No:	17H-0307-0
Date:	March,2018
Prepared By:	AEG

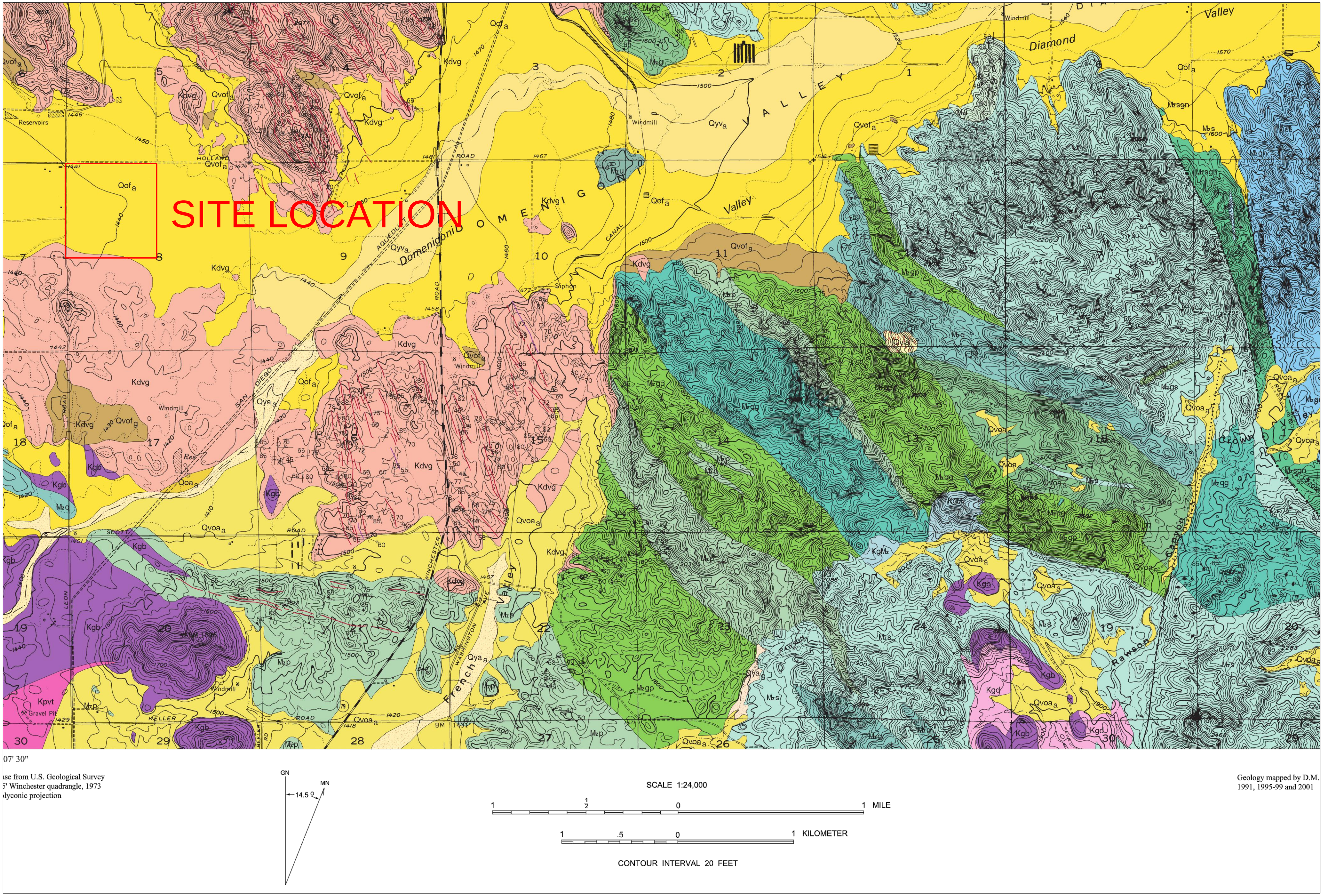


Figure 2

RMA GeoScience

Regional Geologic Map

Tentative Tract 37439

RMA Job No:	17H-0307-0
Date:	March,2018
Prepared By:	AEG

APPENDIX A

FIELD INVESTIGATION

APPENDIX A

FIELD INVESTIGATION

A-1.00 FIELD EXPLORATION

A-1.01 Number of Test Pits

Our subsurface investigation consisted of the excavation of four (4) backhoe-excavated test pits, and five (5) hollow-stem auger borings.

A-1.02 Location of Test Pits

The approximate locations of the Test Pits and Exploratory borings are presented as Plate 1 and Plate 2, Boring and Test Pit Location Map 1 and 2.

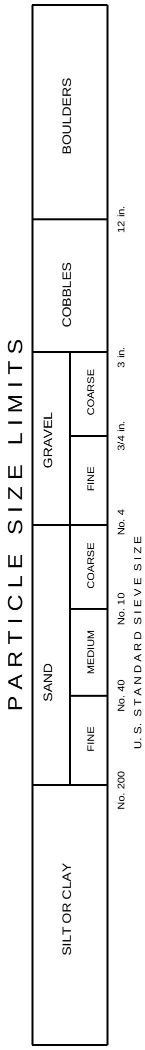
A-1.03 Test Pit Logging

Logs of test pits were prepared by one of our staff and are attached in this appendix. The logs contain factual information and interpretation of subsurface conditions between samples. The strata indicated on these logs represent the approximate boundary between earth units and the transition may be gradual. The logs show subsurface conditions at the dates and locations indicated, and may not be representative of subsurface conditions at other locations and times.

Identification of the soils encountered during the subsurface exploration was made using the field identification procedure of the Unified Soils Classification System (ASTM D2488). A legend indicating the symbols and definitions used in this classification system and a legend defining the terms used in describing the relative compaction, consistency or firmness of the soil are attached in this appendix. Bag samples of the major earth units were obtained for laboratory inspection and testing, and the in-place density of the various strata encountered in the exploration was determined.

A-1.04 Field Infiltration Testing

Four (4) field soil infiltration tests were performed in the test pits excavated at the four corners of the proposed residential development, using the Double-Ring Infiltrometer method (ASTM Test Method D 3385). The results of our infiltration testing are included in this appendix. The locations of the field infiltration tests are shown on Plate 1.



MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravel, gravel-sand mixtures. little or no fines.
			GP	Poorly graded gravel or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	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
			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 AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatamaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

UNIFIED SOIL CLASSIFICATION SYSTEM

I. SOIL STRENGTH/DENSITY

BASED ON STANDARD PENETRATION TESTS

Compactness of sand		Consistency of clay	
Penetration Resistance N (blows/Ft)	Compactness	Penetration Resistance N (blows/ft)	Consistency
0-4	Very Loose	<2	Very Soft
4-10	Loose	2-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff
		>30	Hard

N = Number of blows of 140 lb. weight falling 30 in. to drive 2-in OD sampler 1 ft.

BASED ON RELATIVE COMPACTION

Compactness of sand		Consistency of clay	
% Compaction	Compactness	% Compaction	Consistency
<75	Loose	<80	Soft
75-83	Medium Dense	80-85	Medium Stiff
83-90	Dense	85-90	Stiff
>90	Very Dense	>90	Very Stiff

II. SOIL MOISTURE

Moisture of sands		Moisture of clays	
% Moisture	Description	% Moisture	Description
<5%	Dry	<12%	Dry
5-12%	Moist	12-20%	Moist
>12%	Very Moist	>20%	Very Moist, wet

BORING AND TEST PIT LOGS

RMA GeoScience

9854 Glenoaks Blvd., Sun Valley, CA 91352

BORING NUMBER B-1

PAGE 1 OF 1

CLIENT: Sun Holland, LLC

PROJECT NAME: Canterwood

PROJECT NUMBER: 17H-0307-0/01

PROJECT LOCATION: Tract 37439, Riverside County, CA

DATE STARTED: 9-27-17

COMPLETED: 9-27-17

GROUND ELEVATION:

BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow-stem Auger

GROUND WATER LEVELS:

DRILLING CONTRACTOR: RMA Geoscience

LOGGED BY: AEG

CHECKED BY: MAS

☒ 2.5" Ring Sample

◫ Standard Split Spoon Sample

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS			MATERIAL DESCRIPTION	<200	D 50	Classification
							LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
0										Topsoil (Af)			
			☒							0-3' Brown, silty fine SAND (damp, soft)			
										Alluvium (Qal)			
5	☒	28/32/14		5.5	113.7	120.0				@5' Brown, silty fine to medium SAND (moist, dense to very dense)	34%		SM
			☒										
10	☒	27/18/17		13.6	120.5	136.9				@10' Reddish brown clayey fine SAND (moist to damp, medium dense to dense)			SC
15	☒	2/6/15		12.3	111.7	125.5				@15' Reddish brown clayey fine SAND (moist to damp, medium dense)			SC
20	☒	3/12/19		16.7	112.3	131.1				@20' Reddish brown, silty fine SAND (moist, medium dense)			SM
25										Total Depth = 21' No Water No Caving Backfilled with Cuttings			
30													

BORING NUMBER B-2

RMA GeoScience
9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC

PROJECT NAME: Canterwood

PROJECT NUMBER: 17H-0307-0/01

PROJECT LOCATION: Tract 37439, Riverside County, CA

DATE STARTED: 9-27-17

COMPLETED: 9-27-17

GROUND ELEVATION:

BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow-stem Auger

GROUND WATER LEVELS:

DRILLING CONTRACTOR: RMA Geoscience

LOGGED BY: AEG

CHECKED BY: MAS

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	MATERIAL DESCRIPTION ☒ 2.5" Ring Sample ◫ Standard Split Spoon Sample	<200	D 50	Classification
0										Topsoil (Af)			
										0-3' Brown, silty fine SAND (damp, soft)			SM
										Alluvium (Qal)			
5	☒	4/18/26		14.6	114.0	130.7				@4' Reddish brown, clayey to silty fine SAND (moist to damp, medium dense to dense)	44%		SM
	☒	7/14/16		11.3	120.8	134.5				@8' Reddish brown, clayey fine SAND (moist, medium dense to dense)			SC
10													
	☒	2/11/13		13.1	116.9	132.2				@13' Reddish brown, clayey fine SAND (moist, medium dense)			SC
15										Total Depth = 15' No Water No Caving Backfilled with Cuttings			
20													
25													
30													

BORING NUMBER B-3

PAGE 1 OF 1

RMA GeoScience
9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC
PROJECT NAME: Canterwood
PROJECT NUMBER: 17H-0307-0/01
PROJECT LOCATION: Tract 37439, Riverside County, CA
DATE STARTED: 9-27-17
COMPLETED: 9-27-17
GROUND ELEVATION:
BORING DIAMETER: 8"
EXCAVATION METHOD: 8" Hollow-stem Auger
GROUND WATER LEVELS:
DRILLING CONTRACTOR: RMA Geoscience
LOGGED BY: AEG
CHECKED BY: MAS

☒ 2.5" Ring Sample
◫ Standard Split Spoon Sample

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	MATERIAL DESCRIPTION	<200	D 50	Classification
0										Topsoil (Af) 0-3' Light brown, silty fine SAND (slightly moist, soft to medium dense)			SM
5	☒	7/13/19		12.2	115.8	129.9				Alluvium (Qal) @5' Reddish brown, clayey fine SAND (moist, medium dense to dense)			SC
10	☒	4/12/20	☒	10.9	112.8	125.1				@10' Reddish brown, clayey fine SAND (moist, medium dense to dense)			SC
15	☒	1/7/20		12.2	115.5	129.6				@15' Reddish brown, silty fine to medium SAND with clay (slightly moist, medium dense)			SM
										Total Depth = 16' No Water No Caving Backfilled with Cuttings			
20													
25													
30													

BORING NUMBER B-4

PAGE 1 OF 1

RMA GeoScience

9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC

PROJECT NAME: Canterwood

PROJECT NUMBER: 17H-0307-0/01

PROJECT LOCATION: Tract 37439, Riverside County, CA

DATE STARTED: 9-27-17

COMPLETED: 9-27-17

GROUND ELEVATION:

BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow-stem Auger

GROUND WATER LEVELS:

DRILLING CONTRACTOR: RMA Geoscience

LOGGED BY: AEG

CHECKED BY: MAS

☒ 2.5" Ring Sample

◫ Standard Split Spoon Sample

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS			MATERIAL DESCRIPTION	<200	D 50	Classification
							LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
0										Topsoil (Af)			
	☒	16/40/31		9.6	122.6	134.3				0-2' Light brown, silty fine SAND (slightly moist, soft to medium dense)			SM
										Alluvium (Qal)			
5										@2' Reddish brown, clayey fine to medium SAND (moist, very dense)	48%		SC
	☒	3/17/20		9.3	121.0	132.3				@7' Reddish brown, silty fine SAND with clay (moist, dense)			SC
10													
	☒	10/20/29		13.6	117.3	133.3				@12' Dark reddish brown, clayey fine SAND (moist, dense to very dense)			SC
15										Total Depth = 15' No Water No Caving Backfilled with Cuttings			
20													
25													
30													

BORING NUMBER B-5

PAGE 1 OF 1

RMA GeoScience
9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC

PROJECT NAME: Canterwood

PROJECT NUMBER: 17H-0307-0/01

PROJECT LOCATION: Tract 37439, Riverside County, CA

DATE STARTED: 9-27-17

COMPLETED: 9-27-17

GROUND ELEVATION:

BORING DIAMETER: 8"

EXCAVATION METHOD: 8" Hollow-stem Auger

GROUND WATER LEVELS:

DRILLING CONTRACTOR: RMA Geoscience

LOGGED BY: AEG

CHECKED BY: MAS

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS			MATERIAL DESCRIPTION	<200	D 50	Classification
							LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	☒ 2.5" Ring Sample ◫ Standard Split Spoon Sample			
0										Topsoil (Af) 0-3' Brown, silty fine SAND with clay (slightly moist to moist, medium dense)			SM
5	☒	3/12/20		14.7	112.2	128.7				Alluvium (Qal) @5' Reddish brown, clayey fine SAND (moist, medium dense)			SC
10	☒	12/50=6"		10.1	108.4	119.4				@10' Reddish brown, clayey fine SAND (moist, very dense)			SC
15	☒	3/19/23		13.2	116.5	131.9				@15' Reddish brown, clayey fine to medium SAND (moist, dense)			SC
20													
25													
30													

Total Depth = 16'
No Water
No Caving
Backfilled with Cuttings

TEST PIT NUMBER TP-1

PAGE 1 OF 1

RMA GeoScience

9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC

PROJECT NAME: Canterwood

PROJECT NUMBER: 17H-0307-0/01

PROJECT LOCATION: Tract 37439, Riverside County, CA

DATE STARTED: 9-28-17

COMPLETED: 9-28-17

GROUND ELEVATION:

BORING DIAMETER:

EXCAVATION METHOD: Backhoe

GROUND WATER LEVELS:

DRILLING CONTRACTOR: Williams Backhoe

LOGGED BY: AEG

CHECKED BY: MAS

☒ 2.5" Ring Sample

◫ Standard Split Spoon Sample

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS			MATERIAL DESCRIPTION	<200	D 50	Classification
							LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
0			☒							<u>Topsoil (Af)</u> 0-3' Light brown, silty fine SAND (slightly moist, soft, tilled)			SM
5			☒							<u>Alluvium (Qal)</u> 3-9' Reddish brown, clayey medium SAND (moist, very dense)	51%		SC
10 15 20 25 30										Total Depth = 9' No Water No Caving Backfilled			

TEST PIT NUMBER TP-2

PAGE 1 OF 1

RMA GeoScience
9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC

PROJECT NAME: Canterwood

PROJECT NUMBER: 17H-0307-0/01

PROJECT LOCATION: Tract 37439, Riverside County, CA

DATE STARTED: 9-28-17

COMPLETED: 9-28-17

GROUND ELEVATION:

BORING DIAMETER:

EXCAVATION METHOD: Backhoe

GROUND WATER LEVELS:

DRILLING CONTRACTOR: Williams Backhoe

LOGGED BY: AEG

CHECKED BY: MAS

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS			MATERIAL DESCRIPTION ☒ 2.5" Ring Sample ◫ Standard Split Spoon Sample	<200	D 50	Classification
							LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
0										Artificial Fill (Af) 0-3' Light brown, silty fine SAND (slightly moist, soft, tilled)			SM
5										Alluvium (Qal) 3-8' Reddish brown, clayey fine to medium SAND (moist, very dense)			SC
10 15 20 25 30										Total Depth = 8' No Water No Caving Backfilled			

TEST PIT NUMBER TP-3

PAGE 1 OF 1

RMA GeoScience
9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC
PROJECT NAME: Canterwood
PROJECT NUMBER: 17H-0307-0/01
PROJECT LOCATION: Tract 37439, Riverside County, CA
DATE STARTED: 9-28-17
COMPLETED: 9-28-17
GROUND ELEVATION:
BORING DIAMETER:
EXCAVATION METHOD: Backhoe
GROUND WATER LEVELS:
DRILLING CONTRACTOR: Williams Backhoe
LOGGED BY: AEG
CHECKED BY: MAS

☒ 2.5" Ring Sample
◫ Standard Split Spoon Sample

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS			MATERIAL DESCRIPTION	<200	D 50	Classification
0							LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
			☒							Artificial Fill (Af) 0-3' Light brown, silty fine SAND (slightly moist, soft, tilled)			SM
5			☒							Alluvium (Qal) 3-9' Reddish brown, clayey fine to medium SAND (moist, very dense)	24%		SC
10										Total Depth = 9' No Water No Caving Backfilled			
15													
20													
25													
30													

TEST PIT NUMBER TP-4

PAGE 1 OF 1

RMA GeoScience
9854 Glenoaks Blvd., Sun Valley, CA 91352

CLIENT: Sun Holland, LLC
PROJECT NAME: Canterwood
PROJECT NUMBER: 17H-0307-0/01
PROJECT LOCATION: Tract 37439, Riverside County, CA
DATE STARTED: 9-28-17
COMPLETED: 9-28-17
GROUND ELEVATION:
BORING DIAMETER:
EXCAVATION METHOD: Backhoe
GROUND WATER LEVELS:
DRILLING CONTRACTOR: Williams Backhoe
LOGGED BY: AEG
CHECKED BY: MAS

DEPTH (ft)	DRIVE SAMPLPE	BLOW COUNT (N VALUE)	BULK SAMPLE	MOISTURE CONTENT (%)	DRY UNIT WT. (pcf)	WET UNIT WT. (pcf)	ATTERBERG LIMITS			MATERIAL DESCRIPTION ☒ 2.5" Ring Sample ◫ Standard Split Spoon Sample	<200	D 50	Classification
							LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				
0										Artificial Fill (Af) 0-3' Light brown, silty fine SAND (slightly moist, soft, tilled)			SM
5										Alluvium (Qal) 3-8' Reddish brown, clayey to silty, fine to medium SAND (moist, dense to very dense)			SC
10										Total Depth = 8' No Water No Caving Backfilled			
15													
20													
25													
30													

APPENDIX B

LABORATORY TESTS

APPENDIX B

LABORATORY TESTS

B-1.00 LABORATORY TESTS

B-1.01 Sieve Analysis (% finer than #200)

Two soil samples obtained from the test borings were tested in accordance with ASTM D1140 to determine the percent passing the #200 sieve. This represents the amount of silt and clay that is present in the soil.

B-1.02 Soluble Sulfates

Tests were performed in accordance with California Test Methods 417 and 422 on a near-surface soil sample obtained during the field exploration. These tests were performed by AP Engineering and Testing located in Pomona, California. Test results are included in this section.

B-1.03 Soil Reactivity (pH) and Electrical Conductivity (Ec)

Representative soil sample was tested for soil reactivity (pH) and electrical conductivity (Ec) using California Test Method 643. The pH measurement determines the degree of acidity or alkalinity in the soils. The Ec is a measure of the electrical resistivity and is expressed as the reciprocal of the resistivity. These tests were performed by AP Engineering and Testing located in Pomona, California. Test results are included in this section.

B-1.04 Moisture Determination

Moisture content of the soil samples was performed in accordance to standard method for determination of water content of soil by drying oven, ASTM D2216. The mass of material remaining after oven drying is used as the mass of the solid particles. The results of our laboratory tests are presented on Boring Logs RMA-B1 through RMA-B5 presented in Appendix A.

B-1.05 Density of Split-Barrel Samples

The density of tube samples, which were obtained using a split-barrel sampler, were determined in accordance with ASTM D2937. The results of these tests are provided on the Boring Logs RMA-B1 through RMA-B5 presented in Appendix A.

B-1.06 Maximum Density

Maximum density - optimum moisture relationship for the major soil types encountered during the field exploration were determined in the laboratory using the standard procedures of ASTM D1557.

B-1.07 Expansion Index

Expansion index testing was performed on representative samples of the major soil type to be placed as engineered structural fill, by the test methods outlined in ASTM D4829.

B-1.08 Test Results

Results for laboratory tests performed on representative samples obtained during the field investigation are presented in this appendix and on Boring Logs RMA-B1 through RMA-B5 presented in Appendix A.

MAXIMUM DENSITY - OPTIMUM MOISTURE

(Test Method: ASTM D1557)

Sample Location	Optimum Moisture (Percent)	Maximum Density (lbs/ft^3)
TP-1 @ 3-9 feet	7.1	136.1
TP-1 @ 0-3 feet	9.1	127.4

SOLUBLE SULFATES

(California Test Method 417)

Sample Location	Soluble Sulfate (ppm)
TP-1 @ 0-3 feet	167

SOIL REACTIVITY (pH) AND ELECTRICAL CONDUCTIVITY

(California Test Method 643)

Sample Location	pH	Resistivity (Ohm-cm)
TP-1 @ 0-3 feet	7.7	1386

EXPANSION TEST

(Test Method: ASTM D4829)

Sample Location	Expansion Index	Expansion Classification
TP-1 @ 0-3 feet	0	Very Low
TP-3 @ 0-3 feet	0	Very Low
TP-1 @ 3-9 feet	9	Very Low
TP-3 @ 3-9 feet	13	Very Low

APPENDIX C

GENERAL EARTHWORK
AND
GRADING SPECIFICATIONS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

C-1.00 GENERAL DESCRIPTION

C-1.01 Introduction

These specifications present our general recommendations for earthwork and grading as shown on the approved grading plans for the subject project. These specifications shall cover all clearing and grubbing, removal of existing structures, preparation of land to be filled, filling of the land, spreading, compaction and control of the fill, and all subsidiary work necessary to complete the grading of the filled areas to conform with the lines, grades and slopes as shown on the approved plans.

The recommendations contained in the geotechnical report of which these general specifications are a part of shall supersede the provisions contained hereinafter in case of conflict.

C-1.02 Laboratory Standard and Field Test Methods

The laboratory standard used to establish the maximum density and optimum moisture shall be ASTM D1557.

The insitu density of earth materials (field compaction tests) shall be determined by the sand cone method (ASTM D1556), direct transmission nuclear method (ASTM D2922) or other test methods as considered appropriate by the geotechnical consultant.

Relative compaction is defined, for purposes of these specifications, as the ratio of the in-place density to the maximum density as determined in the previously mentioned laboratory standard.

C-2.00 Clearing

C-2.01 Surface Clearing

All structures marked for removal, timber, logs, trees, brush and other rubbish shall be removed and disposed of off the site. Any trees to be removed shall be pulled in such a manner so as to remove as much of the root system as possible.

C-2.02 Subsurface Removals

A thorough search should be made for possible underground storage tanks and/or septic tanks and cesspools. If found, tanks should be removed and cesspools pumped dry.

Any concrete irrigation lines shall be crushed in place and all metal underground lines shall be removed from the site.

C-2.03 Backfill of Cavities

All cavities created or exposed during clearing and grubbing operations or by previous use of the site shall be cleared of deleterious material and backfilled with native soils or other materials approved by the soil engineer. Said backfill shall be compacted to a minimum of 90% relative compaction.

C-3.00 ORIGINAL GROUND PREPARATION

C-3.01 Stripping of Vegetation

After the site has been properly cleared, all vegetation and topsoil containing the root systems of former vegetation shall be stripped from areas to be graded. Materials removed in this stripping process may be used as fill in areas designated by the soil engineer, provided the vegetation is mixed with a sufficient amount of soil to assure that no appreciable settlement or other detriment will occur due to decaying of the organic matter. Soil materials containing more than 3% organics shall not be used as structural fill.

C-3.02 Removals of Non-Engineered Fills

Any non-engineered fills encountered during grading shall be completely removed and the underlying ground shall be prepared in accordance to the recommendations for original ground preparation contained in this section. After cleansing of any organic matter the fill material may be used for engineered fill.

C-3.03 Overexcavation of Fill Areas

The existing ground in all areas determined to be satisfactory for the support of fills shall be scarified to a minimum depth of 6 inches. Scarification shall continue until the soils are broken down and free from lumps or clods and until the scarified zone is uniform. The moisture content of the scarified zone shall be adjusted to within 2% of optimum moisture. The scarified zone shall then be uniformly compacted to 90% relative compaction.

Where fill material is to be placed on ground with slopes steeper than 5:1 (H:V) the sloping ground shall be benched. The lowermost bench shall be a minimum of 15 feet wide, shall be a minimum of 2 feet deep, and shall expose firm material as determined by the geotechnical consultant. Other benches shall be excavated to firm material as determined by the geotechnical consultant and shall have a minimum width of 4 feet.

Existing ground that is determined to be unsatisfactory for the support of fills shall be overexcavated in accordance to the recommendations contained in the geotechnical report of which these general specifications are a part.

C-4.00 FILL MATERIALS

C-4.01 General

Materials for the fill shall be free from vegetable matter and other deleterious substances, shall not contain rocks or lumps of a greater dimension than is recommended by the geotechnical consultant, and shall be approved by the geotechnical consultant. Soils of poor gradation, expansion, or strength properties shall be placed in areas designated by the geotechnical consultant or shall be mixed with other soils providing satisfactory fill material.

C-4.02 Oversize Material

Oversize material, rock or other irreducible material with a maximum dimension greater than 12 inches, shall not be placed in fills, unless the location, materials, and disposal methods are specifically approved by the geotechnical consultant. Oversize material shall be placed in such a manner that nesting of oversize material does not occur and in such a manner that the oversize material is completely surrounded by fill material compacted to a minimum of 90% relative compaction. Oversize material shall not be placed within 10 feet of finished grade without the approval of the geotechnical consultant.

C-4.03 Import

Material imported to the site shall conform to the requirements of Section 4.01 of these specifications. Potential import material shall be approved by the geotechnical consultant prior to importation to the subject site.

C-5.00 PLACING AND SPREADING OF FILL

C-5.01 Fill Lifts

The selected fill material shall be placed in nearly horizontal layers which will not exceed approximately 6 inches in thickness when compacted. Thicker lifts may be placed if testing indicates the compaction procedures are such that the required compaction is being achieved and the geotechnical consultant approves their use.
Each layer shall be spread evenly and shall be thoroughly blade mixed during the spreading to insure uniformity of material in each layer.

C-5.02 Fill Moisture

When the moisture content of the fill material is below that recommended by the soils engineer, water shall then be added until the moisture content is as specified to assure thorough bonding during the compaction process.

When the moisture content of the fill material is above that recommended by the soils engineer, the fill material shall be aerated by blading or other satisfactory methods until the moisture content is as specified.

C-5.03 Fill Compaction

After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted to not less than 90% relative compaction. Compaction shall be by sheepsfoot rollers, multiple-wheel pneumatic tired rollers, or other types approved by the soil engineer.

Rolling shall be accomplished while the fill material is at the specified moisture content. Rolling of each layer shall be continuous over its entire area, and the roller shall make sufficient trips to insure that the desired density has been obtained.

C-5.04 Fill Slopes

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting of the slopes may be done progressively in increments of 3 to 4 feet in fill height. At the completion of grading, the slope face shall be compacted to a minimum of 93% relative compaction. This may require track rolling or rolling with a grid roller attached to a tractor mounted side-boom.

Slopes may be over filled and cut back in such a manner that the exposed slope faces are compacted to a minimum of 93% relative compaction.

The fill operation shall be continued in six inch (6") compacted layers, or as specified above, until the fill has been brought to the finished slopes and grades as shown on the accepted plans.

C-5.05 Compaction Testing

Field density tests shall be made by the geotechnical consultant to determine the compaction of each layer of fill. Density tests shall be made at locations and elevations selected by the geotechnical consultant.

Frequency of field density tests shall be not less than one test for each 2.0 feet of fill height and at least every one thousand cubic yards of fill. Where fill slopes exceed four feet in height their finished faces shall be tested at a frequency of one test for each 1000 square feet of slope face.

Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several inches. Density reading shall be taken in the compacted material below the disturbed surface. When these readings indicate that the density of any layer of fill or portion thereof is below the required density, the particular layer or portion shall be reworked until the required density has been obtained.

C-6.00 SUBDRAINS

C-6.01 Subdrain Material

Subdrains shall be constructed of a minimum 4-inch diameter pipe encased in a suitable filter material. The subdrain pipe shall be Schedule 40 Acrylonitrile Butadiene Styrene (ABS) or Schedule 40 Polyvinyl Chloride Plastic (PVC) pipe or approved equivalent. Subdrain pipe shall be installed with perforations down. Filter material shall consist of 3/4" to 1 1/2" clean gravel wrapped in an envelope of filter fabric consisting of Mirafi 140N or approved equivalent.

C-6.02 Subdrain Installation

Subdrain systems, if required, shall be installed in approved ground to conform the approximate alignment and details shown on the plans or herein. The subdrain locations shall not be changed or modified without the approval of the geotechnical consultant. The geotechnical consultant may recommend and direct changes in the subdrain line, grade or material upon approval by the design civil engineer and the appropriate governmental agencies.

C-7.00 EXCAVATIONS

C-7.01 General

Excavations and cut slopes shall be examined by the geotechnical consultant. If determined necessary by the geotechnical consultant, further excavation or overexcavation and refilling of overexcavated areas shall be performed, and/or remedial grading of cut slopes shall be performed.

C-7.02 Fill-Over-Cut Slopes

Where fill-over-cut slopes are to be graded the cut portion of the slope shall be made and approved by the geotechnical consultant prior to placement of materials for construction of the fill portion of the slope.

C-8.00 TRENCH BACKFILL

C-8.01 General

Trench backfill within street right of ways shall be mechanically compacted to 90% relative compaction as determined by the ASTM D1557 test method.

C-9.00 SEASONAL LIMITS

C-9.01 General

No fill material shall be placed, spread or rolled while it is frozen or thawing or during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the soils engineer indicate that the moisture content and density of the fill are as previously specified.

C-10.00 SUPERVISION

C-10.01 Prior to Grading

The site shall be observed by the geotechnical consultant upon completion of clearing and grubbing, prior to the preparation of any original ground for preparation of fill.

The supervisor of the grading contractor, the field representative of the geotechnical consultant, and the grading inspector for the local jurisdiction shall have a meeting and discuss the geotechnical aspects of the earthwork prior to commencement of grading.

C-10.02 During Grading

Site preparation of all areas to receive fill shall be tested and approved by the geotechnical consultant prior to the placement of any fill.

The geotechnical consultant or his representative shall observe the fill and compaction operations so that he can provide an opinion regarding the conformance of the work to the recommendations of the soil report.

APPENDIX D

REFERENCED TEST PIT/BORING LOGS BY OTHER COMPANY

APPENDIX D

REFERENCED TEST PIT/BORING LOGS BY OTHER COMPANY

Test Pit Logs by EcoTech

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1436 Feet TRENCH NO. T-1

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE** 03-13-02

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0							
					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC		**Older Alluvium (Qoa)** CLAYEY SAND: Red brown, fine to coarse grained , moist, dense, cohesive
5							
10							
							Total Depth at 12 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1435 Feet TRENCH NO. T-2

PROJECT No. 621-01 EQUIPMENT CAT 420 D

LOGGED BY Christopher Krall **DATE 03-13-02**

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		<u>Top Soil:</u> SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
	BULK MD	☒			SC		**<u>Older Alluvium (Qoa)</u>** CLAYEY SAND: Red brown, fine to coarse grained , moist, dense, cohesive, maximum dry density = 119.0 pcf optimum moisture = 13% Difficult Excavation below 7 Feet
5							
10							Total Depth 10 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1437 Feet TRENCH NO. T- 3

PROJECT No. 621-01 EQUIPMENT CAT 420 D

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION LOGGED BY Christopher Krall DATE 03-13-02 SAMPLED BY Christopher Krall
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC / SM		**Older Alluvium (Qoa)** CLAYEY SILTY SAND: Red brown, fine to coarse grained, very dense, hard, indurated, minor pores from 3 to 5 Feet.
5							Difficult Excavation below 7 Feet
10							Total Depth 10 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1437 Feet TRENCH NO. T-4

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall DATE 03-13-02

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION	
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.	0
5					SC / SM		**Older Alluvium (Qoa)** CLAYEY SILTY SAND: Red brown, fine to coarse, grained, very dense, hard, indurated, minor pores from 3 to 5 Feet. Difficult Excavation below 4 Feet	5
10							Total Depth 10 Feet No Groundwater Trech Backfilled	10
15								15

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

- B - BULK SAMPLE
- R - RING SAMPLE
- SC - SANDCONE
- MD - MAXIMUM DENSITY
- GS - GRAIN SIZE
- SE - SAND EQUIVALENT
- NG - NUCLEAR GAUGE
- (90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1438 Feet TRENCH NO. T-5

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE 03-13-02**

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC / SM		**Older Alluvium (Qoa)** CLAYEY SILTY SAND: Red brown, fine to coarse, grained, very dense, hard, indurated, minor pores from 3 to 5 Feet.
5							
10							Total Depth 10 Feet No Groundwater Trecnch Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1440 Feet TRENCH NO. T- 6

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY **Christopher Krall** **DATE** **03-13-02**

SAMPLED BY **Christopher Krall**

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC		**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores.
5							
10							Total Depth 10 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

- B - BULK SAMPLE
- R - RING SAMPLE
- SC - SANDCONE
- MD - MAXIMUM DENSITY
- GS - GRAIN SIZE
- SE - SAND EQUIVALENT
- NG - NUCLEAR GAUGE
- (90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1440 Feet TRENCH NO. T-7

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE** 03-13-02

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
5					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores.
10							Total Depth 10 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1441 Feet TRENCH NO. T- 8

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY **Christopher Krall** **DATE** **03-13-02**

SAMPLED BY **Christopher Krall**

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION	
								0
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.	
					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Red brown, fine to coarse grained , moist, dense, cohesive	
5								5
							Very difficult excavation below 8 Feet	
10								10
							Total Depth 12 Feet No Groundwater Trench Backfilled	
15								15

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1439 Feet TRENCH NO. T- 9

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall DATE 03-13-01

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
5					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Red brown, fine to coarse grained , moist, dense, cohesive
10	BULK MD	☒			SC	Qoa	CLAYEY SAND: Dark Red brown, fine to coarse grained, moist, dense, hard, indurated blocky soil structure Maximum Dry Density = 118.9 pcf Optimum Moisture = 13 %
15							Total Depth 12 Feet No Groundwater Trench Backfilled

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1441 Feet TRENCH NO. T-10

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE** 03-13-02

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores.
5							Coarse grained below 8 Feet
10							Total Depth 10 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1443 Feet TRENCH NO. T-11

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE** 03-13-02

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores.
5							
							Pores to 1/8 " diameter below 8 Feet (7 % to 8 %)
10							Total Depth 9 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1438 Feet TRENCH NO. T-12

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE 03-13-02**

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores.
5							
10							Total Depth 10 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1438 Feet TRENCH NO. T-13

PROJECT No. 621-01 EQUIPMENT CAT 420 D

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	**GEOTECHNICAL DESCRIPTION** **LOGGED BY Christopher Krall DATE 03-13-02** **SAMPLED BY Christopher Krall**
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores.
5							
							Very Difficult Excavation
10							Total Depth 9 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1440 Feet TRENCH NO. T-14

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE 03-13-02**

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION	
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.	0
					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores. Expansion Index - 13	
5	BULK GS	☒						5
10							Total Depth 10 Feet No Groundwater Trench Backfilled	10
15								15

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1437 Feet TRENCH NO. T-15

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY **Christopher Krall** **DATE** **03-13-02**

SAMPLED BY **Christopher Krall**

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
					SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores.
5							
10							Total Depth 10 Feet No Groundwater Trench Backfilled
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

- B - BULK SAMPLE
- R - RING SAMPLE
- SC - SANDCONE
- MD - MAXIMUM DENSITY
- GS - GRAIN SIZE
- SE - SAND EQUIVALENT
- NG - NUCLEAR GAUGE
- (90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME EcoTech, Inc. ELEVATION 1436 Feet TRENCH NO. T-16

PROJECT No. 621-01 EQUIPMENT CAT 420 D

GEOTECHNICAL DESCRIPTION

LOGGED BY Christopher Krall **DATE 03-13-02**

SAMPLED BY Christopher Krall

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
0					SM		**Top Soil:** SILTY SAND: Gray brown, fine to coarse grained, moist, loose.
5	Bulk GS	☒			SC	Qoa	**Older Alluvium (Qoa)** CLAYEY SAND: Dark yellow brown, fine to coarse grained, moist, dense, well graded, very hard, indurated, minor pores. Expansion Index = 0
10 15							Total Depth 8 Feet No Groundwater Trench Backfilled

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME Canterwood ELEVATION TRENCH NO. T18

PROJECT No. 621-01 EQUIPMENT CAT 420d

GEOTECHNICAL DESCRIPTION

LOGGED BY Steve Pyle DATE 03/10/04

SAMPLED BY Steve Pyle

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
	NG		105.5	14.2	SM		Top Soil: Silty sand fine/organic moist & loose
					SC		<u>Older Alluvium (Qoa):</u> Red brown sandy clay, very hard moist and dense
5							
	B	▨					
10							Dark red brown moist and dense
							Total 12ft depth Dark red brown No ground water
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME Canterwood

ELEVATION

TRENCH NO. T19

PROJECT No. 621-01

EQUIPMENT CAT 420d

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION **LOGGED BY** Steve Pyle **DATE** 03/10/04 **SAMPLED BY** Steve Pyle	
					SM		**Top Soil:** Silty sand fine grained moist & loose	
	NG		104.5	11.5	SC		<u>**Older Alluvium (Qoa):**</u> Red brown sandy clay, very difficult to excavate below 7ft moist and dense	5
5								
10							**Total 9ft depth red brown** **No ground water**	10
15								15

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

- B - BULK SAMPLE
- R - RING SAMPLE
- SC - SANDCONE
- MD - MAXIMUM DENSITY
- GS - GRAIN SIZE
- SE - SAND EQUIVALENT
- NG - NUCLEAR GAUGE
- (90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME **Canterwood** ELEVATION TRENCH NO. **T20**

PROJECT No. **621-01** EQUIPMENT **CAT 420d**

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION LOGGED BY **Steve Pyle** DATE **03/10/04** SAMPLED BY **Steve Pyle**
	NG		**104.1**	**17.2**	**SM**		**Top Soil:** Lt brown sandy fine grained dry and dense primiter road
					SC		**Older Alluvium (Qoa):** Yellowish brown sandy clay, moist and dense, minor pores @ 6-7ft. Very hard to 10ft less hard 10-12ft
5	B	▨					5
10							10
							Total 12ft depth yellowish brown **No ground water**
15							15

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME **Canterwood**

ELEVATION

TRENCH NO. **T21**

PROJECT No. **621-01**

EQUIPMENT **CAT 420d**

GEOTECHNICAL DESCRIPTION

LOGGED BY **Steve Pyle** **DATE** **03/10/04**

SAMPLED BY **Steve Pyle**

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
					SM		**Top Soil:** Gray silty sand fine moist and loose
	NG		**107.4**	**12.4**	**SC**		<u>**Older Alluvium (Qoa):**</u> Yellowish brown very hard, difficult to excavate below 5ft, could not excavate below 8ft.
5							
10							**Total 8ft depth yellowish brown** **No ground water**
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME **Canterwood**
ELEVATION
TRENCH NO. **T22**
PROJECT No. **621-01**
EQUIPMENT **CAT 420d**

GEOTECHNICAL DESCRIPTION

LOGGED BY **Steve Pyle** **DATE** **03/10/04**
SAMPLED BY **Steve Pyle**

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
					SM		**Top Soil:** Silty sand fine to coarse moist and loose
	B	▨					**Older Alluvium (Qoa):** Yellowish brown very hard, well grained.
	NG		110.1	15.3	SC		
5							
10							**Total 9ft depth yellowish brown** **No ground water Trench backfill**
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

- B - BULK SAMPLE
- R - RING SAMPLE
- SC - SANDCONE
- MD - MAXIMUM DENSITY
- GS - GRAIN SIZE
- SE - SAND EQUIVALENT
- NG - NUCLEAR GAUGE
- (90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME Canterwood
ELEVATION
TRENCH NO. T23
PROJECT No. 621-01
EQUIPMENT CAT 420d

GEOTECHNICAL DESCRIPTION

LOGGED BY Steve Pyle **DATE** 03/10/04
SAMPLED BY Steve Pyle

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION	
					SM		**Top Soil:** Silty sand gray brown fine to coarse	
	NG		101.9	14.1	SC		**Older Alluvium (Qoa):** Clay sand dark yellow brown moist and dense	
5								5
	B	▨						
10								10
							Total 10ft depth Dark yellow brown **No ground water** **Trench backfill**	
15								15

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

- B - BULK SAMPLE
- R - RING SAMPLE
- SC - SANDCONE
- MD - MAXIMUM DENSITY
- GS - GRAIN SIZE
- SE - SAND EQUIVALENT
- NG - NUCLEAR GAUGE
- (90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME **Canterwood**
ELEVATION
TRENCH NO. **T24**
PROJECT No. **621-01**
EQUIPMENT **CAT 420d**

LOGGED BY Steve Pyle **DATE** 03/10/04
SAMPLED BY Steve Pyle

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
	NG		105.3	12.6	SM		**Top Soil:** Silty sand lt brown fine to coarse grained moist & loose
5					SC		**Older Alluvium (Qoa):** Clayey sand dark yellow brown moist and dense
10							**Total 8ft depth No ground water** **Trench backfill**
15							

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

- B - BULK SAMPLE
- R - RING SAMPLE
- SC - SANDCONE
- MD - MAXIMUM DENSITY
- GS - GRAIN SIZE
- SE - SAND EQUIVALENT
- NG - NUCLEAR GAUGE
- (90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME Canterwood

ELEVATION

TRENCH NO. T25

PROJECT No. 621-01

EQUIPMENT CAT 420d

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION LOGGED BY Steve Pyle DATE 03/10/04 SAMPLED BY Steve Pyle
					SM		**Top Soil:** Silty sand gray brown fine to coarse grained moist & loose
	NG		108.6	13.6	SC		<u>Older Alluvium (Qoa):</u> Dark yellow brown sand coarse moist and dense Extremely hard to excavate
5							**Total 4ft depth No ground water** **Refusal at 4ft DG** **Trench backfill**
10							
15							

GRAPHIC LOG

Trend:

Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

EXPLORATORY TRENCH LOG

PROJECT NAME **Canterwood**
ELEVATION
TRENCH NO. **T26**
PROJECT No. **621-01**
EQUIPMENT **CAT 420d**

GEOTECHNICAL DESCRIPTION

LOGGED BY **Steve Pyle** **DATE** **03/10/04**
SAMPLED BY **Steve Pyle**

DEPTH (FEET)	TYPE OF TEST*	SAMPLE DEPTH	DRY DENSITY (PCF)	MOISTURE CONTENT %	(USCS) SOIL CLASSIFICATION	EARTH MATERIAL	GEOTECHNICAL DESCRIPTION
					SM		**Top Soil:** Silty sand gray brown fine to coarse grained moist & loose
					SC		**<u>Older Alluvium (Qoa):</u>** Red brown sand coarse grained moist and dense
5	NG		110.3	14.9			
10							
15							
							Total 15ft depth DG No ground water **Trench backfill**

GRAPHIC LOG Trend: Scale: 1" = 5'

*TEST SYMBOLS

B - BULK SAMPLE
R - RING SAMPLE
SC - SANDCONE
MD - MAXIMUM DENSITY
GS - GRAIN SIZE
SE - SAND EQUIVALENT
NG - NUCLEAR GAUGE
(90) - RELATIVE COMPACTION

RGS Engineering Geology

Boring Logs by GeoCon

PROJECT NO. T2304-12-01

BORING B 1

ELEV. (MSL.) **1440'±** DATE COMPLETED **03-28-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, medium dense, moist, Silty, fine to medium SAND			
2					**OLDER ALLUVIUM** Dense, very moist, orange-brown, Silty SAND, trace clay, trace coarse sand, trace carbonate			
	B1-1					63	114.7	16.2
4								
	B1-2					85/11"	116.0	16.6
6					-Very dense, very moist, orange brown, Silty, fine to medium SAND, trace carbonate at 6 feet			
8					-Soil becomes less moist at 8 feet			
	B1-3			SM	-Very dense, damp, orange brown, Silty, fine to coarse SAND, little clay, manganese staining at 9 feet	81/10"		
10								
					-Driller reports gravel at 11 feet			
12	B1-4				-Contains large (3mm) biotite	92/9"		
14								
	B1-5				-Becomes moist	76		
16					BORING TERMINATED AT 16 FEET No groundwater encountered Backfilled			

Figure A-1,
Log of Boring B 1, Page 1 of 1

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▮ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
▨ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 2

ELEV. (MSL.) **1439'±** DATE COMPLETED **03-28-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B2-1 ▨			SM	**TOPSOIL** Loose, moist, brown, Silty, fine to medium SAND			
					ALLUVIUM Dense, moist, orange brown, Clayey Silty SAND			
2								
	B2-2 ■			SM/SC		56	125.0	12.2
4	▨				Very dense, moist, orange brown, Silty, fine to coarse SAND with manganese staining			
6								
	B2-3 ■					95/11"		
	B2-4 ▨							
8	B2-6 ▨							
	B2-5 ■			SM		50/5"		
10								
12								
14								
	B2-7 ■				-Becomes sandier and micaceous	78		
16								
18								
20	B2-8 ■					50/6"		

BORING TERMINATED AT 20½ FEET
No groundwater encountered
Backfilled

Figure A-2,
Log of Boring B 2, Page 1 of 1

T2304-12-01.GPJ

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▨ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 3

ELEV. (MSL.) **1440'±** DATE COMPLETED **03-28-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist, brown, Silty, fine to medium SAND			
					OLDER ALLUVIUM Very dense, moist, orange brown, Silty SAND with trace clay, manganese staining			
2								
	B3-1					76	124.4	12.6
4								
6	B3-2				-Trace pinhole porosity	50/6"	125.1	12.4
8								
	B3-3					50/5"		
10								
12								
14								
	B3-4			SM	-Becomes bright orange and siltier	50/4"		
16								
18								
20	B3-5				-Becomes orange brown and micaceous with large (3-5mm) biotite grains	50/4"		
22								
					-Driller added water to hole to facilitate drilling			
24								
	B3-6				-Little clay	82		
26								
28								

Figure A-3,
Log of Boring B 3, Page 1 of 2

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◣ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 3

ELEV. (MSL.) 1440'± DATE COMPLETED 03-28-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B3-7				-Sand is fine, soil is less cemented	50/4½"		
32								
				SM	-Becomes light brown			
34								
	B3-8					78/11"		
36								
38								
					Very dense, damp, yellow, fine to medium sand, friable			
40	B3-9					50/6"		
				SP				
42								
44								
					Very dense, moist, light yellow brown, Silty, fine to medium SAND, friable - sample disturbed			
	B3-10					50/6"		
46				SP				
48					Very dense, damp, light yellow, fine to coarse SAND, friable			
				SP/SW				
50	B3-11					50/5"		

BORING TERMINATED AT 50½ FEET
No groundwater encountered
Backfilled

Figure A-3,
Log of Boring B 3, Page 2 of 2

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SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 4

ELEV. (MSL.) **1441'±** DATE COMPLETED **03-28-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist, brown, Silty, fine SAND			
2					**OLDER ALLUVIUM** Very dense, moist, orange brown, Silty, coarse SAND with little clay, trace to some pinhole porosity			
4	B4-1 ■					89	126.9	11.5
6				SM				
	B4-2 ■					77	120.4	14.2
8					-No pinhole porosity, trace clay, very moist			
10	B4-3 ■				-Becomes dense with manganese staining	47		
12								
14					Very dense, moist, orange, Silty, fine SAND, manganese staining			
				SM				
16	B4-4 ■					32		
					BORING TERMINATED AT 16 FEET No groundwater encountered Backfilled			

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Figure A-4,
Log of Boring B 4, Page 1 of 1

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 5

ELEV. (MSL.) **1442'±** DATE COMPLETED **03-28-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist, brown, Silty SAND			
					OLDER ALLUVIUM Very dense, moist, orange brown, Silty SAND with little clay			
2								
	B5-1					80/10"	123.3	11.6
4								
6	B5-2			SM	-Little pinhole porosity, manganese staining	92/11"	130.8	9.9
8								
	B5-3					83/11"		
10								
12								
14								
	B5-4				Medium dense, moist, yellow brown, Silty, fine SAND trace coarse sand	39		
16					BORING TERMINATED AT 16 FEET No groundwater encountered Backfilled			

Figure A-5,
Log of Boring B 5, Page 1 of 1

T2304-12-01.GPJ

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ▨ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◩ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 6

ELEV. (MSL.) 1441'± DATE COMPLETED 03-28-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B6-1	▨		SM	**TOPSOIL** Loose, moist, brown, Silty SAND			
2					**OLDER ALLUVIUM** Very dense, moist, orange brown, Silty, fine to coarse SAND, trace clay			
4	B6-2	■				81	130.2	9.9
6	B6-3	■		SM	-Less clay at 6 feet	50/5"	125.5	12.0
8								
10	B6-4	■				50/4"		
12								
14					Very dense, moist, yellow brown, fine to medium SAND with trace silt and mica			
16	B6-5	■		SP		76		
18				SM	Very dense, moist, orange brown, Silty, fine SAND			
20	B6-6	■				50/6"		

BORING TERMINATED AT 20½ FEET
No groundwater encountered
Backfilled

Figure A-6,
Log of Boring B 6, Page 1 of 1

T2304-12-01.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▨ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 7

ELEV. (MSL.) **1441'±** DATE COMPLETED **03-28-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist, brown, Silty SAND			
2					**OLDER ALLUVIUM** Very dense, moist, orange brown, Silty SAND			
	B7-1					93	129.9	10.3
4								
6	B7-2			SM	-Becomes dense with manganese staining	54	125.1	12.0
8								
	B7-3				-Very dense, moist, orange, fine to medium SAND with silt, non-cemented	80		
10								
12								
14								
	B7-4					91/10½"		
16					BORING TERMINATED AT 16 FEET No groundwater encountered Backfilled			

Figure A-7,
Log of Boring B 7, Page 1 of 1

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▨ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 8

ELEV. (MSL.) 1440'± DATE COMPLETED 03-28-2005

EQUIPMENT CME 75

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist,brown, Silty SAND			
					OLDER ALLUVIUM Very dense, very moist, orange brown, Silty SAND, with little clay			
2								
	B8-1					96/11"	120.9	15.3
4								
6	B8-2					50/6"	122.9	11.6
8								
	B8-3			SM	-Driller added water to hole to facilitate drilling	50/6"		
10								
12								
14								
	B8-4				-Becomes dense, very moist, clay content increases, contains large biotite	53		
16								
18								
20	B8-5				-Becomes very dense	81		
					BORING TERMINATED AT 21 FEET No groundwater encountered Backfilled			

Figure A-8,
Log of Boring B 8, Page 1 of 1

T2304-12-01.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
▨ ... DISTURBED OR BAG SAMPLE
◩ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2304-12-01

BORING B 9

ELEV. (MSL.) **1439'±** DATE COMPLETED **03-28-2005**

EQUIPMENT **CME 75**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist, brown, Silty SAND			
2					**ALLUVIUM** Dense, moist, orange, Silty SAND with little clay and manganese staining			
	B9-1			SM		46	128.0	11.2
4								
6	B9-2				-Becomes yellow brown and clayey	47		
8					Dense, moist, orange, Clayey SAND			
	B9-3			SC		68		
10								
12								
14					Medium dense, very moist, orange brown, Silty SAND with some clay			
	B3-4			SC/SM		36		
16					BORING TERMINATED AT 16 FEET No groundwater encountered Backfilled			

Figure A-9,
Log of Boring B 9, Page 1 of 1

T2304-12-01.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▩ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Boring Logs by EcoTech

EXPLORATORY BORING LOG

Date: 04-10-02
Drill Method: HSA
Logged By: Chris Krall
Location: See Plan
Drive Weight: 140 Lbs
Drop: 30 Inches
Elevation: 1437 Feet
Hole Diameter: 8" - 12"

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B-1*
0						SM	**Older Alluvium (Qoa)** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
5						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
10						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
5							
)							
5							

EXPLORATORY BORING LOG

Date: 04-10-02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1437 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B-1 (Con't)*
30						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
35							
0							
							Total Depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

EXPLORATORY BORING LOG

Date: 04-10-02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1438 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** ***Boring B-2***
0							**Older Alluvium (Qoa)**
						SM	SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
5						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
10							
						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.

EXPLORATORY BORING LOG

Date: 04-10-02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1438 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 2 (Con't)*
0						SP /SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
35							
							Total Depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

EXPLORATORY BORING LOG

Date: 04/10/02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1439 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 3*
5						SM	**Older Alluvium (Qoa)** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
10						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
						SM	SILTY SAND WITH CLAY: Brown, fine to coarse grained, damp dense
						SP / SW	SAND: Medium light brown, fine to coarse grained, damp, dense.

EXPLORATORY BORING LOG

Date: 04/10/02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1439 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 3 (Con't)*
30						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
35							
40							
5							
							Total depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing
5							

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1440 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B-4*
						SM	**Older Alluvium (Qoa)** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
5						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
5						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1440 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B-4 (Con't)*
30						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
35							
40							
5							
							Total depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing
5							

EXPLORATORY BORING LOG

Date: 04/10/02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1436 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** ***Boring B-5***
						SM	**Older Alluvium (Qoa)** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
						SC	CLAYED SAND: Light orange / red brown, fine to coarse grained with clay, very dense damp
						SP / SW	SAND: Medium to light brown, very dense, fine to coarse, grained damp, well graded, non-cohesive

EXPLORATORY BORING LOG

Date: 04/10/02	**Drill Method: HSA**	**Logged By: Pete Ratbun**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1436 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 5 (Con't)*
30 35						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
							DECOMPOSED GRANITE: Variegated Yellow - Brown , fine to coarse grained, dense, hard, well decomposed and weathered
							Total depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

EXPLORATORY BORING LOG

ate: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1435 Feet**	**Hole Diameter: 8" - 12"**

epth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** ***Boring B-6***
						SM	**<u>Older Alluvium (Qoa)</u>** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1435 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 6 (Con't)*
30						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
35							
40							
							Total depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1438 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 7*
						SM	**Older Alluvium (Qoa)** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
5						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1438 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 7 (Con't)*
0						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
5							
							Total Depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1440 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** ***Boring B- 8***
						SM	**Older Alluvium (Qoa)** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
5						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1440 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 8 (Con't)*
0						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
5							
							Total Depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1438 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** ***Boring B- 9***
0							**Older Alluvium (Qoa)**
						SM	SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
5						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
0						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
5							
0							
5							

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1438 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 9 (Con't)*
0						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
5							
							Total Depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1442 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 10*
0						SM	**Older Alluvium (Qoa)** SILTY SAND : Yellow brown, fine to coarse grained, damp, medium dense
5						SC	CLAYEY SAND: Red Brown, fine to coarse grained, moist, dense cohesive, well indurated, hard
10							
5							
						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
0							
5							

EXPLORATORY BORING LOG

Date: 04/11/02	**Drill Method: HSA**	**Logged By: Chris Krall**	**Location: See Plan**
Drive Weight: 140 Lbs	**Drop: 30 Inches**	**Elevation: 1442 Feet**	**Hole Diameter: 8" - 12"**

Depth (ft)	Blows per Foot	Soil Sample	PID (ppm)	Moisture Content (%)	Graphic Log	USCS	**Lithologic Description** *Boring B- 10 (Con't)*
30						SP / SW	SAND: Yellow brown, fine to coarse grained, moist, medium dense, moderately well graded, non-cohesive.
35							
							Total Depth 50 Feet No Groundwater Hole Backfilled to 40 Feet for Percolation Testing

APPENDIX E

REFERENCES

REFERENCES

1. County of Riverside General Plan, Safety Element, Effective December 15, 2015.

2. County of Riverside Transportation and Land Management Agency, Building and Safety Department, Planning Department, Transportation Department, Technical Guidelines for Review of Geotechnical and Geological Reports, 2000.

3. GeoCon, 2005, Supplemental Geotechnical Investigation: Cantorwoods Estates, Tentative Tract 37439, Leon Road at Holland Road, Menifee Area, Riverside County, California, Project No. T2304-12-01

4. EcoTech, 2004, Preliminary Geotechnical Investigation: Canterwood Estates, North of Craig Avenue between Leon Road and Eucalyptus Road, Riverside County, California, Project No. 621-02

5. Morton, D.M., 2003, Preliminary Geologic Map of the Winchester 7.5' Quadrangle, Riverside County, California, USGS Open-File Report 03-188, Scale 1:24,000.

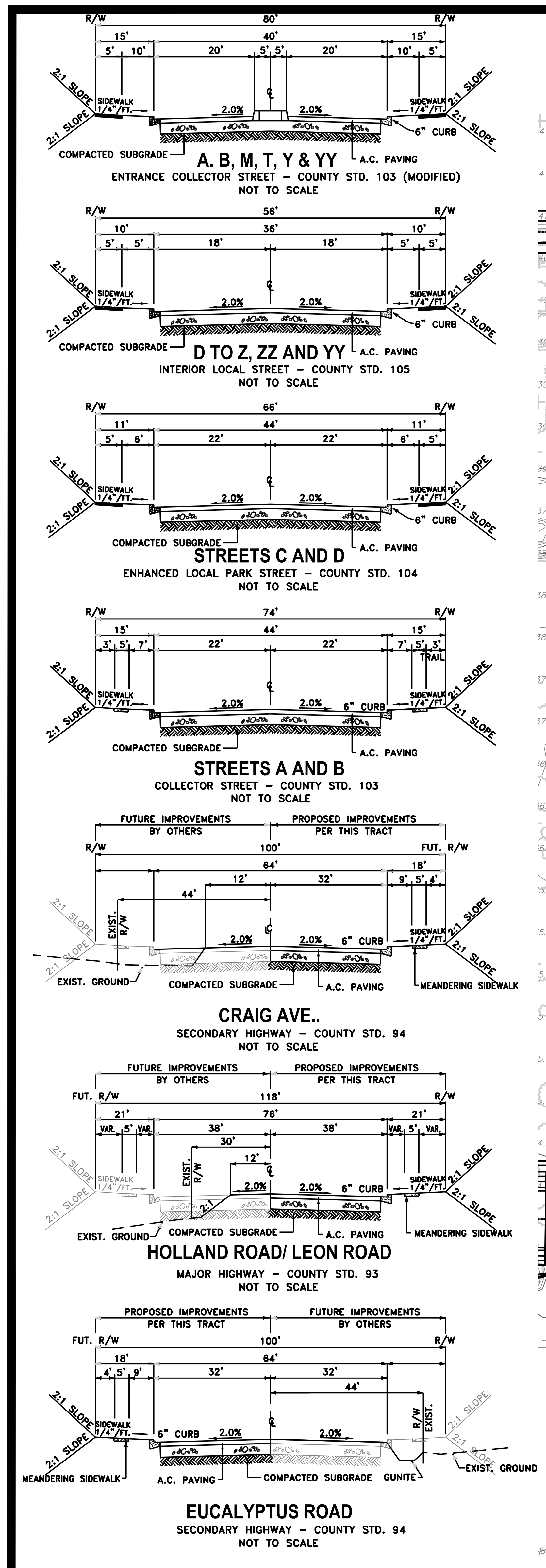
6. Riverside County Flood Control and Water Conservation District, Design Handbook for Low Impact Development Best Management Practices, 2011.

7. Historic Aerials by NETR, Aerial Photographs from 1938 to 2012, Topographic Maps from 1943 to 1986: http://www.historicaerials.com/

8. Google Earth, Aerial Photographs, 1996-2016

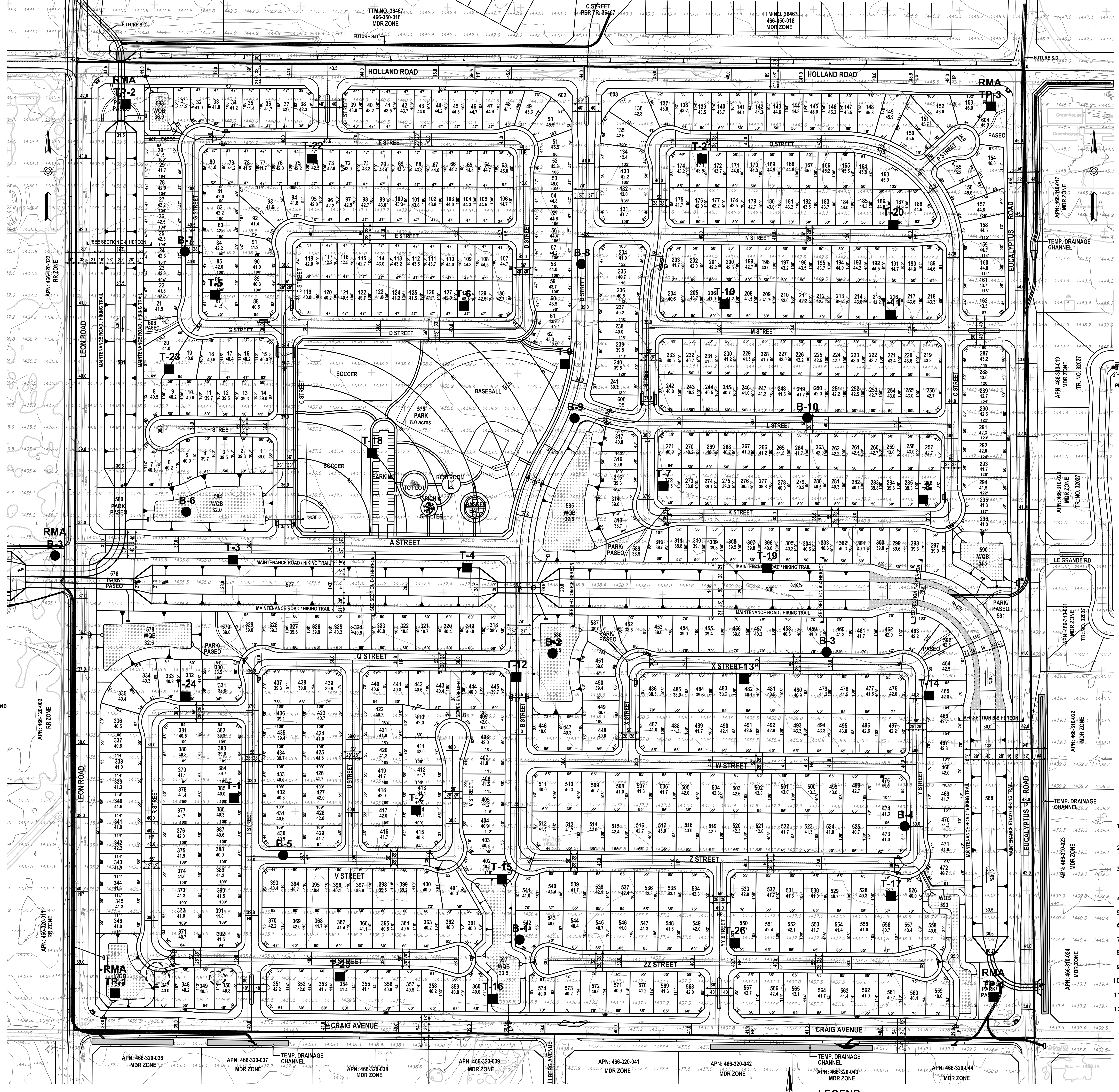
TENTATIVE TRACT NO. 37439

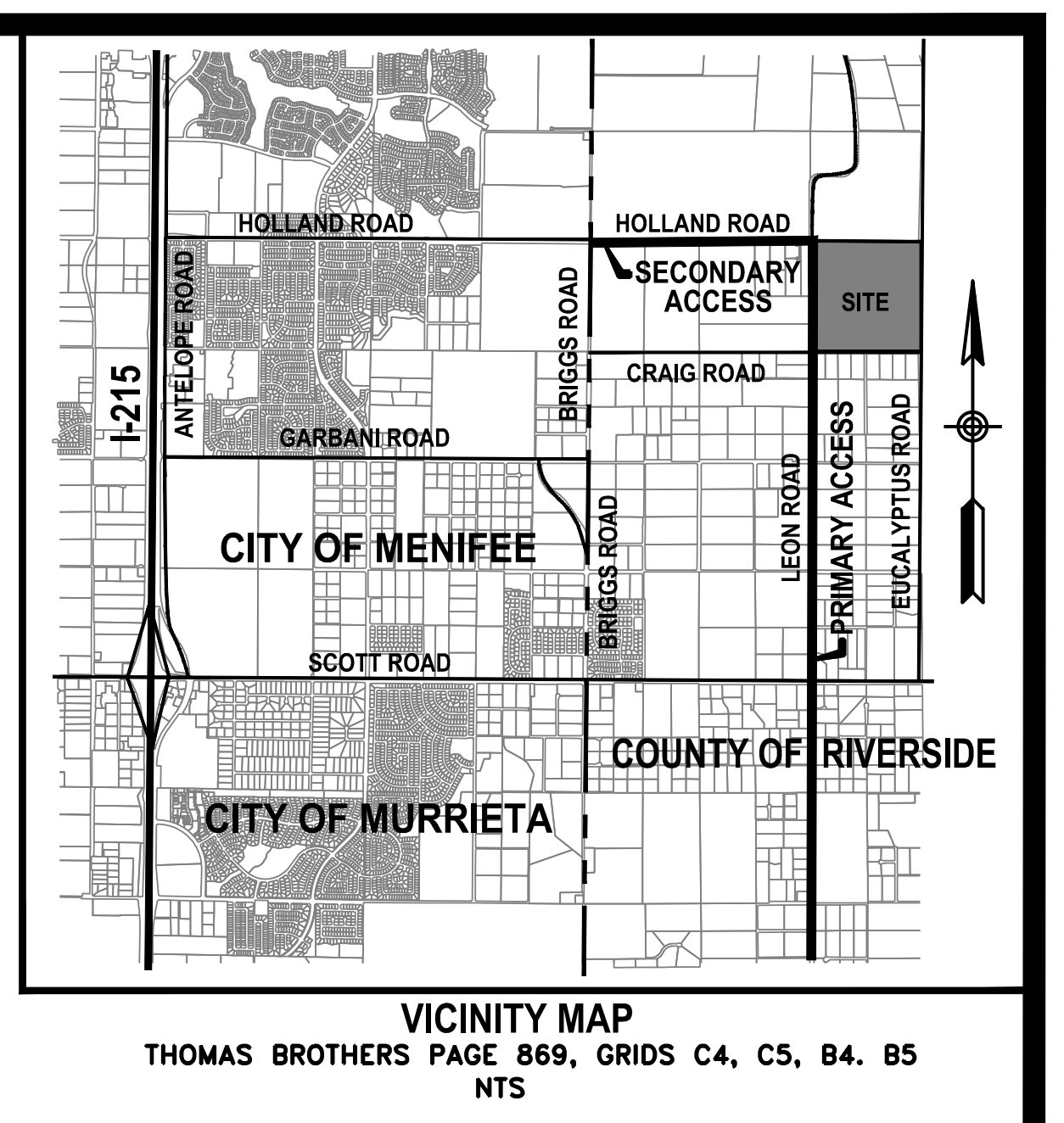
COUNTY OF RIVERSIDE



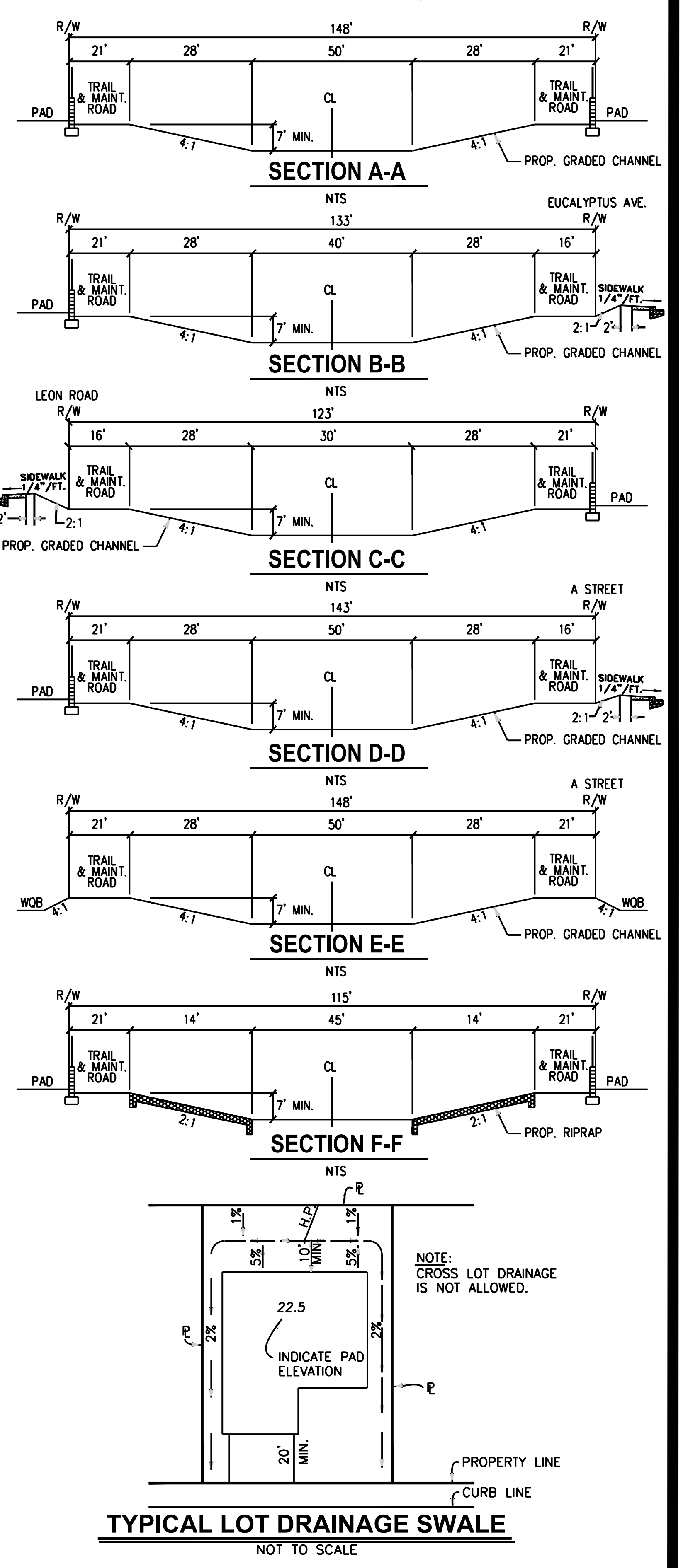
RMA LEGEND

RMA TP-1 ■	RMA Geoscience Test Pit Location
RMA B-1 ●	RMA Geoscience Boring Location
TP-1 ■	EcoTech Test Pit Location
B-1 ●	EcoTech/GeoCon Boring Location
◌	Bedrock Outcrop Location





VICINITY MAP
THOMAS BROTHERS PAGE 869, GRIDS C4, C5, B4. B5
NTS



NOTE:
CROSS LOT DRAINAGE IS NOT ALLOWED.

TYPICAL LOT DRAINAGE SWALE

NOT TO SCALE

GENERAL NOTES

1. LEGAL DESCRIPTION
   NORTHWEST QUARTER OF SECTION 8, T6S, R2W
2. TOTAL ORIGINAL ACREAGE:
   158.18 ACRES (GROSS)
   144.90 ACRES (NET)
3. NUMBER OF LOTS:
   574 SINGLE FAMILY LOTS
   25 OPEN SPACE
   9 DRAINAGE BASIN LOTS
4. MINIMUM LOT SIZE:
   4700 SF
5. EXISTING ZONING:
   R-1
6. PROPOSED ZONING:
   R-4
7. EXISTING LAND USE:
   AGRICULTURE
8. PROPOSED LAND USE:
   SINGLE FAMILY RESIDENTIAL
9. EXISTING LAND USE DESIGNATION
   MEDIUM DENSITY RESIDENTIAL
10. PROPOSED LAND USE DESIGNATION
    MEDIUM DENSITY RESIDENTIAL
11. METHOD OF SEWAGE DISPOSAL
    SEWER SYSTEM PER EMWD
12. UTILITIES:
    WATER – EVMWD
    SEWER – EVMWD
    GAS – SOUTHERN CALIFORNIA GAS COMPANY
    ELECTRIC – SCE
    TELEPHONE – VERIZON
    CABLE –TIME WARNER CABLE
13. SCHOOL DISTRICT:
    MENIFEE VALLEY UNIFIED SCHOOL DISTRICT
14. ASSESSORS PARCEL NO.'S:
    466-310-002, 466-310-026
15. 2006 THOMAS BROS. GUIDE:
    PAGE 869, GRID C4, C5, B4, B5
16. TENTATIVE MAP PREPARED:
    FEB. 15, 2018
17. ALL PROPOSED DRAINAGE FACILITIES SHALL BE DESIGNATED TO ACCOMODATE 100 YEAR STORM FLOWS. ALL STORM FLOWS ARE APPROX.
18. ALL FENCES ON SITE TO BE REMOVED AS PART OF DEVELOPMENT.
20. THIS IS A SCHEDULE "A" SUBDIVISION.
21. TENTATIVE MAP SHOWS ENTIRE CONTIGUOUS OWNERSHIP.
22. THIS PROJECT IS NOT WITHIN A SPECIFIC PLAN.
23. COMMUNITY PLAN: SOUTHWEST AREA.
24. ALL SLOPES ARE 2:1 UNLESS NOTED.
25. THIS PROPERTY IS NOT WITHIN A SPECIAL STUDIES ZONE AND IS NOT SUBJECT TO LIQUEFACTION OR OTHER GEOLOGICAL HAZARD.
26. OPEN SPACE TO BE MAINTAINED BY VALLEYWIDE REC. AND PARK DISTRICT AND/OR COUNTY CDF.
27. FEMA FLOOD PLAIN:
    FLOOD ZONE X
28. EARTHWORK QUANTITIES: CUT = 176000 CY
    FILL = 418000 CY
29. OWNER:
    EASTERN FINANCIAL
    1352 LA LOMA DR.
    SANTA ANA, CA. 92705

AMENDMENTS:

DATE	No.	DESCRIPTION

Plate 1

PROJECT NO.	17H-0307-0
DATE	3-20-18
PREPARED BY	AEG
APPROVED BY	MAS

BORING AND TRENCH LOCATION MAP

SCALE: 1" = 100'

LEGEND

GB — GRADE BREAK
FF — FINISHED FLOOR ELEVATION
FS — FINISHED SURFACE
FL — FLOW LINE
TC — TOP OF CURB
97.0 PAD ELEVATION
— 1095 — EXISTING CONTOURS
— 1095 — PROPOSED CONTOURS
▬ ▪ ▪ ▬ — TRACT BOUNDARY

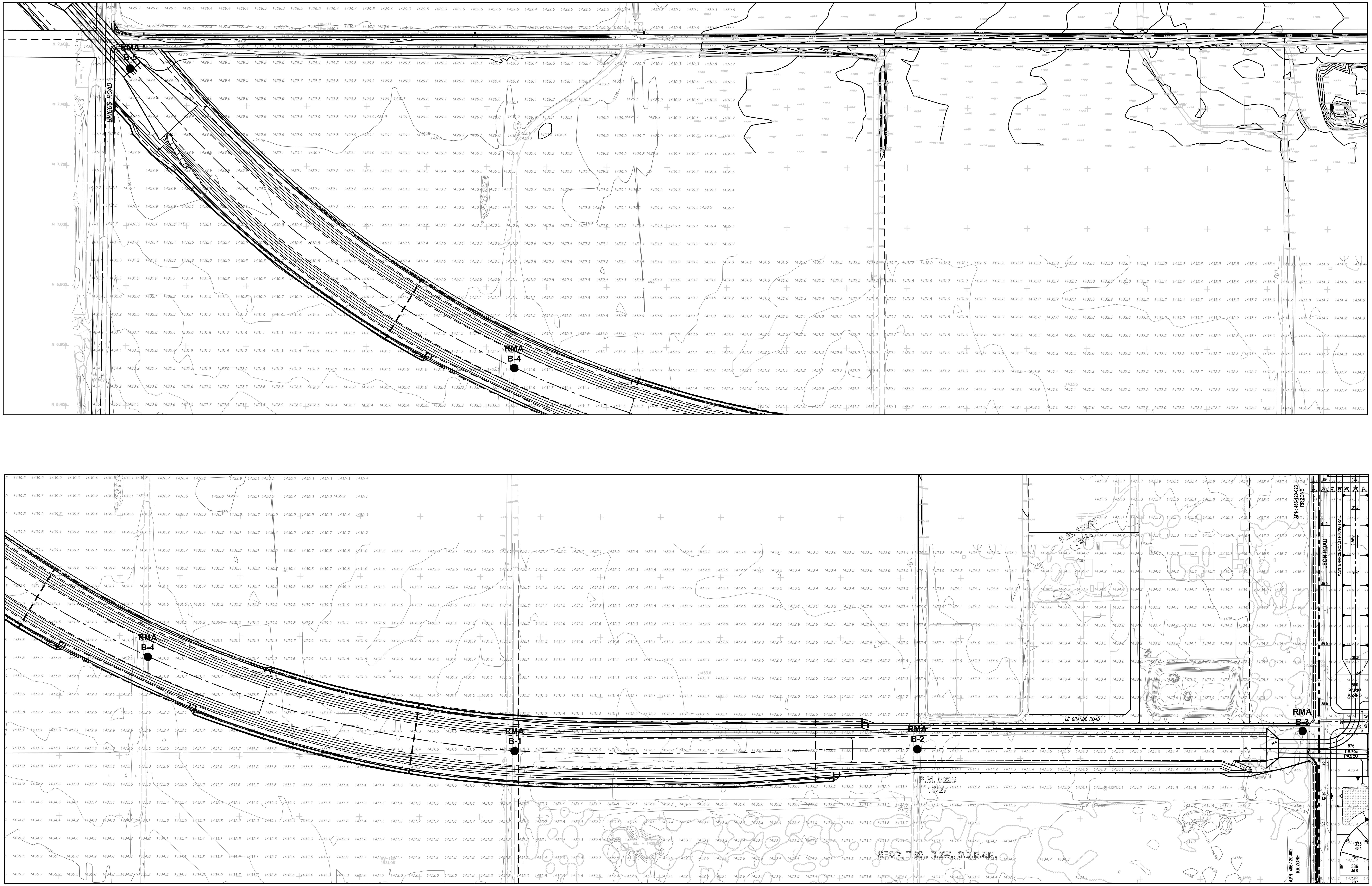
EXHIBIT PREPARER:
VSL ENGINEERING
951-296-3930
31805 TEMECULA PARKWAY, #129
TEMECULA, CA 92592

DATE PREPARED: MARCH 15, 2018

DEVELOPER:
SUN HOLLAND, LLC
949-218-6023
27127 CALLE ARROYO, #1910
SAN JUAN CAPISTRANO, CA 92675

COUNTY OF RIVERSIDE
TENT. TRACT 37439
(574 LOTS)
SCHEDULE "A"

SHEET NO.
1
OF 1 SHTS.
FILE NO.



Scale 1" = 100'

RMA GeoScience

BORING AND TRENCH LOCATION MAP

0' 100' 200' 300' 400'
SCALE: 1" = 100'

Plate 2

PROJECT NO.	17H-0307-0
DATE	3-20-2018
PREPARED BY	AEG
APPROVED BY	MAS