APPENDIX E – GEOTECHNICAL REVIEW OF TENTATIVE TRACT MAP

RMA GeoScience
Every Project Matters | www.rmacompanies.com

October 19, 2022 Project No. 22G-1064-0

Pacific Summit Tilbury, LLC
LA-DF Investment Fund 78, LLC
212 S. Palm Avenue, Suite 200
Alhambra, CA 91801

Attention: Chad Stadnicki

Subject: Geotechnical Review of Tentative Tract Map
Tentative Tract Map No. 83674
Rancho Vista Blvd. & Tilbury Drive
Palmdale, CA

Dear Chad Stadnicki,

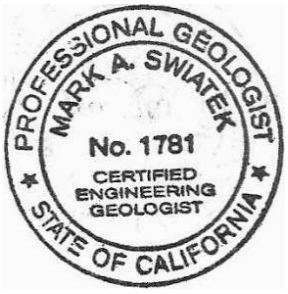
In accordance with your request, we have completed a geotechnical review of Tentative Tract Map No. 83674 in the City of Palmdale, California. The review relied upon field observation and available work, laboratory testing and engineering analyses completed as a part of the referenced geotechnical investigation of the property completed by other firms. The Geologic Maps, Plates 1-3 included in this report were prepared utilizing the Conceptual Grading and Drainage Plan prepared by Antelope Valley Engineering. The findings of the geotechnical review are presented in the accompanying report.

We appreciate this opportunity to be of continued 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

Haiyan Liu, PE
Project Engineer
C81463



Mark A. Swiatek, RG|CEG
Principal Geologist
CEG 1781

RMA GeoScience
Every Project Matters | www.rmacompanies.com

GEOTECHNICAL REVIEW OF TENTATIVE TRACT MAP
TENTATIVE TRACT MAP NO. 83674
RANCHO VISTA BLVD. AND TILBURY DRIVE
PALMDALE, CALIFORNIA

For

Pacific Summit Tilbury, LLC
LA-DF Investment Fund 78, LLC
212 S. Palm Avenue, Suite 200
Alhambra, CA 91801

October 19, 2022

Project No. 22G-1064-0

RMA GeoScience
Every Project Matters | www.rmacompanies.com

Table of Contents

RMA GeoScience
Every Project Matters | www.rmacompanies.com

FIGURES AND PLATES

APPENDICES

RMA GeoScience
Every Project Matters | www.rmacompanies.com

1.0 Introduction

1.01 Purpose

The purpose of this study was to identify and evaluate general geotechnical, geologic and environmental conditions within Tentative Parcel No. 83674 in the City of Palmdale, California. This study included site visits and reviewing of available geotechnical, geologic and percolation testing reports of the subject tract and adjacent properties.

1.02 Scope of the Study

The general scope of this investigation included the following:

- Review of prior geologic and geotechnical reports prepared for the subject tract
- Review of regional geologic maps and reports prepared by the California Geological Survey including those prepared when the agency was known as the California Division of Mines and Geology, the U.S. Geological Survey and the California Department of Water Resources.
- Examination of aerial photographs available from in-house library and other sources.
- Preparation of Geologic Maps
- Provide the latest 2019 Seismic Design Parameters
- 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 property consists of an irregularly shaped parcel of land located on the west side of Rancho Vista Boulevard and Tilbury Drive and neighbored between two developed tracts in the north and south in the city of Palmdale, California (Figure 1). The tract at north is Tract No. 46394, which is bordered with a masonry wall on top of a increasing height slope to the east up to 8 feet. The boundary at south with Tract 45003 is an upslope from east to west. A rough graded tract No. 62490 with paved streets and vacant lots is at the southeast, whose grading operation was observed and documented by AGI Geotechnical, Inc. in 2012.

Based on field observation conducted on October 7, 2022, the subject site was vacant land with vegetation consisting of short brush and annual grasses. The subject site encompasses moderately steep hilly terrain in its northwest and southwest portions, flattening to more gently north sloping terrain across the northeast, central and east portions of the Tract. Topographic relief (from the southwest corner of the Tract to its northeast corner) is approximately 40 feet. A protruding ridge in the northwest portion of the Tract is another 50’ to 60’ higher. Existing topography across the study site is gently sloping with surface drainage by sheet surface flow to the east to southeast. A temporary desilting basin approximately 6 feet was observed at the southeast of the subject Tract 83674 next to Tract 45003 and on the west side of Tilbury Street. Stockpiles have been observed at the southeast portion of the subject site. Joshua Tree existed on the northwestern portion of the subject site.

Its central geographic position is 33.610381° north latitude and -117.166056° west longitude.

1.04 Planned Development

The Tentative Tract Map was prepared by Antelope Valley Engineering at a scale of 1"=60'. The three sheet set of plans is dated May 2, 2002. For the purposes of this report, we used the Antelope Valley Engineering at a scale of 1"=40' Conceptual Grading and Drainage Plan dated May 3, 2022. According to the plans, the Tract Map will be divided into two units. Unit 1 is planned for 102 residential homesites and Unit 2 is planned for 139 residential units. Unit 1 contains a 17.8 acre open space area (lot A) and 2 basins (Lots B and C). Unit 2 contains lettered lots A thru F for slopes, pads and a rec center.

Cut and fill slopes are planned at gradients of 2:1 up to a maximum height of 50 feet. Public and private Streets are planned to access the lots. Retaining walls are also planned as a part of the development as indicated on Details B,E,F,G2 and H.

Our understanding is the proposed project will consist of the construction of single and/or two story, wood framed structures with slab on grade. These types of structures typically have a light to moderate weight with continuous and / or isolated foundation design.

The approximate location of borings presented in the referenced Geotechnical Data Report prepared by CCL Engineering Inc., QC Consultants Inc. and Southwest Geotechnical Inc. were re-plotted on Conceptual Grading & Drainage plan of Tentative Tract No. 83674 prepared by Antelope Valley Engineering as Plates 1 and 2.

2.00 Findings

2.01 Geologic Setting (Southwest Geotechnical, Inc. 2006)

The site is situated along the northern boundary of the Transverse Ranges Geomorphic Province with the San Andreas Fault dividing the Transverse Ranges from the northern Mojave Geomorphic Province. The Transverse Ranges are an east-west trending series of mountain ranges and valleys that extend from the San Bernardo Mountains to the Pacific Ocean including the offshore islands of San Miguel, Santa Rosa and Santa Cruz. The Transverse Range block has rotated 80 to 110 degrees clockwise (Bartolomeo and Longinotti). This rotation occurred in three stages: subduction, transtension and transpression during the western North America Plate's change from a subduction zone where the Farallon-Pacific spreading ridge was subducted and the western coast plate boundary became transtensional. A number of continental blocks broke off, one being the Transverse Ranges block. As the oceanic and continental plates' motions changed, the northern end of the Transverse Ranges block was pinned thereby starting its counter clockwise rotation and the continental margin began opening up a number of extensional basins by normal faulting. The Transverse Ranges rotation continued until the Pacific Plate transported continental Baja California and began transporting it northwest pushing it against southern California again changing the western North America Plate coastal boundary from a transtensional to a transpressional regime. The continental compressional forces created widespread folding, and the former normal faults transitioned to reverse faults creating extensive uplift of the Transverse Ranges (Atwater, 1998).

The earth materials underlying the area of planned development consists predominately of Quaternary Aged alluvium and Pelona Schist. The active San Andreas Fault is located approximately 1.5 miles to the south of the site.

The site is not located in a Fault Study Zone, although it is not located within a liquefaction hazard zone. The closest zoned fault is the San Andreas Fault located to the north.

The mapped earth units encountered on site are shown on the Geologic Maps, Sheets 1- 3 and discussed in further detail in the sections below.

2.02 Earth Materials

The lower (northerly and central) portions of the site are primarily underlain by alluvial (Q_{al}) deposits, while the northwest and southerly portions of the site (Hillsides) are underlain by Pelona Schist (Psp) bedrock. The southwest and northwest portions of the site can be typified as north to east trending ridges (bedrock, with thin soil cover), separated by several more gently north and east trending ravines or swales, which contain alluvial soil deposits. The majority of the site (northerly, middle, & easterly portions) consist of a sloping alluvial fan that is underlain by slope wash soils (Q_{SW}), more recent alluvial/ colluvial (Q_{al}) deposits, and older alluvial soils at depth. Previous consultants also used the terms residual soil, colluvium, slopewash and older alluvium in there descriptions of the earth materials but did not differentiate them on the maps or exploration logs. Laboratory testing indicates that the upper five (5) to seven (7) feet of this unit is prone to 2% or greater hydroconsolidation. The underlying older alluvium was medium-dense to dense silty sands. All of the on-site soils are suitable for reuse as fill soils.

The bedrock (Pelona Schist) exposed along the ridges in the westerly & southerly portions of the Tract and as encountered in the Geologic Trenches, is dense and contains some highly resistant (very dense) quartzite strata and more massive zones of non-foliated material. The schist is typically well foliated and fractured and the surface (2'-4' ±) is weathered. The rock is classified as "soft to moderately hard", and will present moderate resistance to excavation with large earthmoving equipment. Locally, strata of denser rock (quartz/quartzite) and very fresh (unweathered) rock in the deeper cuts will require ripping with large bulldozers (D-9 with single shank rippers). Some of this rock (1% -2%) will not break down to sizes small enough to incorporate into the proposed fills and will have to be disposed of offsite or used in slope- protection areas.

The primary geologic structure observed within the onsite bedrock is schistosity, or mineral alignment pattern (foliation) typical of schist and some other rock types of metamorphic origin. Schistosity, as observed within our onsite test holes and illustrated on regional geologic references of the site's vicinity, indicates the predominant orientation of the onsite bedrock is an east-west and northwest strike and a north and northeast dip ranging from 17 to 48 degrees. The generally steep angles of the schistose planes are considered supported with respect to the slope in its existing condition, and are considered favorable for the site's gross stability.

Secondary structural elements, namely joints, were also observed within the bedrock exposed in the exploratory trenches. Two pervasive sets of joints were observed; a north- to northwest-striking steeply west-dipping joint set and a east- west-striking near-vertical set of joints. The geometric relationships between the two joint sets, as well as their orientations with respect to the schistosity, are considered supported with respect to the existing and proposed slopes.

The onsite bedrock is also moderately to highly fractured along randomly oriented, steeply dipping, and discontinuous fractures. These fractures are not anticipated to adversely affect the proposed onsite grading or the existing onsite slopes.

2.03 Expansive Soil

Soils at this site are expected to be non-expansive (E.I. < 20), or at worst, slightly expansive (E.I. in the 21-50 range). The bedrock cut pads may expose clay-rich strata (seams, layers) that could be expansive in nature. If expansive layers/seams are encountered in cut lots, they should be re-graded as previously recommended. The final expansive nature of the soils will necessarily have to be determined during/after the pads are graded, when the on-site soils have been mixed/blended.

2.04 Surface and Groundwater Conditions

No surface water was observed during the site reconnaissance and field exploration program and no evidence of near-surface ground water conditions were observed at the time of our field reconnaissance. It is anticipated that ground water conditions should not adversely affect the proposed development. (QC Consultants Inc., 2006).

2.05 Landslides

The site is relatively flat and there are no known landslides within or immediately adjacent to the site. The property has not been mapped within a seismic hazard zone. The potential for landsliding at the site is judged to be low.

2.06 Faulting

The site does not lie within an AP Fault Zone. The active San Andreas fault system lies approximately 1.5 miles south of the site and the inactive Hitchbrook fault is mapped approximately one mile northwest of the site.

3.00 Conclusions and Recommendations

3.01 General Conclusion

Based on specific data and information contained in this report and the referenced reports, 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 geotechnically feasible provided the recommendations presented below are fully implemented during design and construction.

Further detailed geotechnical studies including subsurface exploration, soil sampling, laboratory testing and engineering analyses are recommended at the grading plan stage of the project.

3.02 General Earthwork and Grading

It is recommended that all earthwork and grading be performed in accordance with the 2019 California Building Code and all applicable governmental agency requirements. In the event of conflicts between this report and the 2019 California Building Code, this report shall govern.

3.03 Removals and Overexcavation

All vegetation, trash, and debris should be cleared from the grading area and removed from the site. Prior to placement of compacted fills, all undocumented fills (af) and loose, porous, or compressible alluvial soils will need to be removed down to competent ground in areas planned for foundation support. Removal and requirements will also apply to cut areas, if the depth of cut is not sufficient to reach competent ground. Removed and/or over-excavated soils may be moisture-conditioned and recompacted as engineered fill, except for soils containing detrimental amounts of organic material or chemical contamination. Estimated depths of removals are based on the following:

- All undocumented fills (af) and loose, porous, or compressible topsoil, and alluvial soils will need to be removed down to competent ground. It is expected that competent ground (bedrock) will be encountered below existing artificial fill (af) and alluvium. Provided competent materials are exposed, these cut surfaces should be scarified to a minimum depth of 6 inches, moisture conditioned and compacted to a minimum of 90% relative compaction (ASTM D1557) provided that footing overexcavation requirements are met.

In addition to the above requirements, in areas were the planned foundation transitions from cut to fill, over-excavation will also need to meet the following criteria for the building pads, concrete flatwork and pavement areas:

- Within the graded areas, removals are recommended to a minimum of seven (7) feet below existing grade or three (5) feet below the bottom of planned footings, whichever is greater.

- All concrete flatwork 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).

The above recommendations are based on the assumption that soils encountered during field exploration were representative of soils throughout the site. However, there can be unforeseen and unanticipated variations in soils between points of subsurface exploration. Hence, overexcavation depths must be verified, and adjusted if necessary, at the time of grading. The overexcavated materials may be moisture-conditioned and re-compacted as engineered fill.

3.04 Graded Slopes

Cut and fill slopes up to the maximum height planned are anticipated to be stable at gradients of 2:1 or less.

North-facing proposed cut slopes whose resulting slope gradients will exceed the angles of the schistose planes are anticipated to result in an unsupported condition with respect to the face of the excavation. This proposed condition should be evaluated and analyzed for stability by the project geotechnical engineer at the grading plan review stage of the project. In general, cut slopes graded to 2:1 (horizontal: vertical) or flatter slope gradients are anticipated to result in a supported condition with respect to the predominant orientation with the observed schistose planes.

Several planned cuts are also anticipated to expose alluvium. Any cuts slopes exposing alluvium need to be overexcavated and rebuilt as stabilizations fill slopes. We have included our typical stabilization slope detail in Appendix B for planned cuts which require stabilization.

3.04 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 fill (elevated building pad, embankment, etc.) is placed over natural ground. These factors account for changes in soil volumes that will occur during grading. Our estimates are as follows:

- Shrinkage factor = 7% - 12% for soil removed and replaced as compacted fill
- Subsidence factor = approximately 1 percent of the height of fill that is placed

These estimates do not include losses due to removal of existing structures, improvements or over-sized materials (boulders, concrete or other similar materials greater than 12 inches in maximum dimension). Removal and exporting of these materials is may have an impact earthwork balance and should be considered in design, planning and cost estimating.

The degree to which fill soils are compacted and variations in the insitu 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.

3.05 Import soil

Imported fill materials that will be placed within building, pavement, or concrete flatwork areas must be non-hazardous and be obtained from a single, uniform source that meets the following criteria:

Maximum Particle Size:	3 inches
Percent Passing 3/4-inch Sieve:	90% - 100%
Percent Passing #4 Sieve:	60% - 100%
Percent Passing #200 Sieve:	15% - 20%
Maximum Expansion Index:	less than 20

3.06 Excavation Characteristics and Rock Disposal

The bedrock (Pelona Schist) exposed along the ridges in the westerly & southerly portions of the Tract and as encountered in the Geologic Trenches, is dense and contains some highly resistant (very dense) quartzite strata and more massive zones of non-foliated material. The schist is typically well foliated and fractured and the surface (2'-4' ±) is weathered. The rock is classified as "soft to moderately hard", and will present moderate resistance to excavation with large earthmoving equipment. Locally, strata of denser rock (quartz/quartzite) and very fresh (unweathered) rock in the deeper cuts will require ripping with large bulldozers (D-9 with single shank rippers). Some of this rock (1% - 2%) will not break down to sizes small enough to incorporate into the proposed fills and will have to be disposed of offsite or used in slope- protection areas.

No rocks greater than 1 foot in dimension may be placed in the structural fill pads; no rocks greater than 6" in dimension may be placed in the upper 3' of the pads. As the deeper cuts will produce very rocky material, it may be necessary to utilize large, steel wheeled compaction apparatus to break down oversize rocks and to blend the rocks/soil together into a non-voided, well-compacted fill mass. All placed fill is to be observed and tested by the geotechnical engineer's representative to verify compliance with these recommendations.

3.07 Temporary Slopes and Excavations

Based on the recommended removal depths as described in Section 3.03, temporary excavations within the limits of grading are expected to be 7 feet. Excavations may be cut vertically to a maximum height of 4 feet. Cuts above 4 feet may be laid back at a gradient of 1:1.

For excavations adjacent to existing walls, buildings or along property lines, the use of ABC Slot Cuts may be necessary to achieve recommended grading limits. The ABC Slot Cut Method uses the earth as a buttress and allows the earth excavation to proceed in phases. The requirement and design of slot cuts should be evaluated at the grading plan review stage.

Vehicles, equipment, materials, etc. should be set back away from the edge of temporary excavations a minimum distance of 10 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.

3.08 Seismic Design Parameters

Mapped Spectral Accelerations were obtained by using the online ATC Calculator (ASCE 7-16 Standard) and a site class D was used for the project site based on seismic shear-wave survey results. Since the mapped risk-targeted maximum considered earthquake (MCE_R) spectral response acceleration parameter at a period of 1 second (S_1) is greater than 0.2, a ground motion hazard analysis is required per ACSE/SEI 7-16 to be performed in accordance with Section 21.2 for structures on Site Class D. However, instead of performing the ground motion hazard analysis, a long period coefficient (F_V) of 1.7 was used for calculation of S_{M1} and S_{D1}. The parameters generated for the subject site are presented in the following table:

2019 California Building Code (CBC) Seismic Parameters

Parameter	Value
Site Location	Latitude = 34.60366 degrees Longitude = -118.192035 degrees
Site Class	Site Class = D
Mapped Spectral Accelerations	S_s (0.2- second period) = 2.285g S_1 (1-second period) = 0.971 g
Site Coefficients (Site Class D)	F_a = 1.0 F_v = 1.7
Maximum Considered Earthquake Spectral Accelerations (Site Class D)	S_{MS} (0.2- second period) = 2.285g S_{M1} (1-second period) = 1.651g
Design Earthquake Spectral Accelerations (Site Class D)	S_{DS} (0.2- second period) = 1.523g S_{D1} (1-second period) = 1.1g

For Risk Category II structures with mapped spectral response acceleration parameter at 1-s period (S_1) is greater than 0.75, the Seismic Design Category is E (ASCE 7-16 Section 11.6).

Peak earthquake ground acceleration adjusted for site class effects (PGA_M) has been determined in accordance with ASCE 7-16 Section 11.8.3 as follows: $PGA_M = F_{PGA} \times PGA = 1.1 \times 0.983g = 1.082g$.

3.09 Liquefaction and Secondary Earthquake Hazards

Potential secondary seismic hazards that can affect land development projects 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 loose its shear strength and enter a liquefied state. The possibility of liquefaction is dependent upon grain size, relative density, confining pressure, saturation of the soils, and intensity and duration of ground shaking. 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 not located in an area of known liquefaction hazards. The site is underlain at shallow depths by either bedrock or dense older alluvial soils & ground water levels are at least 100 feet below the site. Therefore, the risk of liquefaction occurring during a design seismic event is considered negligible.

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 and seiches do not pose hazards due to the inland location of the site and lack of nearby bodies of standing water.

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 soil and bedrock, seismically induced settlement is not considered a design concern during a design seismic event.

Seismically Induced Flooding

The site is not located within a potential dam inundation area. Consequently seismically induced flooding at the site is unlikely.

Seismically Induced Landsliding

According to the California Geological Survey Earthquake Zones of Required Investigation for the Ritter Ridge Quadrangle (2003, 1979) the site does not lie in a landslide hazard zone. Since the site is relatively flat earthquake-induced landsliding does not appear to be a hazard to proposed development.

3.10 Foundation

Isolated spread footings and/or continuous wall footings are recommended to support the proposed structures. If the recommendations in the section on grading are followed and footings are established in compacted fill, footings may be designed using the following allowable soil bearing values.

- For continuous wall footings, the allowable soil bearing values and foundation parameters are summarized in the following table.

Number of Stories	Expansion Index	Footing Width, in.	Depth Below Finish Grade		Soil Bearing Capacity, psf	Reinforcement
			Perimeter Footings, in.	Interior Footings, in.		
1	Low	12	12	12	1800	One #4 bars top & bottom
2	Low	15	18	18	2200	Two #4 bars top & bottom

- Isolated Spread Footings:

  Footings having a minimum width of 24 inches and a minimum depth of 18 inches below the lowest adjacent grade may be designed for an allowable bearing pressure of 2,200 psf.

- Retaining Wall Footings:

  Footings for retaining walls should be founded a minimum depth of 12 inches and have a minimum width of 12 inches. Footings may be designed using the allowable bearing capacity of 1,500 pounds per square foot (psf). However, when calculating passive resistance, the upper 6 inches of the footings should be ignored in areas where the footing will not be covered with concrete flatwork. Reinforcement should be provided for structural considerations by the design engineer.

The above bearing pressures 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 above bearing capacity may be increased by 20% for each additional foot of depth or width, to a maximum of 3,000 psf. The maximum expected settlement of footings designed with the recommended allowable bearing pressure is expected to be on the order of 1 inch with differential settlement on the order of ½ inch in a 30 feet span. The structural engineer should review the footing reinforcement and 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.

3.11 Slab-On-Grade

Concrete floor slabs on grade with a minimum thickness of 4 inches are recommended for slabs on grade for the proposed structures for normal floor loading conditions. However, if heavy concentrated or moving loads are anticipated, slabs should be designed using a modulus of subgrade reaction (k) of 150 psi/in when soils are prepared in conformance with the grading recommendations contained within the report. Reinforcement may be specified by the structural engineer. At a minimum, building slabs should be reinforced with a minimum of #3 bars at 24-inch centers each way.

Concrete floor slabs on grade 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.

A moisture vapor retarder/barrier is recommended beneath all slabs-on-grade 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 Section 1805 of the 2019 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 consist of a minimum 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 moisture vapor retarder/barriers either directly beneath floor slabs or below an intermediate granular soil layer.

Placing the moisture retarder/barrier directly beneath the floor slab will provide improved curing of the slab bottom and will eliminate potential problems caused by water being trapped in a granular fill layer. Concrete slabs poured directly on a vapor retarder/barrier can experience shrinkage cracking and curling due to differential rates of curing through the thickness of the slab. Therefore, for concrete placed directly on the vapor retarded, we recommend a maximum water cement ratio of 0.45 and the use of water-reducing admixtures to increase workability and decrease bleeding.

If granular soil is placed above and below 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.

3.12 Miscellaneous Concrete Flatwork

Miscellaneous concrete flatwork and walkways may be designed with a minimum thickness of 4 inches. Control joints should be constructed to create squares or rectangles with a maximum spacing of 15 feet. Outdoor flatwork should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

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 subgrade soils beneath all miscellaneous concrete flatwork should be compacted to a minimum of 95 percent relative compaction for a minimum depth of 12 inches. The geotechnical engineer should monitor the compaction of the subgrade soils and perform testing to verify that proper compaction has been obtained.

3.13 Footing Excavation and Slab Preparation

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 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 95 percent relative compaction within the upper 12 inches.

Footings may experience and 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.

Subgrade soils beneath slabs on grade and walkways moist prior to the placement of concrete. The geotechnical

consultant should verify that the appropriate moisture content has been achieved a maximum of 24 hours prior to the placement of concrete or moisture barriers.

3.14 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).

  We recommend neglecting passive soil resistance from the upper foot of soil unless protected by a concrete slab or pavement.
- Allowable Coefficient of Friction (soil to footing) = 0.30
- 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	40
2:1	55

  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 = 60 pcf (equivalent fluid weight)

The lateral earth pressure due to earthquake motions for the retaining walls are calculated by using PGA=S_{DS}/2.5=0.609g and γ=125 pcf for retaining wall dynamic load increment calculations. The point of application may vary between 0.37H to 0.40H.

- Basement (restrained) walls with level backfill:
  $P_{ae} = \frac{1}{2}\gamma H^2(0.68\ PGA/g) = 26H^2$
- Cantilever (unrestrained) walls with level backfill:
  $P_{ae} = \frac{1}{2}\gamma H^2(0.42\ PGA/g) = 16H^2$
- Cantilever (unrestrained) walls with no steeper than 2:1 slope:
  $P_{ae} = \frac{1}{2}\gamma H^2(0.70\ PGA/g) = 27H^2$

3.15 Cement Type and Corrosion Potential

These results indicate that concrete at the subject site will have a negligible exposure to water-soluble sulfate in the soil. Our 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 Type V concrete or combinations of cementitious materials formulated to provide sulfate resistance may be permitted if the combinations meet design recommendations contained in American Concrete Institute guideline ACI 318-11.

Based on our analysis, it appears that the underlying onsite soils are corrosive to ferrous metals. Protection of buried pipes utilizing coatings on all underground pipes; clean backfills and a cathodic protection system can be effective in controlling corrosion. A qualified corrosion engineer should be consulted to further assess the corrosive properties of the soil.

3.16 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 back fill 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.

3.17 Drainage

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 or within low-lying or level areas of the lot. 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.

3.18 Preliminary Pavement Sections

Based on an assumed R-value of 64 (QC Construction, Inc. 2006), we would recommend the following preliminary structural sections:

ASPHALT SECTIONS

Street Type	TRAFFIC INDEX	ASPHALT THICKNESS, IN.	BASE THICKNESS, IN.
Interior & Collector Street	5.0	3.5	4.0
Minor Arterial	9.0	4.0	7.0
Main City Street	10.0	4.0	8.0

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 prior to placement of base. All aggregate base courses should also be at or no more than 2% over optimum moisture and compacted to a minimum of 95% relative compaction.

3.19 Plan Review

Once formal 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.

3.20 Geotechnical Observation and Testing During Grading

The geotechnical engineer should be contacted to provide observation and testing during the following stages of grading:

- During the clearing and grubbing of the site.
- During the demolition of any existing structures, buried utilities or other existing improvements.
- During excavation and over-excavation of existing subgrade.
- During all phases of grading including ground preparation and filling operations.
- When any unusual conditions are encountered during grading.

A grading and compaction report summarizing conditions encountered during grading and the in-place density testing that was performed should be submitted upon completion of the earthwork construction.

3.21 Post-Grading Geotechnical Observation and Testing

After the completion of grading the geotechnical engineer should be contacted to provide additional observation and testing during the following construction activities:

- During trenching and backfilling operations of buried improvements and utilities to verify proper backfill and compaction of the utility trenches.
- After excavation and prior to placement of reinforcing steel or concrete within footing excavations to verify that footings are properly founded in competent materials.
- During fine or precise grading involving the placement of any fills underlying driveways, sidewalks, walkways, or other miscellaneous concrete flatwork to verify proper placement, mixing and compaction of fills.
- When any unusual conditions are encountered during construction.

4.0 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 Pacific Summit Tilbury, LLC and LA-DF Investment Fund 78, 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 AND PLATES

RMA GeoScience
Every Project Matters | www.rmacompanies.com

Source Map: Google Earth

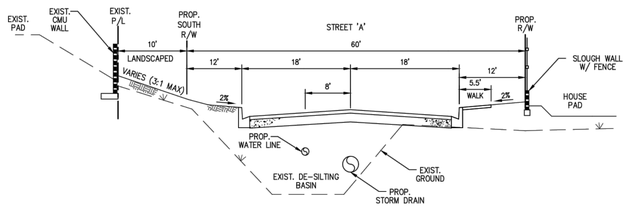
North

Not to Scale

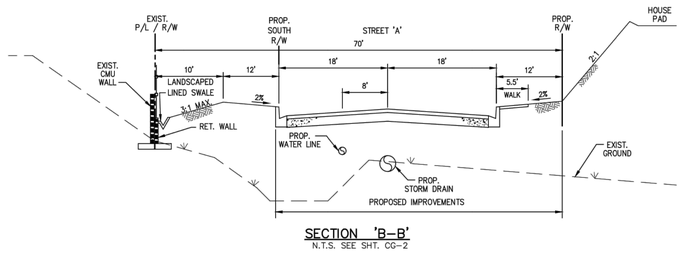
Figure 1: Site Location Map

CITY OF PALMDALE
CONCEPTUAL GRADING PLAN
TENTATIVE TRACT NO. 83674

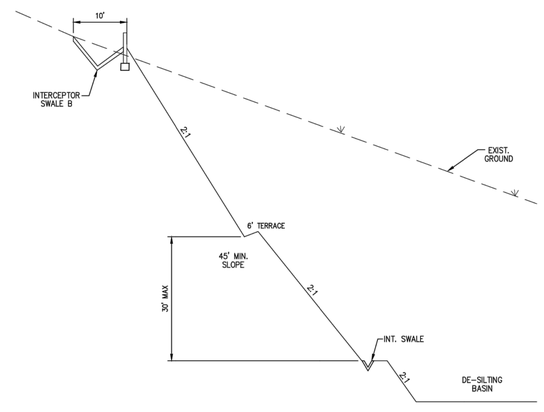
RANCHO VISTA BLVD & TILBURY STREET
PALMDALE, CA. 93551
APN's 3001-003-160, 163 & 164



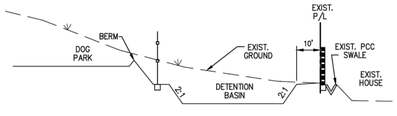
SECTION 'A-A'
N.T.S. SEE SHT. CG-3



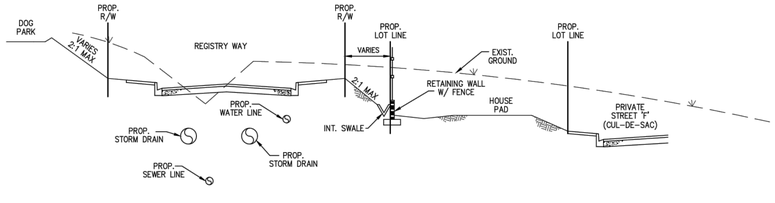
SECTION 'B-B'
N.T.S. SEE SHT. CG-2



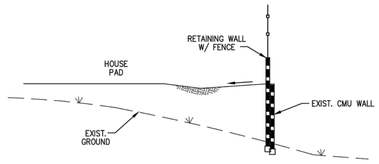
SECTION 'C-C'
N.T.S. SEE SHT. CG-2



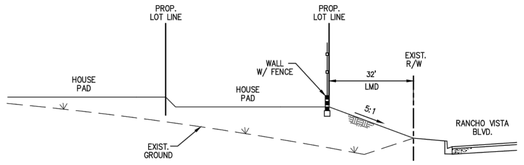
SECTION 'D-D'
N.T.S. SEE SHT. CG-2



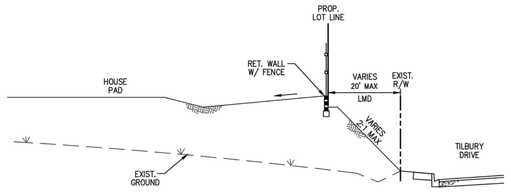
SECTION 'E-E'
N.T.S. SEE SHT. CG-2



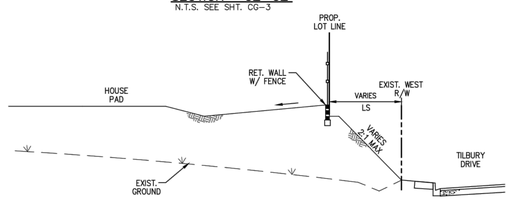
SECTION 'F-F'
N.T.S. SEE SHT. CG-3



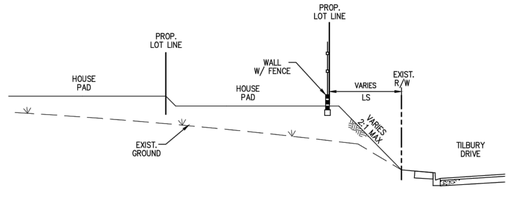
SECTION 'G-G'
N.T.S. SEE SHT. CG-3



SECTION 'G2-G2'
N.T.S. SEE SHT. CG-3

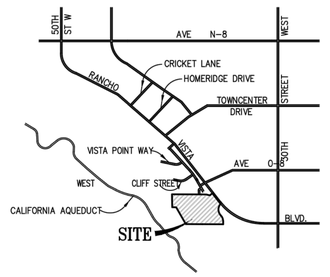


SECTION 'H-H'
N.T.S. SEE SHT. CG-3

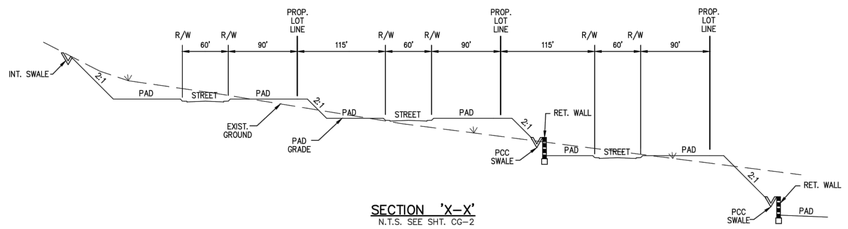


SECTION 'H2-H2'
N.T.S. SEE SHT. CG-3

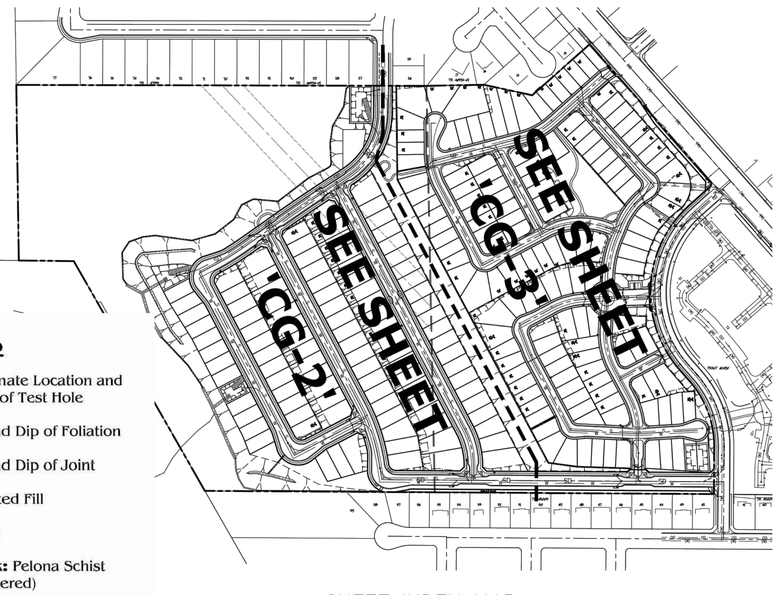
BENCHMARK: L 6266
ELEV. 2712.351'
DPW BM TAG IN S CB 12' E/O BCR @ SE COR 30TH ST W & RANCHO VISTA BLVD (AVE P)
PALMDALE QUAD (2010 ADJ.)
NAVD 88 DATUM



VICINITY MAP
(NOT TO SCALE)



SECTION 'X-X'
N.T.S. SEE SHT. CG-2



SHEET INDEX MAP
1"=200'

GEOLOGIC MAP **LEGEND**

TH-1	Approximate Location and Number of Test Hole
21	Strike and Dip of Foliation
67	Strike and Dip of Joint
Afc	Compacted Fill
Qal	Alluvium
Psp	**Bedrock:** Pelona Schist (Soil Covered)
B-4	Approximate Location of Borings (QC Consultants Inc., 2006)

UNIT1 (PA 7)

PRELIMINARY ESTIMATE OF EARTHWORK

DESCRIPTION	CUT (C.Y.)	FILL (C.Y.)
LOT (RAW)	*192,665*	*165,142*
3" OVER-EX & 7" SCARIFICATION BENEATH ALL AREAS (400,606 SF)	*53,167*	*53,167*
2' OVER-EX & 7" SCARIFICATION BENEATH ALL AREAS (640,567 SF)	*61,288*	*61,288*
SUBTOTALS	*307,120*	*279,597*
* *SHRINKAGE @ 9%*	–	*25,164*
* *0.02' SUBSIDENCE (±1,041,773 SF)*	–	*771*
TOTALS	*307,120*	*305,532*
EXPORT TOTALS	*1,588*	–

ENGINEER'S ESTIMATE OF EARTHWORK FOR PERMIT PURPOSES ONLY. CONTRACTOR TO DETERMINE THEIR OWN EARTHWORK FOR BIDDING PURPOSES. FOOTING & TRENCH SPOILS NOT INCLUDED IN ABOVE CALCULATIONS.

*NOTE: SOILS REPORT DOES NOT INDICATE VALUES, ESTIMATED..

UNIT2 (PA 8)

PRELIMINARY ESTIMATE OF EARTHWORK

DESCRIPTION	CUT (C.Y.)	FILL (C.Y.)
LOT (RAW)	*115,715*	*59,448*
7" OVER-EX & 12" SCARIFICATION (445,665 SF)	*132,049*	*132,049*
PAVEMENT/HARDSCAPE/FILL AREAS 1' OVER-EX & 12" SCARIFICATION (579,032 SF)	*42,891*	*42,891*
SUBTOTALS	*290,655*	*234,388*
* *SHRINKAGE @ 10%*	–	*23,439*
* *0.1' SUBSIDENCE (±1,024,691 SF)*	–	*3,795*
TOTALS	*290,655*	*261,622*
EXPORT TOTALS	*29,033*	–

ENGINEER'S ESTIMATE OF EARTHWORK FOR PERMIT PURPOSES ONLY. CONTRACTOR TO DETERMINE THEIR OWN EARTHWORK FOR BIDDING PURPOSES. FOOTING & TRENCH SPOILS NOT INCLUDED IN ABOVE CALCULATIONS.

*NOTE: SOILS REPORT DOES NOT INDICATE VALUES, ESTIMATED..

REV.	DESCRIPTION	DATE
1	---	-/-/-

DEVELOPER
PACIFIC SUMMIT TILBURY, LLC
LA-DF INVESTMENT FUND 78, LLC
212 SOUTH PALM AVENUE #200
ALHAMBRA, CA. 91801
ATTN: CHAD STADNICKI
(626)282-3100 X-18

PROJECT
TENTATIVE TRACT NO. 83674
RANCHO VISTA BLVD & TILBURY STREET
PALMDALE, CA. 93551
APN's 3001-003-160, 163 & 164

SHEET TITLE
CONCEPTUAL GRADING & DRAINAGE PLAN

REGISTERED PROFESSIONAL ENGINEER — BARRY S. MARSHALL — C44084 — EXP. 6-30-23 — CIVIL — STATE OF CALIFORNIA
PRELIMINARY FOR REVIEW

PLANS PREPARED BY:
Antelope Valley Engineering est. 1975
129 West Pencess St.
Visalia, CA 93291
Tel: (661) 948-8805
Email: info@antelopevalleyengineering.com

DRAWN:	RG/JA
DATE:	5/3/2022
JOB No.:	20-165
SHEET:	CG-1
OF	– SHEETS

T46394

T45003

B-4

B-3

STREET 'B'

STREET 'C'

STREET 'D'

STREET 'E'

STREET 'A'

REGISTRY WAY

DOG PARK

LOT A

LOT C BASIN

LOT D BASIN

Qal

PSP

TH-1

TH-2

TH-3

TH-4

TH-5

TH-6

DOWN DRAIN B

INTERCEPTOR SWALE B

TERRACE DRAIN

SECTION "L–L"
NTS

SECTION "R–R"
NTS

INTERCEPTOR SWALE B
NTS

TERRACE DRAIN
NTS

DOWN DRAIN B

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

LEGEND
- Approximate Location and Number of Test Hole
- Strike and Dip of Foliation
- Strike and Dip of Joint
- Afc Compacted Fill
- Qal Alluvium
- Psn **Bedrock:** Pelona Schist (Soil Covered)
- Approximate Location of Borings (GC Consultants Inc., 2006)

Geology Map

Palmdale, CA

RMA GeoScience

Plate 2

RMA Job No:	22G-1064
Report Date:	10/2022
Prepared By:	MRM

REV.	DESCRIPTION	DATE
1	—	-/-/-

DEVELOPER

PACIFIC SUMMIT TILBURY, LLC
LA-DF INVESTMENT FUND 78, LLC
212 SOUTH PALM AVENUE #200
ALHAMBRA, CA. 91801
ATTN: CHAD STONICKI
(626)282-3100 X-18

PROJECT

TENTATIVE TRACT NO. 83674
RANCHO VISTA BLVD & TILBURY STREET
PALMDALE, CA. 93551
APN's 3001-003-160, 163 & 164

SHEET TITLE

CONCEPTUAL GRADING & DRAINAGE PLAN

REGISTERED PROFESSIONAL ENGINEER
HARRY S. KENNEDY
C44094
EXP. 6-30-23
CIVIL
STATE OF CALIFORNIA

PRELIMINARY FOR REVIEW

PLANS PREPARED BY:
Antelope Valley Engineering est. 1975
129 West Ponders St.
Lancaster, Ca. 93534
Tel: (661) 948-0805
Email: info@antelopevalleyengineering.com

DRAWN:	RG/JA
DATE:	10/3/2021
JOB No.:	20-165
SHEET:	CG-3
OF	– SHEETS

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

APPENDIX A

REFERENCES

RMA GeoScience
Every Project Matters | www.rmacompanies.com

REFERENCES

1. California Building Standards Commission, 2019 California Building Code.

2. CCL Engineering Inc., Geotechnical Conditions, Tentative Tract No. 53342, South of Registry Way, West of 30th St. W., Palmdale, CA, dated October 12, 2005.

3. OC Consultants Inc., Geotechnical Data Report, Proposed Townhomes APN 3001-003-911, Avenue P & 30th Street West Palmdale, California, Project Number: 05-340, dated February 8, 2006.

4. OC Consultants Inc., Percolation Testing for Proposed Dry Well Installation Proposed Townhome Site; APN 3001-003-911 Avenue P & 30th Street West, Palmdale, California Project Number: 05-340, dated March 10, 2006.

5. Southwest Geotechnical, Inc., Limited Geologic Investigation for Proposed Cut Slope Grading Vesting Tentative Tract 53342, Vicinity of Sandstone Court Southwest of Rancho Vista Boulevard, Palmdale, California, dated November 14, 2006.

6. CCL Engineering Inc., Geotechnical Engineering Report, Grading Plan Review for Proposed Residential Development, Tract 53342, Registry Way, south of Rancho Vista Blvd., Palmdale, California, dated November 20, 2006.

7. State of California, Department of Conservation, http://www.conservation.ca.gov/cgs/Pages/Index.aspx

8. Applied Technology Council (ATC) Hazards by Location https://hazards.atcouncil.org

9. Seismic Earth Pressures on Retaining Walls, S004.0, Rev. 1/6/2020, Geotechnical and Materials Engineering Division, Administrative Manual, County of Los Angeles, Department of Public Works.

10. California Geological Survey, Earthquake Zones of Required Investigation, Ritter Ridge Quadrangle, 1979 and 2003.

11. California Geological Survey, Seismic Hazard Zone Report 083, Seismic Hazard Zone Report for the Ritter Ridge 7.5-Minutes Quadrangle, Los Angeles County, California, 2003.

RMA GeoScience
Every Project Matters | www.rmacompanies.com

APPENDIX B

GENERAL EARTHWORK
AND
GRADING SPECIFICATIONS

RMA GeoScience
Every Project Matters | www.rmacompanies.com

General Earthwork and Grading Specifications

B-1.00 General Description

B-1.01 Introduction

These specifications present our general recommendations for earthwork and grading 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.

B-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.

B-2.00 Clearing

B-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.

B-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.

B-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% or 95% relative compaction (ASTM: D1557) provided that

footing overexcavation requirements are met. The minimum of 90% or 95% compaction requirements will be determined by performing hydrometer testing on representative soil samples during grading to define the percentage of passing 2-microns required by City of Los Angeles.

B-3.00 Original Ground Preparation

B-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.

B-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.

B-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 95% 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.

B-4.00 Fill Materials

B-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.

B-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 95% relative compaction. Oversize material shall not be placed within 10 feet of finished grade without the approval of the geotechnical consultant.

B-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.

B-5.00 Placing and Spreading of Fill

B-5.01 Fill Lifts

The selected fill material shall be placed in nearly horizontal layers which when compacted will not exceed approximately 6 inches in thickness. 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.

B-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 he moisture content is as specified to assure thorough bonding during the compacting 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.

B-5.03 Fill Compaction

After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted to not less than 95% 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.

B-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 95% 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 95% 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.

B-5.05 Compaction Testing

Field density tests shall be made by the geotechnical consultant of the compaction of each layer of fill. Density tests shall be made at locations 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.

B-6.00 Subdrains

B-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.

B-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.

B-7.00 Excavations

B-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.

B-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.

B-8.00 Trench Backfill

B-8.01 General

Trench backfill within street right of ways shall be compacted to 95% relative compaction as determined by the ASTM D1557 test method. Backfill may be jetted as a means of initial compaction; however, mechanical compaction will be required to obtain the required percentage of relative compaction. If trenches are jetted, there must be a suitable delay for drainage of excess water before mechanical compaction is applied.

B-9.00 Seasonal Limits

B-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.

B-10.00 Supervision

B-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.

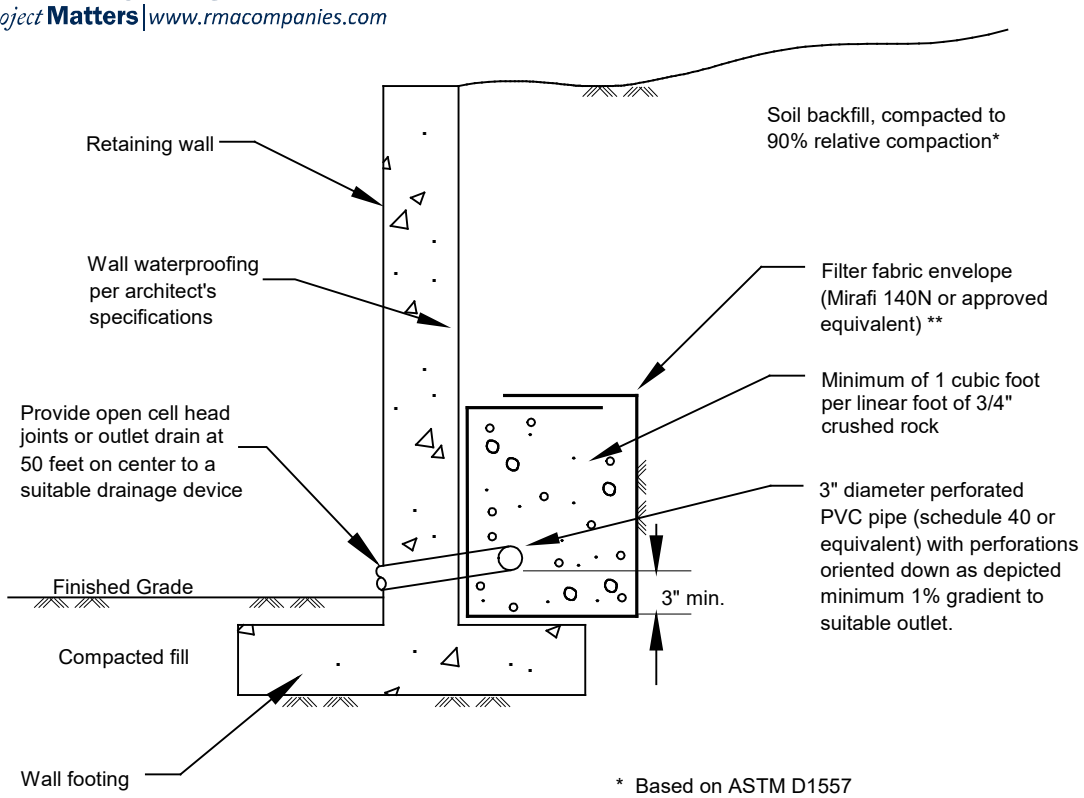
The supervisor of the grading contractor and the field representative of the geotechnical consultant shall have a meeting and discuss the geotechnical aspects of the earthwork prior to commencement of grading.

B-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

RMA GeoScience
Every Project Matters | www.rmacompanies.com



* Based on ASTM D1557

** If class 2 permeable material (See gradation to left) is used in place of 3/4" - 1 1/2" gravel. Filter fabric may be deleted. Class 2 permeable material compacted to 90% relative compaction. *

SPECIFICATIONS FOR CLASS 2 PERMEABLE MATERIAL (CAL TRANS SPECIFICATIONS)

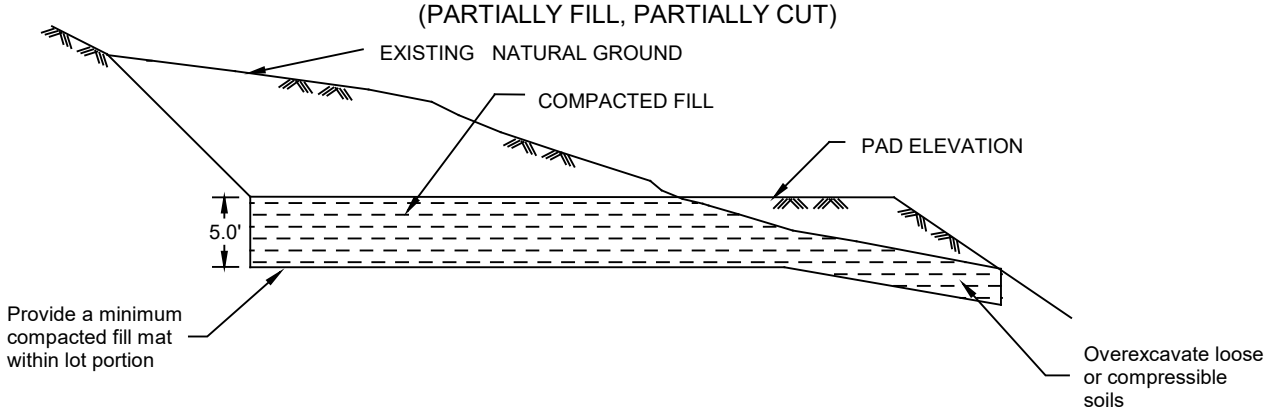
Sieve Size	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No.4	25-40
No.8	18-33
No.30	5-15
No.50	0-7
No.200	0-3

RETAINING WALL DRAINAGE DETAIL

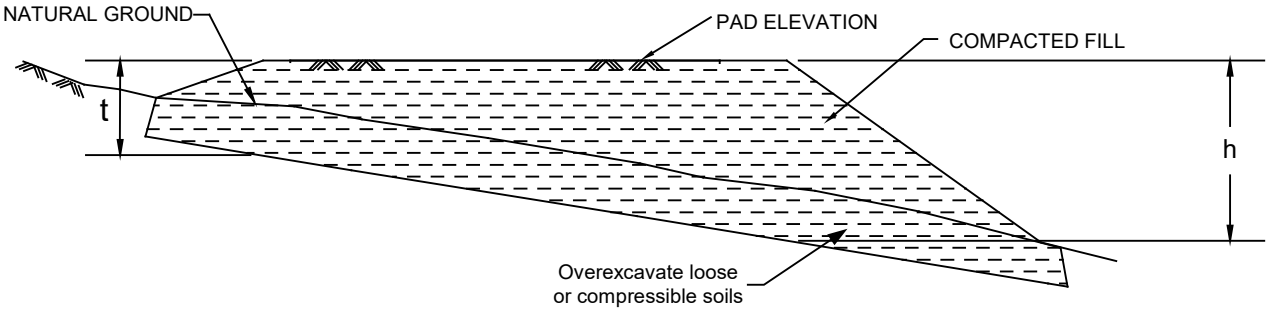
RMA GeoScience
Every Project Matters | www.rmacompanies.com

CUT TO FILL TRANSITION PADS

(PARTIALLY FILL, PARTIALLY CUT)

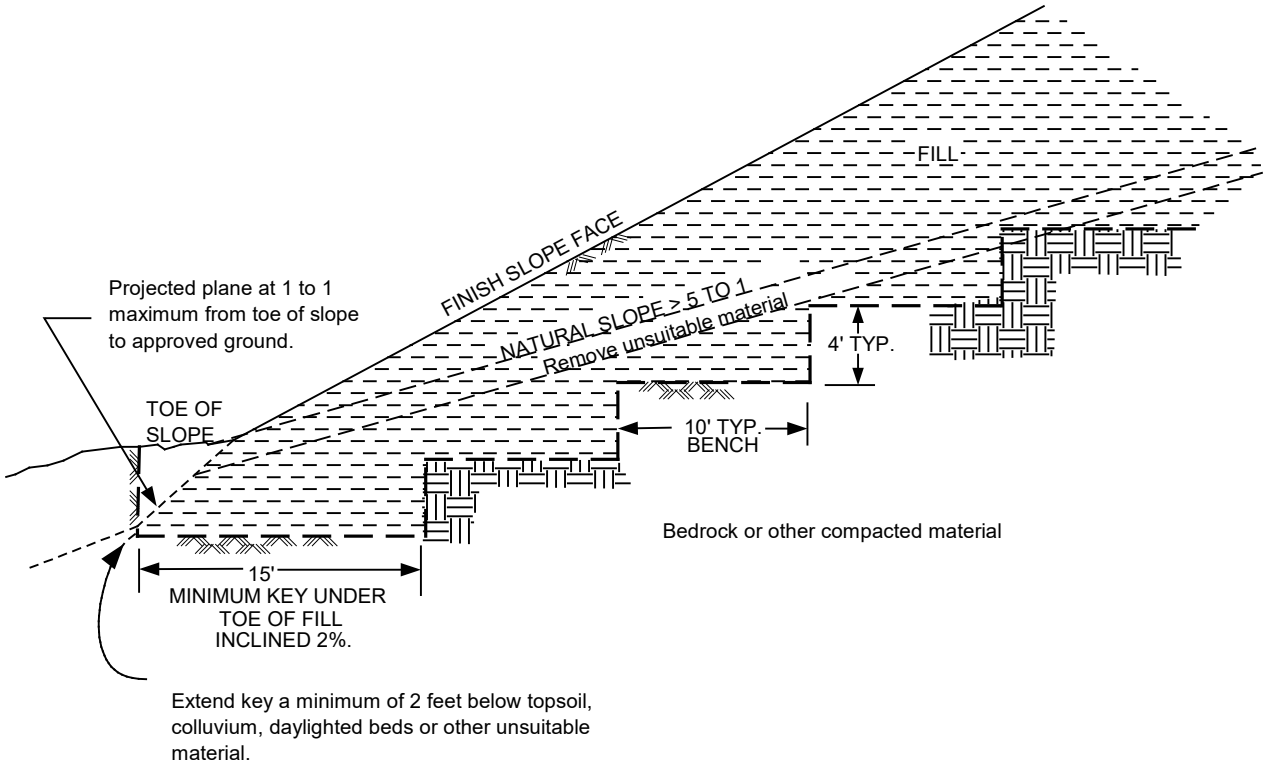


FILL PADS

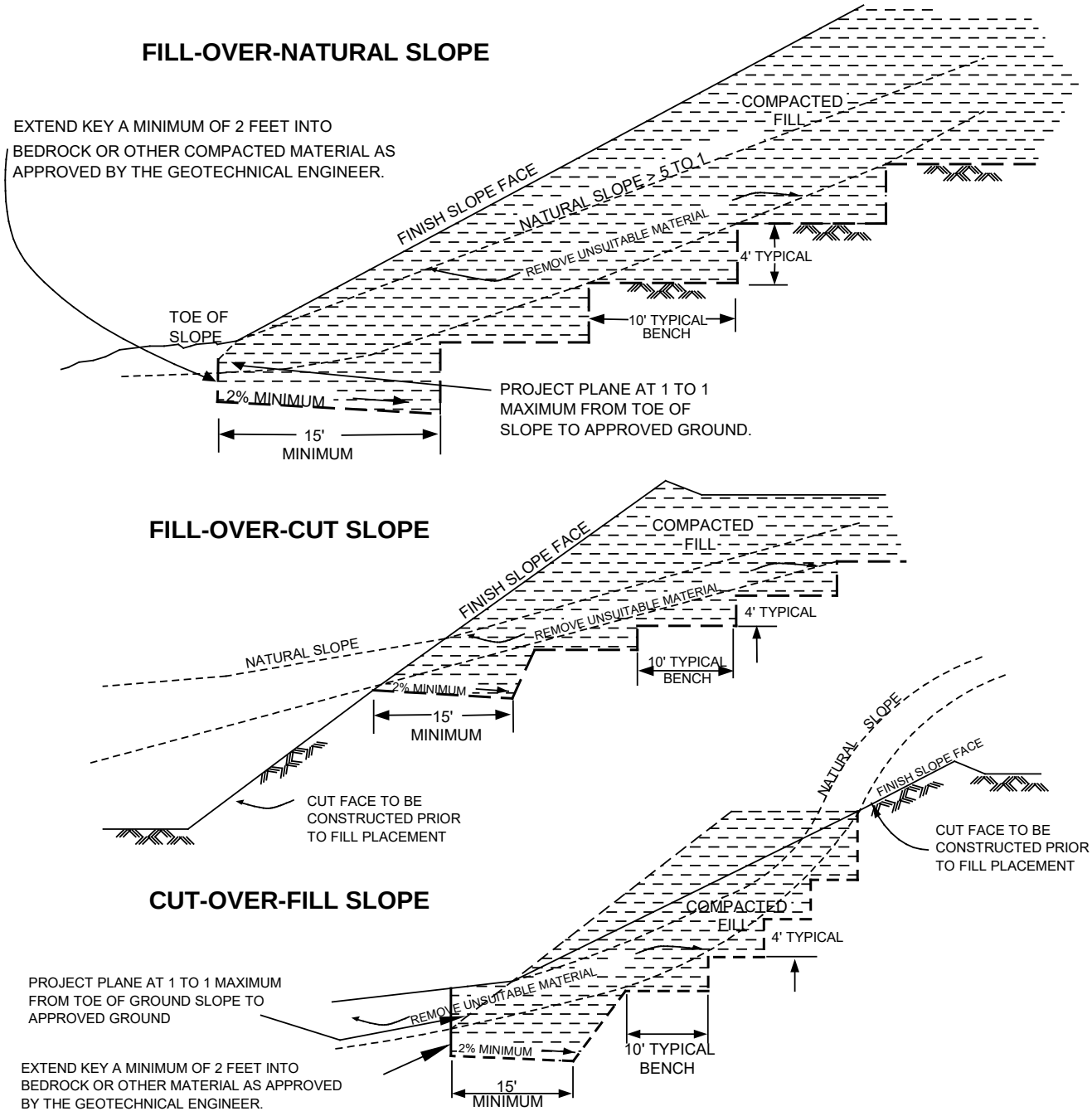


Minimum Mat Thickness t (ft)	Maximum Fill Depth h (ft)
5.0	0 to 15
one third the maximum fill depth not to exceed 15 feet	> 15

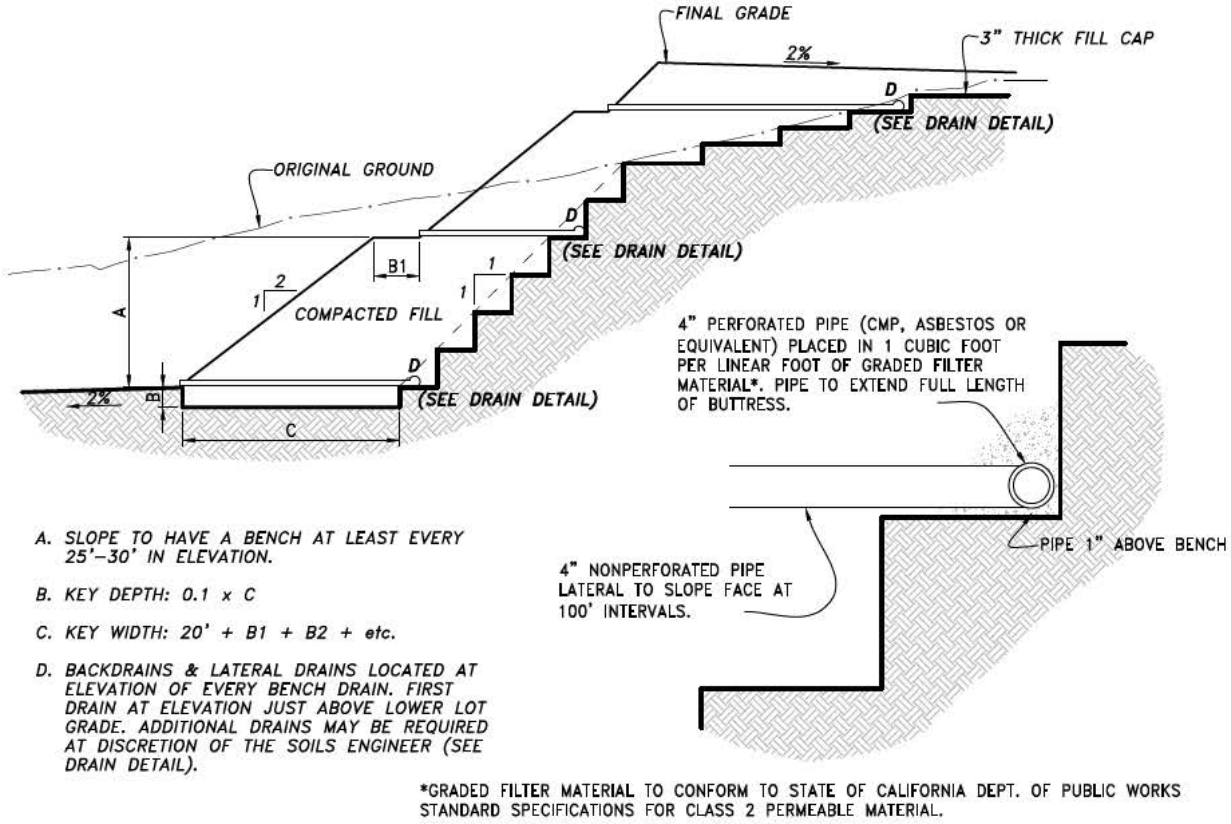
FILL TRANSITIONS OVEREXCAVATION REQUIREMENTS



TYPICAL KEYWAY AND BENCHING CROSS-SECTION WHEN EXISTING SLOPES ARE STEEPER THAN 5 TO 1



KEY AND BENCHING DETAIL



A. SLOPE TO HAVE A BENCH AT LEAST EVERY 25'–30' IN ELEVATION.

B. KEY DEPTH: 0.1 x C

C. KEY WIDTH: 20' + B1 + B2 + etc.

D. BACKDRAINS & LATERAL DRAINS LOCATED AT ELEVATION OF EVERY BENCH DRAIN. FIRST DRAIN AT ELEVATION JUST ABOVE LOWER LOT GRADE. ADDITIONAL DRAINS MAY BE REQUIRED AT DISCRETION OF THE SOILS ENGINEER (SEE DRAIN DETAIL).

*GRADED FILTER MATERIAL TO CONFORM TO STATE OF CALIFORNIA DEPT. OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CLASS 2 PERMEABLE MATERIAL.

TYPICAL STABILIZATION FILL DESIGN

APPENDIX C

CCL Engineering Inc., Geotechnical Conditions

CCL ENGINEERING INC.

CIVIL ENGINEERING • SURVEYING • GEOTECHNICAL ENGINEERING

October 12, 2005
JN: 1615G

Mr. Robert Yu
R.Y. Properties
212 S. Palm Ave., Ste. 200
Alhambra, CA 91801

RE: Geotechnical Conditions
Tentative Tract No. 53342
South of Registry Way, West of 30th St. W.
Palmdale, CA

Gentlemen,

This brief geotechnical conditions report is presented in support of your application for an extension of Tentative Tract No. 53342 (copy attached). CCL Engineering (Geotechnical Dept.) has reviewed several older Geotechnical / Geology reports encompassing the property (Buena Engineers (1989) and California Geo / Systems (1988); we are also currently exploring the site to provide soils / geologic information for the now proposed grading and development concepts. In addition, CCL Engineering provided all geotechnical services during the development of adjacent Tracts 46394 and 47935.

Bedrock is exposed in several graded road cuts in the upper elevations of the site. The bedrock consists of foliated schist (Portal Schist) and is typically massive and tight (dense). Based on experience in adjacent Tracts, the bedrock performs well (is grossly stable) in cut slopes. The foliated rock weathers with time and will ravel, necessitating intermittent catchment benches and in some cases requiring thin stabilization fills (in front of the proposed cut slopes). Most of the bedrock material breaks up substantially during grading such that it is easily used in making compacted fills.

The lower areas of the site are underlain by very shallow (1'-3') deposits of recent (younger) alluvial soils, underlain by older alluvial and colluvial soil that is typically dense (SILTY and slightly CLAYEY SANDS and Schistic GRAVELS). Such soils will supply excellent support for proposed compacted fills with only minor remedial processing of the shallow topsoil zones. Compacted fills generated from either bedrock or the on-site soils are generally non-expansive in nature.

It is our opinion, based on previous work on adjacent projects, and on our geotechnical studies presently underway, that the site is entirely suitable for development as a residential subdivision. Specific geotechnical recommendations for grading and structural design will be presented with the GRADING IMPROVEMENT PLANS presently being prepared.

43434 Sahuayo Street • Lancaster, CA 93535
(661) 949-9500 • FAX (661) 949-8380

Please feel free to call if you have any questions or require any additional information.

Respectfully submitted,

CCL ENGINEERING, INC.

Thomas J. Howser, G.E.
Geotechnical Manager

TJH/aad

Attachment: Tentative Tract Map 53342
Encl: 2 copies
City of Palmdale: 2 copies


REGISTERED PROFESSIONAL ENGINEER
THOMAS J. MONROE
421
Exp. 6/30/07
GEOTECHNICAL
STATE OF CALIFORNIA

RMA GeoScience
Every Project Matters | www.rmacompanies.com

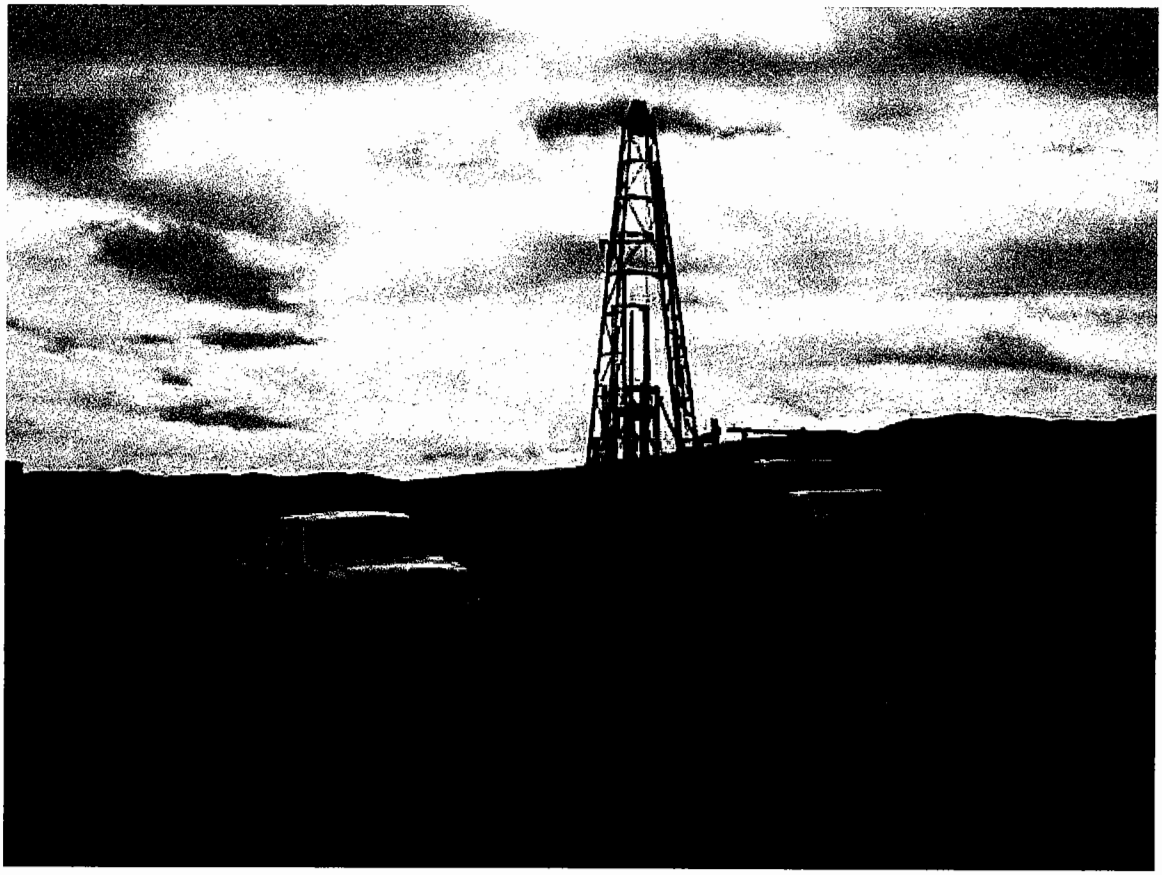
APPENDIX D

OC Consultants Inc., Geotechnical Data Report

QC CONSULTANTS INC.
Geotechnical And Materials Testing/QC Management

GEOTECHNICAL DATA REPORT

Proposed Townhomes
APN 3001-003-911; Avenue P and 30th Street West
Palmdale, California



Prepared for:

JP Eliopulos Enterprises

Project Number 05-340

February 8, 2006

42326 N. 10th Street West, Ste. A, Lancaster, CA 93534 • (661) 726-9424 • Fax (661) 726-9467

QC CONSULTANTS INC.

Geotechnical And Materials Testing/QC Management

February 8, 2006

JP Eliopulos Enterprises
42225 10th Street West, Suite 101
Lancaster, CA 93534
(661) 942-8481 Fax (661) 949-9680

Regarding: **GEOTECHNICAL DATA REPORT**
Proposed Townhomes
APN 3001-003-911
Avenue P & 30th Street West
Palmdale, California
Project Number: 05-340

Gentlemen:

In accordance with your request, **QC Consultants Inc.** has prepared the subject Geotechnical Data Report for the referenced project.

This report summarizes our findings and conclusions regarding onsite earth materials and general geotechnical conditions within the subject site. This report also provides preliminary foundation design and general grading recommendations for the property.

Thank you for the opportunity to provide our services. If you should have any questions, please do not hesitate to contact this office.

Respectfully submitted,

QC Consultants Inc.

M. R. Maevers

Marvin R. Maevers, P.E.
Project Engineer

MRM/ly

Dist: (5) Addressee

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

Attachments

1.0 INTRODUCTION

1.1 Background

In December 2005, **QC Consultants Inc.** conducted a site reconnaissance and field exploration of the subject site. The site reconnaissance consisted of traversing the subject property and marking the proposed boring locations and approximate property boundaries for identification by underground utility locators. The field exploration consisted of nine (9), 8" hollow stem auger borings drilled to a maximum depth of approximately 20 feet below the existing ground surface.

1.2 Purpose and Scope

The purpose of this Geotechnical Data Report is to present the results of the field exploration program of the subject site and to provide geotechnical engineering data which may be used in the planning and initial design phase of the proposed development. The scope of work was limited to the following:

- Research of available literature
- Site reconnaissance
- Logging and sampling of nine (9) exploratory borings
- Laboratory testing of relatively undisturbed and bulk samples
- Preparation of this report to provide a discussion of procedure, findings, recommendations for site earthwork and tentative foundation design

The determination of the absence or presence of known hazardous materials was not within the scope of this program. This program has been completed prior to structure locations and grading plan finalization.

2.0 SITE DESCRIPTION

2.1 Proposed Development

It is represented that the proposed development for the subject site will consist of the construction of single and/or two story, wood framed structures with slab on grade. These types of structures typically have a light to moderate weight with continuous and / or isolated foundation design. Should something other than what is represented here be incorporated into the proposed development, this office should be notified immediately so that we may consider the need for revisions to the recommendations provided herein.

2.2 Site Location

The subject site is located at Avenue P and 30th Street West, APN 3001-003-911, within the City of Palmdale, Los Angeles County; California. Please refer to Plate I, Vicinity Map for the approximate location of the subject site.

2.3 Existing Development

At the time of the exploration program, the subject study site had been cleared of any debris.

2.4 Vegetation

At the time of the exploration program, vegetation consisted of short brush and annual grasses.

2.5 Surrounding Property

At the time of the exploration program, the properties to the North and South were developed as residential, the property to the East was commercially developed and the property to the West was vacant.

2.6 Topography

Existing topography across the study site is gently sloping with surface drainage by sheet-flow to the East / Southeast. Total relief across the site is approximately seventy to eighty (70-80) feet.

2.7 Water

2.7.1 Surface

No surface water was observed during the site reconnaissance and field exploration program.

2.7.2 Subsurface

No evidence of near-surface ground water conditions were observed at the time of our exploration program. Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature and other factors. It is anticipated that ground water conditions should not adversely affect the proposed development.

3.0 FIELD EXPLORATION

3.1 General

The field exploration phase of this report was conducted on December 30, 2005; nine (9) exploratory borings were drilled at the study site to a maximum depth of approximately 20 feet below the existing ground surface. Borings were advanced utilizing a Mobile B-61 truck mounted drill rig with an eight (8) inch diameter continuous flight hollow stem auger. Drilling procedures were conducted in accordance with ASTM D1586. Subsurface conditions as encountered were carefully logged by our field representative for apparent moisture, color, and classified by visual examination in accordance with the Unified Soil Classification System (USCS). Please refer to Appendix I - Log of Borings, for boring log diagrams. Please note that while the stratification lines on the Log of Borings represent approximate boundaries between soils types, the actual transitions may be gradual.

3.2 Sampling Program

Relatively undisturbed samples of the soil encountered were retrieved at selected intervals during the drilling operations. Samples were obtained in accordance with ASTM D1586 by driving a split spoon sampler into the undisturbed material using a 140-pound hammer falling approximately 30 inches. Penetration resistance values are recorded as blows - per - foot of penetration of the sampler.

The in-place soil was retained in brass rings of 2.42 inches (6.14 centimeters) inside diameter and 1.0 inch (2.54 centimeters) in height. The center portion of the sample was retained in close - fitting, moisture - proof sample containers and transported to the laboratory for testing and classification verification. Bulk samples were collected from the excavation cuttings. These samples were placed in moisture - proof sample containers and returned to the laboratory for testing. Please refer to Appendix I - Log of Borings for both undisturbed and bulk sample locations.

4.0 LABORATORY TESTING PROGRAM

4.1 General

Bulk and undisturbed samples obtained during drilling were carefully logged and assigned a testing program in the laboratory. The samples obtained during the field exploration program will be discarded 30 days after the date of this report. This office should be notified immediately if retention of samples is required beyond 30 days. The following is a listing and brief explanation of the laboratory tests which were performed during the laboratory testing program.

4.2 Classification

The field classification of soil materials was verified in the laboratory in accordance with the Unified Soils Classification System, ASTM D 2488, Standard Practice for Determination and Identification of Soils (Visual-Manual Procedures).

4.3 In-Situ Moisture Density

In-situ moisture contents and dry unit weights were determined in accordance with ASTM D2937. The dry weight is determined in pounds per cubic foot (pcf) and the moisture content is determined as a percentage of the dry unit weight. Please refer to Appendix I - Log of Borings, for actual dry weight and moisture contents of in-situ samples.

4.4 Maximum Density / Optimum Moisture Relationship

Maximum density / optimum moisture relationship was performed in accordance with ASTM D1557 Method A, Modified for a 10 pound hammer and 18 inch drop. This procedure involves mixing several samples of successive moisture contents and compacting five (5) uniform lifts in a four (4) inch mold with a 10 pound hammer falling approximately 18 inches. Please refer to Table I - Maximum Density / Optimum Moisture Data for test results.

4.5 Consolidation Tests

Consolidation tests were performed on seven (7) individual samples in accordance with ASTM D2435 to develop data for settlement studies. Loads were applied to each sample in several increments of geometric progression, with the resulting deformation recorded at selected time intervals. Porous stones were placed in contact with the top and bottom of each sample to allow the release and addition of pore fluid. Inundation of each sample was performed at a load of 1.00 tons per square foot to check the hydroconsolidation potential. The maximum stress during testing was 16.00 tons per square foot. Please refer to Plates III through IX - Consolidation Test Data, for results of consolidation tests.

5.0 EARTH MATERIALS

The subject site is underlain by alluvium to the depths explored. Two distinct alluvial units were observed. The upper ten (10) feet was typically loose to medium-dense silty sands with trace amounts of clay. Laboratory testing indicates that the upper five (5) to seven (7) feet of this unit is prone to 2% or greater hydroconsolidation. The underlying older alluvium was medium-dense to dense silty sands. All of the on-site soils are suitable for reuse as fill soils.

5.1 Liquefaction Potential

Liquefaction is the loss of strength of cohesionless soils below the water table when the pore pressure induced in the soils becomes equal to the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater level, soil type, relative in-situ density of the soil, confining pressure, and intensity and duration of ground shaking. Liquefaction potential is the greatest in loose, saturated, poorly graded fine sands with a mean grain size of 0.075 to 0.5 mm. The potential for liquefaction in zones susceptible to severe ground shaking is considered to be high where groundwater levels in the alluvial deposits are less than 10 feet below the ground surface. Liquefaction potential decreases when the depth to groundwater increases. Liquefaction is considered very unlikely when the depth to groundwater is in excess of 40 feet. Based upon the depth to groundwater (>50 feet) the potential for liquefaction is considered low.

5.2 Expansion Potential

In general, soils in the vicinity of the subject site are silty sands with # 4 - 1" gravels in nature. It is anticipated that the potential for expansion will be very low to low expansive, depending on the materials ultimately exposed at pad grade. Materials ultimately exposed at pad, should be verified and tested for actual expansion potential.

5.3 Seismicity

Proposed structures should be designed and constructed in accordance with seismic design parameters provided below as recommended by the 1997 Uniform Building Code (UBC).

Nearest Active Seismic Source (Type A Fault)(San Andreas):	2.0 km
Seismic Zone Factor *Z* (Table 16-I):	0.40
Seismic Zone Factor (Table 16-J):	S_D
Seismic (accl.) Coefficient (Table 16Q) C_a:	$0.44N_a$
Seismic (velocity) Coefficient (Table 16R) C_v:	$0.64N_v$
Near Source Factor (Table 16S) N_a:	1.5
Near Source Factor (Table 16T) N_v:	2.0

5.4 Site Geology

The entire site is overlain by alluvium, derived from the adjacent hillside to the south. The alluvium consists of silty sands with some small gravel to one (1) inch diameter. No faults, fractures, or slope instability were observed during the site's geotechnical investigation. The active San Andreas fault system lies approximately 1.5 miles south of the site and the inactive Hitchbrook fault is mapped approximately one mile northwest of the site. With the exceptions of potential hydroconsolidation of the upper five to seven feet of alluvium and possible very strong ground shaking during a large earthquake on the San Andreas fault, no adverse geologic condition was apparent on the subject property.

The site is down slope from the California aqueduct. During a large earthquake there is some limited potential of a failure on the aqueduct, causing flooding on any adjacent downhill properties. In addition, there is some potential for leaking of the aqueduct to increase ground water conditions.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

The conclusions and recommendations presented in this report are based on data obtained during the field exploration program and the results of the laboratory program detailed in this report. Based upon a review of both programs as well as engineering analysis, proposed construction is considered feasible from a geotechnical standpoint, provided that all earth work is performed in accordance with applicable City of Palmdale and/or other grading ordinance requirements as well as the recommendations of this report. It is our professional opinion that the subject property will not be subject to geologic hazards, including: landslide, slippage or settlement, and the grading will not adversely affect the stability of the site or adjacent properties. Please note that foundation plans

should be reviewed by this office prior to construction grading to verify the extent of the removals and degree of compaction required.

6.2 Excavation

The earth materials that will be encountered during construction are expected to excavate easily utilizing standard excavation equipment (ie. backhoe, trackhoe, etc.).

6.2.1 Temporary Excavations

Excavations greater than four (4) feet in depth and involving personnel working within the excavation, shall be sloped, benched and / or shored. Temporarily sloped cut slopes for structure or trench excavations may be as steep as a 1:1 ratio (horizontal to vertical). If an excavation will remove lateral support from any existing structures, shoring or sheeting will be required. No vehicular traffic is permitted within 10 feet of any open excavation.

6.3 Clearing

Prior to any grading, the site should be cleared of all debris, trash, concrete, deleterious and any other miscellaneous materials not permitted to be incorporated into the fill. All non-engineered and / or stockpiled fill shall be removed prior to remedial grading.

6.4 Removal of Unsuitable Materials

In order to minimize the potential for excessive differential settlement of the materials directly below the proposed foundations, the materials subject to hydroconsolidation should be removed. All unsuitable alluvium should be stripped to a minimum depth of seven (7) feet below the existing grade. *Areas of cut and cut/fill transitions may require additional removals to satisfy over-excavation recommendations.* Removals should be carried out to a minimum of at least seven (7) feet beyond the exterior limits of the proposed structure, wherever possible. Once the removals have been

completed, the excavated area should be observed by the Geotechnical Engineer or their representative to verify the depth of the removals.

6.5 Compacted Fill

After removal of the unsuitable materials has been completed, the resulting ground surface shall be scarified a minimum of 12 inches and moisture conditioned to at least optimum moisture or up to 2 percent greater, as determined in accordance with ASTM D1557. The scarified ground surface shall then be compacted to a minimum of 90 percent relative compaction. (Relative compaction is expressed as a percentage of the Maximum Dry Density as determined in accordance with ASTM D1557.) Fill materials shall be placed in thin, six (6) to eight (8) inch lifts (uncompacted), moisture conditioned to at least optimum moisture or up to 2 percent greater and compacted to a minimum of 90 percent of the materials maximum dry density as determined in accordance with ASTM D1557.

6.6 Shrinkage and Subsidence

Shrinkage of the surficial soil materials when removed and re-compacted in accordance with the recommendations of this report should be anticipated. It is estimated that the average shrinkage of the upper seven (7) feet of alluvial materials will be approximately 7 to 12 percent. This estimate is based upon compactive effort needed to produce an average degree of compaction of approximately 92 percent and may vary depending on contractor methods. During compaction, subsidence of the underlying natural soils material is estimated to be approximately 0.1 feet.

6.7 Slope Stability

Should design slopes exceed three (3) feet in height and steepness greater than 2:1 (horizontal to vertical), engineering calculations should be performed to substantiate the slope stability.

6.8 Import Material

All imported material shall be approved by the Geotechnical Engineer prior to use on site. As a minimum, import material should meet the following criteria:

- Plasticity Index less than 15
- Expansion Index less than 50
- Less than 30 percent passing the 200 sieve
- No material larger than 6"
- Free of debris and deleterious material

6.9 Control of Fill Placement

During grading operations, the Geotechnical Engineer or their representative should conduct field and laboratory testing of fill placement. Observations should also be made to verify that the grading is being performed in conformance with recommendations of this report. When field or laboratory testing indicates non-compliance with the recommendation of this report, every effort should be made by the grading contractor to rectify the deficiencies, whether in compactive effort, moisture conditioning or the quality of fill material.

6.10 Foundations

Foundations should be designed in accordance with structural considerations and the following preliminary recommendations. Foundation design for the proposed structure may consist of either continuous wall footings and/or isolated spread footings founded in competent, recompacted native soils. The following recommendations are based solely on soil characteristics, laboratory testing and assuming a low expansion potential for the soils occurring in the upper three feet of finish pad grade. These tentative recommendations should not preclude more stringent structural requirements.

6.10.1 Single-Story Structures

Exterior and interior continuous footings shall have a minimum width of 12 inches, founded to a minimum depth of 12 inches below the lowest adjacent final grade. It is recommended that the

footing be reinforced with two (2) No. 4 steel reinforcing bars, one (1) located near the top and one (1) near the bottom of the footing. Soil should be moistened and all debris should be removed prior to concrete placement.

6.10.2 Two-Story Structures

Exterior and interior continuous footings shall have a minimum width of 15 inches, founded to a minimum depth of 18 inches below the lowest adjacent final grade. It is recommended that the footing be reinforced with four (4) No. 4 steel reinforcing bars, two (2) located near the top and two (2) near the bottom of the footing. Soil should be moistened and all debris should be removed prior to concrete placement.

6.10.3 Flatwork

All exterior concrete slabs-on-grade should be a minimum four (4) inches nominal thickness and underlain by a minimum of 12 inches of compacted and moisture conditioned fill material.

6.10.4 Structural Pavement Section

Soils material within the proposed structural pavement section should be removed to a depth of 12 inches below the existing ground surface or finish grade whichever is lowest. The resultant ground surface should be scarified and moisture conditioned in accordance with **Section 6.5 -Compacted Fill.** The scarified ground surface shall then be compacted to a minimum of 90 percent relative compaction. Fill materials shall be placed in thin, six (6) to eight (8) inch lifts (uncompacted), moisture conditioned to at least optimum moisture or up to 3 percent greater and compacted to a minimum of 90 percent of the materials maximum dry density as determined in accordance with ASTM D1557.

6.11 Bearing Capacity

Provided that the recommendations of this report are incorporated into the project construction, the allowable soil bearing value will be 1,800 pounds per square foot (psf). This capacity may be

increased by 20% for each additional foot of depth or width, to a maximum of 3,000 psf. Allowable bearing pressures may be increased by one-third (1/3) when considering loading of short duration such as wind or seismic forces.

6.11.1 Predicted Foundation Settlement

If the above design recommendations are adhered to, the anticipated post construction settlement is expected to be less than 0.5 inches. Differential settlement would be less than 0.25 inches in 30 feet.

6.11.2 Interior Slabs

Interior concrete slabs should have a minimum thickness of four (4) inches (nominal) and be reinforced at mid-height with 6" x 6" 10/10 gauge welded wire mesh or a minimum of No. 3 reinforcing bar placed at 24-inch on center, each way. Interior concrete slabs should also be underlain by a two inch layer of sand which is underlain by 6 mil (minimum) polyethylene vapor barrier.

6.11.3 Lateral Earth Pressures

Based upon our analyses, the following lateral earth pressures may be used in the design of any proposed retaining walls or similar structures.

	Active Earth Pressure*	Passive Earth Pressure*
Well drained level soil – "Active"	40	250
Well drained soil 2:1 Slope Backfill – "Active"	55	
At rest well drained level soil (restrained wall)	60**	

*Equivalent fluid pressure (PSF) per foot of soil height.
** For purposes of design, a wall is considered restrained if it is prevented from movement greater than 0.002H (H = height of wall in feet) at the top of the wall.

The pressures recommended above were based on the assumption that the on site soils will be compacted to approximately 90% of maximum dry density. The use of select granular fill may lower the recommended driving earth pressure. The resisting pressure provided is an ultimate value. An

appropriate factor of safety should be used for design calculations (minimum of 1.5 recommended). The resisting pressure value may be increased by 1/3 for total loads, including seismic forces. A coefficient of friction of 0.35 should be used for concrete on compacted alluvium. Weepholes, backdrains or an equivalent system of backfill drainage should be incorporated into the retaining wall design. Waterproofing of retaining walls should be provided to help reduce the potential for moisture migration. The final grade should be such that all diverted away from the retaining wall's foundation or backfill.

6.12 Utility Trenches

6.12.1 Bedding

Bedding material shall be clean sand and / or gravel having a sand equivalent of not less than 30. Onsite soil below ten feet (from existing soil grade) may be suitable for use as bedding material.

6.12.2 Backfill

All backfill shall be placed in thin, six (6) to eight (8) inch lifts (uncompacted), moisture conditioned to at or near optimum moisture and compacted to a minimum of 90 percent relative compaction. Compaction equipment shall be of a suitable type to obtain the degree of compactive effort required. Flooding or jetting shall not be an acceptable means of compaction. Caution should be maintained during the backfilling operations so that newly installed pipe is not damaged. Final site grades should be such that water is not allowed to pond on or near the compacted fill.

6.12.3 Corrosive Soil

The soils onsite were tested for resistivity in accordance with California Method 643. Results indicate soil to be moderately corrosive to ferrous metals, please refer to Table I (Soil Corrosion Series).

6.13 Asphalt Pavement Design

Based on a preliminary R-Value of 64 the following pavement sections are provided with a Safety Factory (S.F.) applied. The R-Value should be verified upon completion of fine street grading.

Interior and Collector Street

Traffic Index (T.I.)	*5.0*
Asphaltic Concrete Pavement	3.5 inches
Crushed Aggregate Base*	4.0 inches

Minor Arterial
(Moderate Duty)

Traffic Index (T.I.)	*9.0*
Asphaltic Concrete Pavement	4.0 inches
Crushed Aggregate Base*	7.0 inches

Main City Street
(Heavy Duty)

Traffic Index (T.I.)	*10.0*
Asphaltic Concrete Pavement	5.0 inches
Crushed Aggregate Base*	8.0 inches

* Crushed Aggregate Base (CAB) compacted to a minimum of 95 percent relative compaction.

6.14 Drainage

QC Consultants Inc. strongly recommends that surface water be kept from infiltrating into the subgrade adjacent to each units foundation system. This may include, but not be limited to rain water, roof water, landscape water and/or leaky plumbing. Lots should be fine graded at the completion of construction to include positive drainage away from the structures. Roof and landscape water should be collected via gutters, down-spouts and area drains, and transported to the street in buried drain pipes. Home buyers should be cautioned against constructing open draining planters immediately adjacent to the houses, or obstructing the yard drainage in any way.

7.0 CONSTRUCTION REVIEW

7.1 General

Finalized foundation plans should be reviewed by this office to determine the necessity of additional recommendations. Construction review during grading and post grading operations to include removals, trench backfill and foundation observation should be performed by **QC Consultants Inc.** If any of the observations and testing to verify site conditions are not conducted by **QC Consultants Inc.**, liability for the performance of the project is limited solely to the actual portions of the project observed and / or tested by **QC Consultants Inc.**

CLOSURE

This Geotechnical Data Report presents data obtained during the exploration and laboratory testing programs for the proposed structures located at Avenue P and 30th Street West, APN 3001-003-911; Palmdale, California. It has been prepared exclusively for **JP Eliopulos Enterprises** specifically for the uses and location named above. This report may not contain sufficient information for other parties or purposes. In the event that changes in the assumed nature, design or location of the proposed structures as described above are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions and recommendations of this report are modified in writing. This report was performed in accordance with the applicable standards of this profession and the normally accepted soil and foundation engineering practices and principles at the time of preparation of this report. No other warranty is pressed or implied beyond the direct representation of this report. Changes in the conditions of the subject site, whether due to natural processes or the works of man on adjacent properties or changes in legislation or the broadening of knowledge may invalidate the conclusions and recommendations presented in this report.

TABLE I

Sand Equivalent

Sample	Description	S.E.
B2 @ 0-5'	Brown, Silty F-M SAND w/Small Rootlets	24
B7 @ 0-5'	Light Brown, Silty F-M SAND	23
B8 @ 5-10'	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel	19
B9 @ 0-5'	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel	18
B1 @ 10'	Dark Brown, Clayey F-C SAND	18
B3 @ 15'	Yellowish Brown, Silty F-M SAND w/Traces of Clay	22
B5 @ 20'	Brown, Silty F-C SAND w/Traces of Clay	27
B9 @ 4'	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel	15
B9 @ 8'	Brown, Silty F-C SAND w/Traces of Clay & # 4-3/4" Gravel	23

Maximum Density / Optimum Moisture Data

Sample	Description	Maximum Density PCF	Optimum Moisture%	Expansion Index
B3 @ 0-5'	Light Brown, Silty F-M SAND w/Rootlets	129.0	8.5	16
B8 @ 5-10'	Reddish Brown, Silty F-C SAND	128.9	8.0	0

Soil Corrosion Series

Sample	Description	pH	Sulfate Percent	Sulfate[1] Exposure	Chlorides Percent	Resistivity Ca. 643[2] OHM-CM
B3 @ 0-5'	Light Brown, Silty F-M SAND	8.0	0.003	Negligible	0.017	4,672
B9 @ 0-5'	Reddish Brown, Silty F-C SAND	8.4	0.004	Negligible	0.015	2,336

[1] *Sulfate test results indicate that this level soluble sulfate is not detrimental to concrete and therefore special sulfate resistant cement will not be required.*

[2] *Resistivity test results indicate soil is moderately corrosive to ferrous metals.*

A commonly accepted correlation between electrical resistivity and potential corrosiveness toward ferrous metals is presented below:

Below 1,000 ohm-cm	severely corrosive
1,000 to 2,000 ohm-cm	corrosive
2,000 to 10,000 ohm-cm	moderately corrosive
Over 10,000 ohm-cm	mildly corrosive

Table II Cont.
Grain Size Analysis
Percent Passing

Sample Number	1.00"	3/4"	1/2"	3/8"	No. 4	No. 10	No. 40	No. 100	No. 200
B3 @ 3'	100	100	98.7	98.0	95.3	90.9	72.9	38.8	26.5
B3 @ 10'	100	100	99.1	99.1	97.2	92.1	69.9	43.4	32.1
B5 @ 5'	100	91.4	88.1	86.6	83.1	78.8	62.9	32.8	21.3
B6 @ 10'	100	100	98.8	97.7	94.0	86.6	61.5	32.6	22.1
B6 @ 15'	100	100	94.5	92.8	90.6	86.8	64.2	39.2	29.8
B8 @ 3'	100	100	93.3	91.3	85.7	77.9	57.3	34.1	24.6
B9 @ 2'	100	100	99.6	94.8	89.8	83.5	60.5	36.7	25.8
B9 @ 6'	100	95.2	91.7	90.2	86.5	79.8	57.7	34.1	23.4

APPENDIX I

Boring Logs

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340 — Project Name: JP Eliopulos Enterprises
Date: 12-30-05 — Boring #: B-1 — Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61 — Dia. 8" Hollow Stem — Elev.: N/A — Depth: 15'
Groundwater: N/A — Bedrock: N/A — Refusal: N/A — Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0	110.3	3.4%	14/26	SM	Light Brown, Silty F-M SAND, Medium Dense & Slightly Moist to Moist
	108.4	3.7%	15/47	SM	Light Brown, Silty F-M SAND w/Rootlets, Slightly Porous, Dense & Slightly Moist to Moist
5	117.1	5.6%	50-6"	SM	Light Brown, Silty F-M SAND w/Rootlets, Slightly Porous, Very Dense & Slightly Moist to Moist
	111.1	6.1%	75-6"	SC	Dark Brown, Clayey F-C SAND, Very Dense & Moist
10	115.4	7.8%	50-6"	SC	Dark Brown, Clayey F-C SAND, Very Dense & Moist
15	129.0	8.7%	21/50-5"	SC	Dark Brown, Clayey F-C SAND, Very Dense & Moist
					Terminated Drilling @ 15'
20					
25					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340 — Project Name: JP Eliopulos Enterprises
Date: 12-30-05 — Boring #: B-2 — Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61 — Dia. 8" Hollow Stem — Elev.: N/A — Depth: 10'
Groundwater: N/A — Bedrock: N/A — Refusal: N/A — Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0					
	83.6	30.5%	7/16	SM	Brown, Silty F-M SAND w/Small Rootlets, Slightly Porous, Medium Dense & Moist
	107.5	4.2%	12/23	SM	Light Brown, Silty F-M SAND w/Small Rootlets, Slightly Porous, Medium Dense & Slightly Moist
5					
	113.0	4.9%	15/24	SM	Light Brown, Silty F-M SAND w/Small Rootlets, Slightly Porous, #4-3/8" Gravel, Medium Dense & Slightly Moist
	112.9	4.8%	17/28	SM	Light Brown, Silty F-M SAND w/Small Rootlets, Slightly Porous, #4-3/8" Gravel, Medium Dense & Slightly Moist
10					
					Terminated Drilling @ 10'
					BULK SAMPLE @ 0-5'
15					
20					
25					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340 | Project Name: JP Eliopulos Enterprises
Date: 12-30-05 | Boring #: B-3 | Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61 | Dia. 8" Hollow Stem | Elev.: N/A | Depth: 20'
Groundwater: N/A | Bedrock: N/A | Refusal: N/A | Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0-					
	107.3	4.0%	8/21	SM	Light Brown, Silty F-M SAND, Medium Dense & Slightly Moist
	105.6	4.8%	7/12	SM	Light Brown, Silty F-M SAND w/Rootlets, Slightly Porous, Dense & Slightly Moist to Moist
5-	105.9	4.5%	11/17	SM	Light Brown, Silty F-M SAND w/Rootlets, Slightly Porous, Dense & Slightly Moist to Moist
10-	116.3	9.4%	13/28	SM	Yellowish Brown, Silty F-M SAND w/Traces of Clay, Medium Dense & Moist Firm Drilling
15-	124.7	7.3%	75-6"	SM	Yellowish Brown, Silty F-M SAND w/Traces of Clay, Medium Dense & Moist Very Firm Drilling H_2O Added to Reduce Friction
20-	121.2	6.8%	75-6"	SM	Yellowish Brown, Silty F-M SAND w/Slight Coarse Sand, # 4 Gravel, Very Dense & Moist Terminated Drilling @ 20' BULK SAMPLE @ 0-5'
25-					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340 | Project Name: JP Eliopulos Enterprises
Date: 12-30-05 | Boring #: B-4 | Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61 | Dia. 8" Hollow Stem | Elev.: N/A | Depth: 10'
Groundwater: N/A | Bedrock: N/A | Refusal: N/A | Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0	108.2	3.9%	6/12	SM	Light Brown, Silty F-M SAND w/Coarse Sand, Slightly Porous, Medium Dense & Slightly Moist to Moist
	107.6	4.5%	7/14	SM	Light Brown, Silty F-M SAND w/Coarse Sand, Slightly Porous, Medium Dense & Slightly Moist to Moist
5	109.8	4.5%	9/16	SM	Light Brown, Silty F-M SAND w/Coarse Sand, Slightly Porous, Medium Dense & Slightly Moist to Moist
	120.4	11.5%	50-6"	SM	Brown, Silty F-M SAND w/Coarse Sand, Traces of Clay, Very Dense & Moist
10	126.3	11.1%	50-6"	SM	Brown, Silty F-M SAND w/Coarse Sand, Traces of Clay, Very Dense & Moist
					Terminated Drilling @ 10'
15					
20					
25					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340
Project Name: JP Eliopulos Enterprises
Date: 12-30-05
Boring #: B-5
Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61
Dia. 8" Hollow Stem
Elev.: N/A
Depth: 15'
Groundwater: N/A
Bedrock: N/A
Refusal: N/A
Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0-					
	101.3	3.1%	7/13	SM	Light Brown, Silty F-M SAND, Medium Dense & Slightly Moist to Moist
	104.7	3.8%	8/23	SM	Light Brown, Silty F-M SAND, Medium Dense & Slightly Moist to Moist
5-	110.9	4.3%	11/25	SM	Light Brown, Silty F-M SAND w/Rootlets, Very Dense & Moist
	109.4	6.6%	7/15	SM	Brown, Silty F-M SAND w/Coarse Sand, Slightly Porous, Medium Dense & Moist
10-	110.8	7.1%	10/19	SM	Yellowish Brown, Silty F-M SAND w/Coarse Sand, Medium Dense & Moist
15-	120.1	6.8%	18/33	SC	Brown, Silty F-C SAND w/Traces of Clay, Dense & Moist
20-	114.8	6.9%	50-6"	SC	Brown, Silty F-C SAND w/Traces of Clay, Dense & Moist
					Terminated Drilling @ 20'
25-					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340
Project Name: JP Eliopulos Enterprises
Date: 12-30-05
Boring #: B-6
Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61
Dia. 8" Hollow Stem
Elev.: N/A
Depth: 15'
Groundwater: N/A
Bedrock: N/A
Refusal: N/A
Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0					
	111.4	4.2%	11/26	SM	Brown, Silty F-M SAND w/Small Rootlets, Slightly Porous, Medium Dense & Moist
	107.1	4.5%	26/40	SM	Brown, Silty F-C SAND, Slightly Porous, Medium Dense & Moist
5					
	109.6	5.9%	13/21	SM	Brown, Silty F-C SAND, Slightly Porous, Medium Dense & Moist
10	113.7	6.9%	12/20	SM	Yellowish Brown, Silty F-C SAND w/# 4-3/8" Gravel, Medium Dense & Moist
15	122.4	12.3%	50-6"	SC	Reddish Brown, Clayey F-C SAND w/# 4-1/2" Gravel, Very Dense & Moist
					Terminated Drilling @ 15'
20					
25					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340
Project Name: JP Eliopulos Enterprises
Date: 12-30-05
Boring #: B-7
Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61
Dia. 8" Hollow Stem
Elev.: N/A
Depth: 10'
Groundwater: N/A
Bedrock: N/A
Refusal: N/A
Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0-					
	100.9	3.4%	7/11	SM	Light Brown, Silty F-M SAND, Medium Dense & Slightly Moist to Moist
	103.7	4.1%	8/11	SM	Light Brown, Silty F-M SAND, Slightly Porous, Medium Dense & Slightly Moist to Moist
5-	108.8	4.4%	15/24	SM	Light Brown, Silty F-M SAND, Slightly Porous, Medium Dense & Slightly Moist to Moist
	109.7	4.1%	6/12	SM	Light Brown, Silty F-M SAND, Medium Dense & Slightly Moist to Moist
10-	116.9	5.6%	50-5"	SM	Light Brown, Silty F-M SAND, Medium Dense & Slightly Moist to Moist
					Terminated Drilling @ 10'
15-					
20-					
25-					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340
Project Name: JP Eliopulos Enterprises
Date: 12-30-05
Boring #: B-8
Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61
Dia. 8" Hollow Stem
Elev.: N/A
Depth: 10'
Groundwater: N/A
Bedrock: N/A
Refusal: N/A
Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0	106.7	3.0%	7/13	SM	Brown, Silty F-C SAND w/# 4 Gravel, Medium Dense & Slightly Moist
	116.6	5.1%	28/50-4"	SM/SC	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel, Traces of Clay, Very Dense & Moist
5	112.5	6.1%	29/50-3"	SM/SC	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel, Traces of Clay, Very Dense & Moist
10	113	5.2%	50-6"	SM/SC	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel, Traces of Clay, Very Dense & Moist
					Terminated Drilling @ 10'
					BULK SAMPLE @ 5'-10'
15					
20					
25					

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

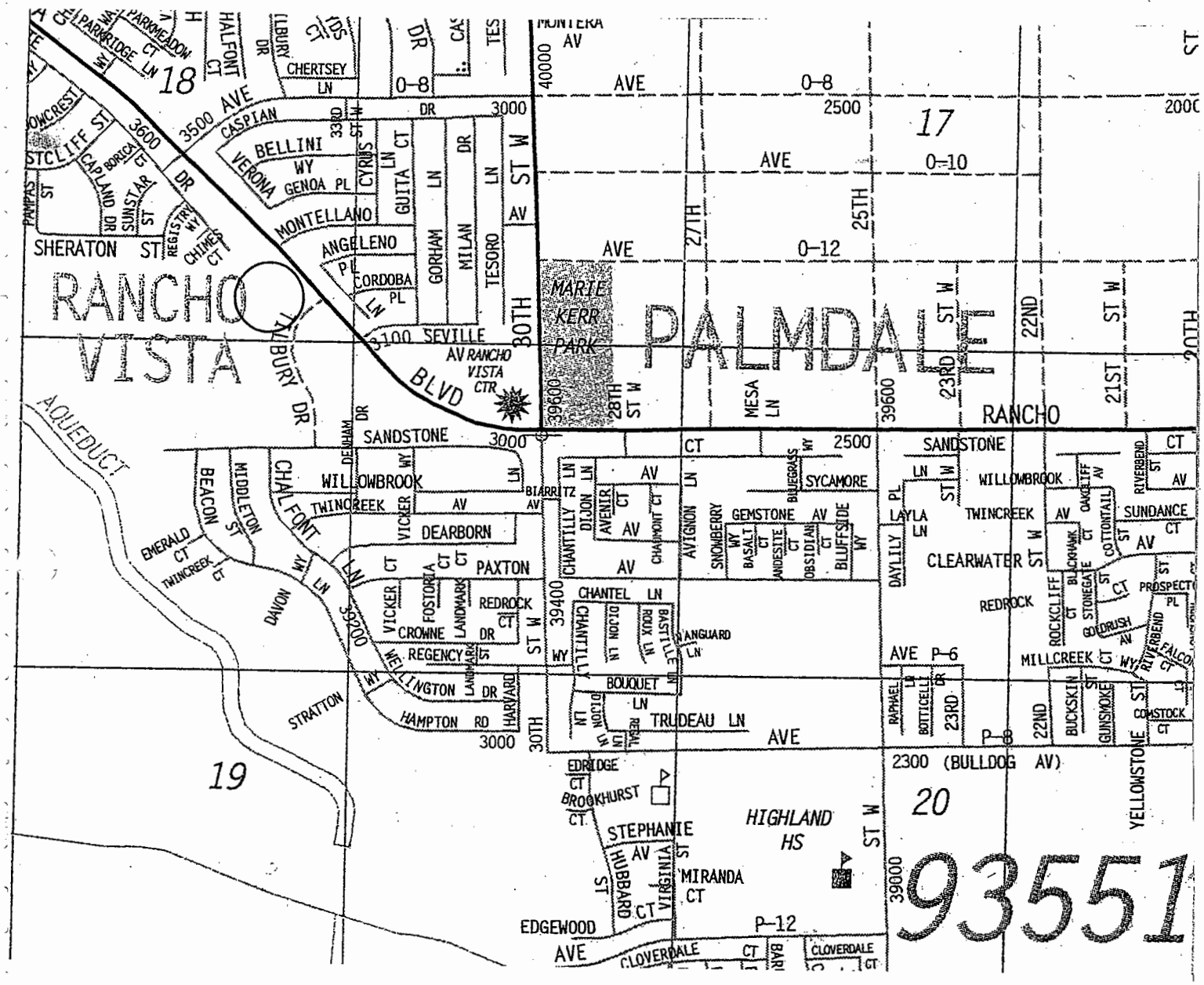
Project #: 05-340
Project Name: JP Eliopulos Enterprises
Date: 12-30-05
Boring #: B-9
Location: APN 3001-003-911, Palmdale
Rig Type: Mobile B-61
Dia. 8" Hollow Stem
Elev.: N/A
Depth: 15'
Groundwater: N/A
Bedrock: N/A
Refusal: N/A
Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0					
	108.9	5.0%	1-1/25	SM	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel, Dense & Slightly Moist to Moist
	114.6	9.1%	12/27	SM	Reddish Brown, Silty F-C SAND w/# 4-1/2" Gravel, Dense & Moist
5					
	115.9	6.9%	50-6"	SM	Brown, Silty F-C SAND w/Traces of Clay, Very Dense & Moist
	124.8	4.9%	50-5"	SM	Brown, Silty F-C SAND w/Traces of Clay, # 4-3/4" Gravel, Very Dense & Moist
10	115.3	4.3%	23/50-4"	SM	Yellowish Brown, Silty F-C SAND w/Traces of Clay, #4-3/4" Gravel, Very Dense & Moist
15	116.1	4.9%	50-5"	SM	Yellowish Brown, Silty F-C SAND w/Traces of Clay, #4-3/4" Gravel, Very Dense & Moist
					Terminated Drilling @ 15'
20					
25					

No Caving
No Groundwater Encountered

PLATES I - X

VICINITY MAP

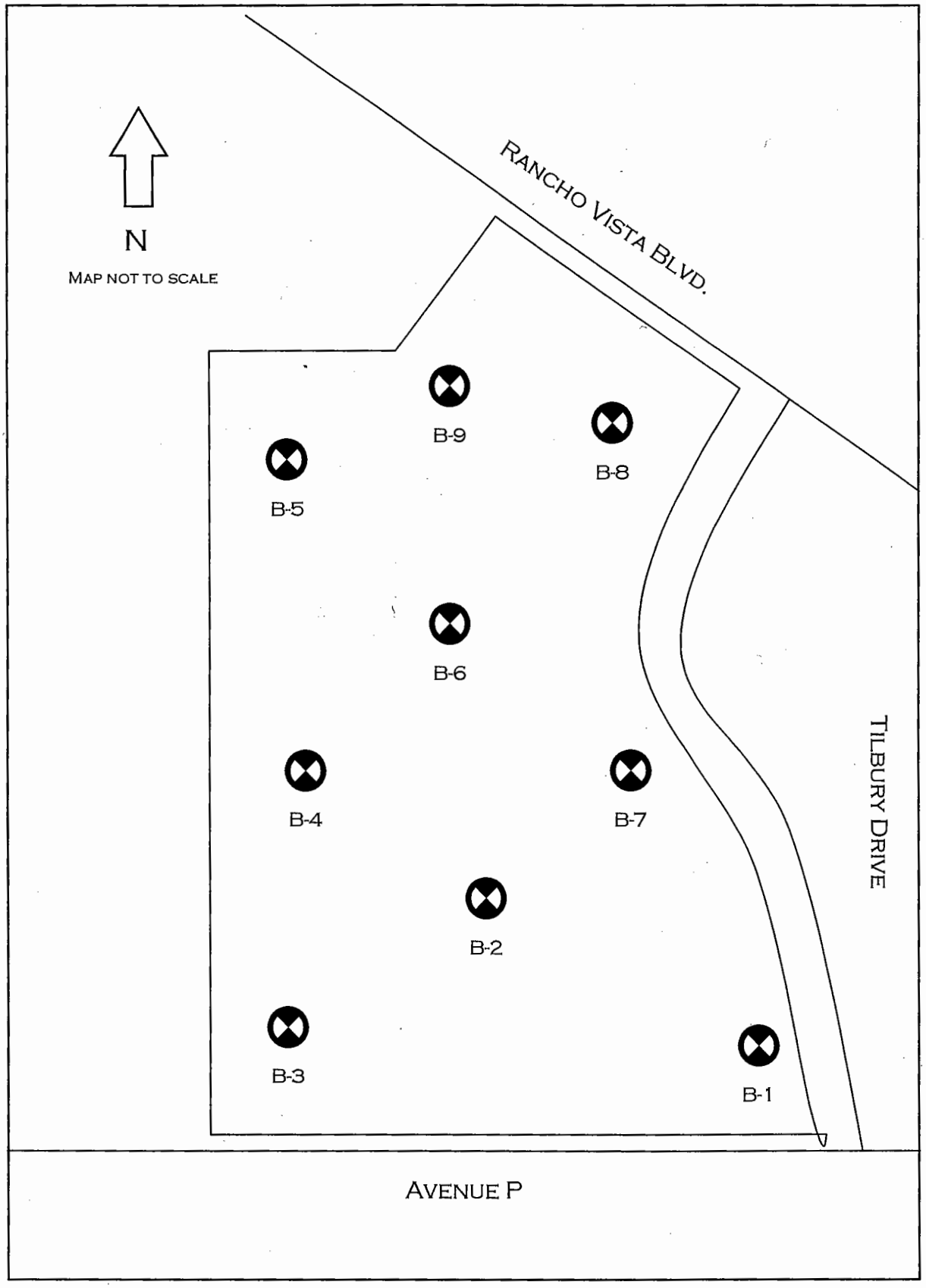


Project Number 05-340
Location: Ave. P & 30th St. W.; Palmdale, Ca

Project Name: JP Eliopulos Enterprises
Date: February 6, 2006

Plate I

Boring Location Map



Project Number 05-340
Location: APN 3001-003-911; Palmdale

Project Name: JP Eliopulos Enterprises
Date: February 6, 2006

Plate II

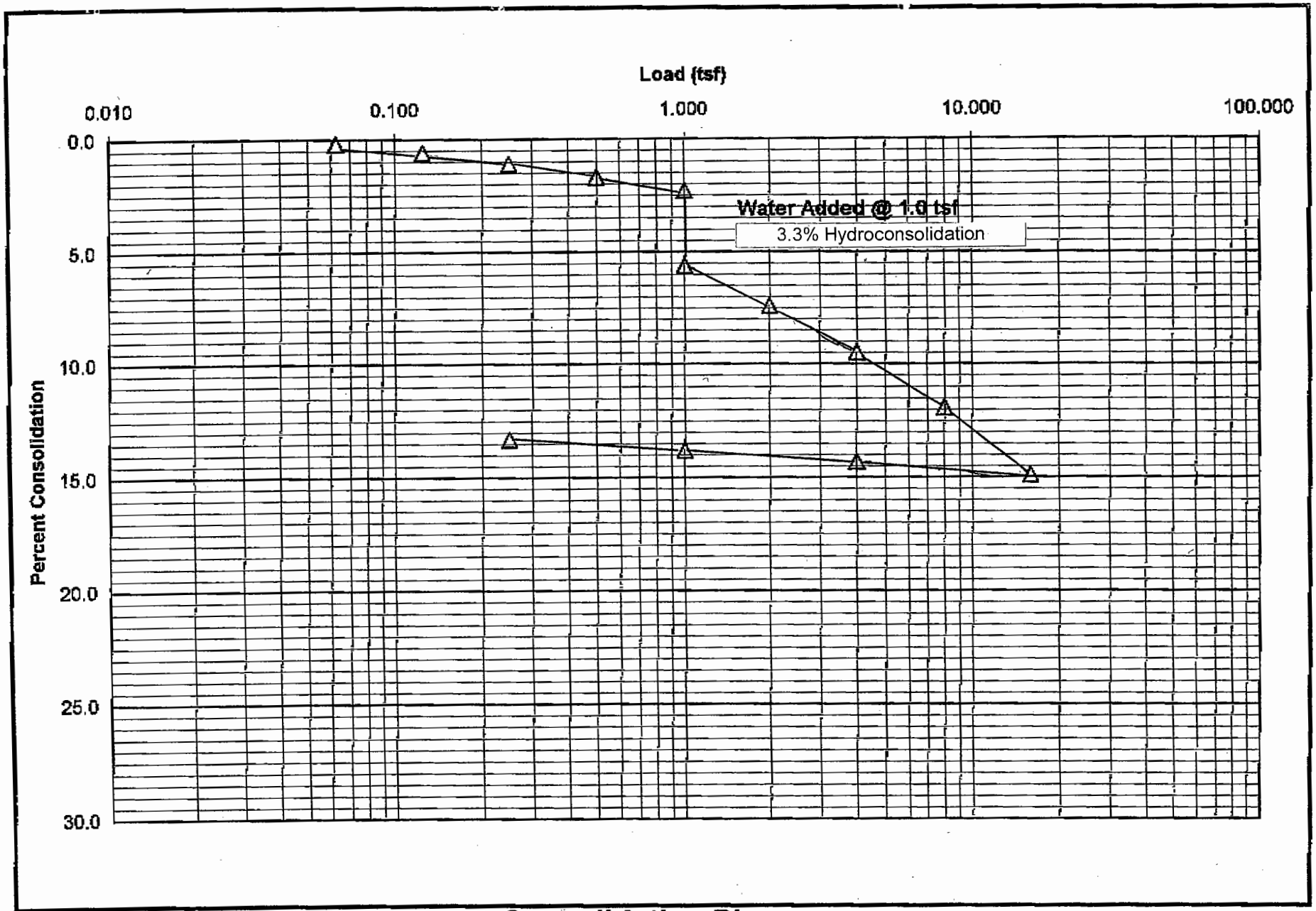
QC Consultants, Inc.
W.O. 340

Date of Test: 1/06

QC Consultants, Inc.

Moisture(%)
Before: 3.7 After: 13.3

Sample(in.)
Height: 1.00 Diameter: 2.41



Consolidation Diagram

B-1 @ 3.0'
Orange-brown, silty, very fine to fine SAND, w/ coarse sand gravel.

C05-340.1

Plate III

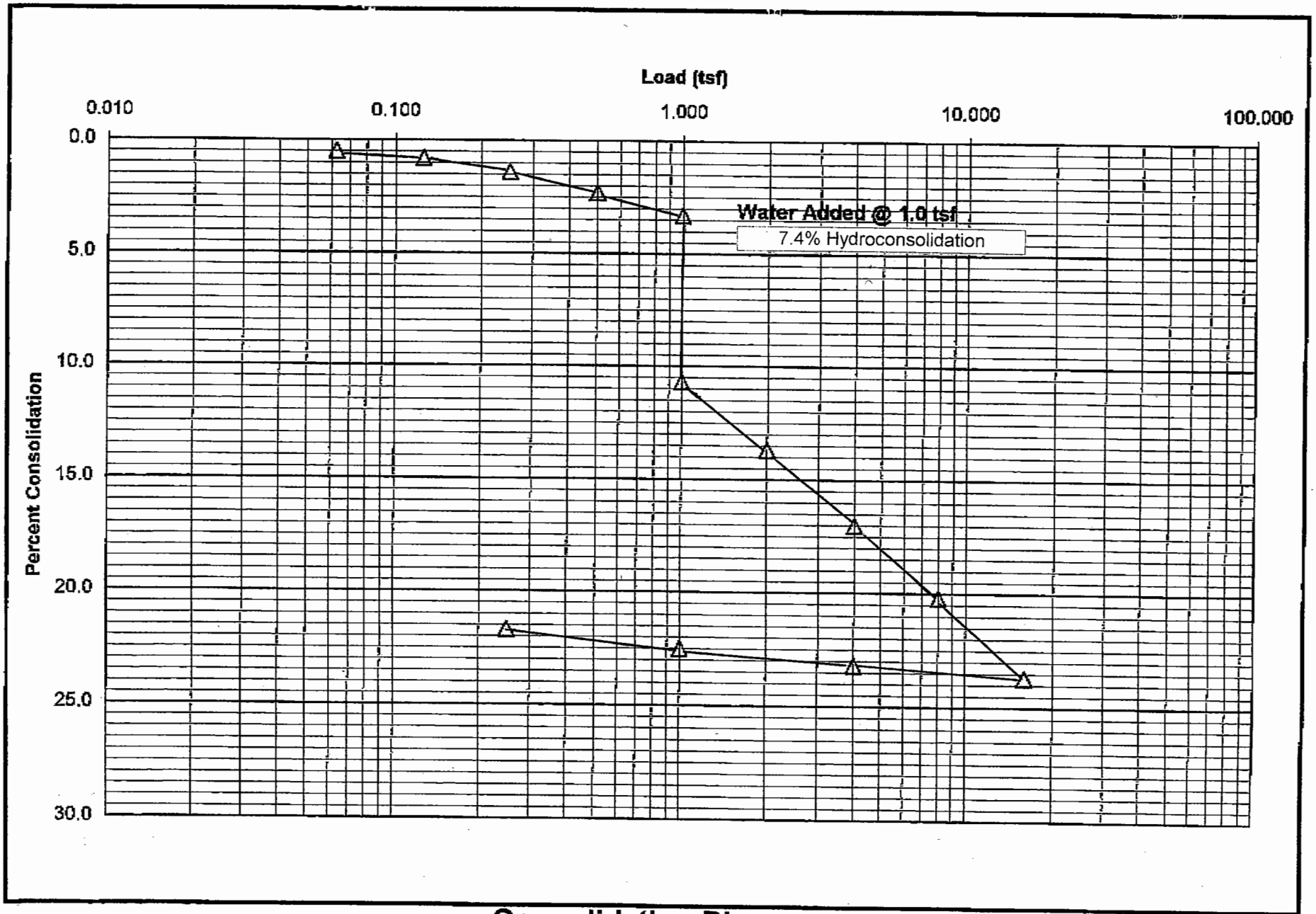
QC Consultants, Inc.
W.O.: 40

Date of Test: 1/06

QC Consultants, Inc.

sture(%)
Before: 4.5 ter: 12.9

Sample(In.)
Height: 1.00 Diameter: 2.41



B-3 @ 5.0'
Orange-brown, silty, very fine to fine SAND, w/ coarse sand gravel.

Consolidation Diagram

C05-340.2

Plate IV

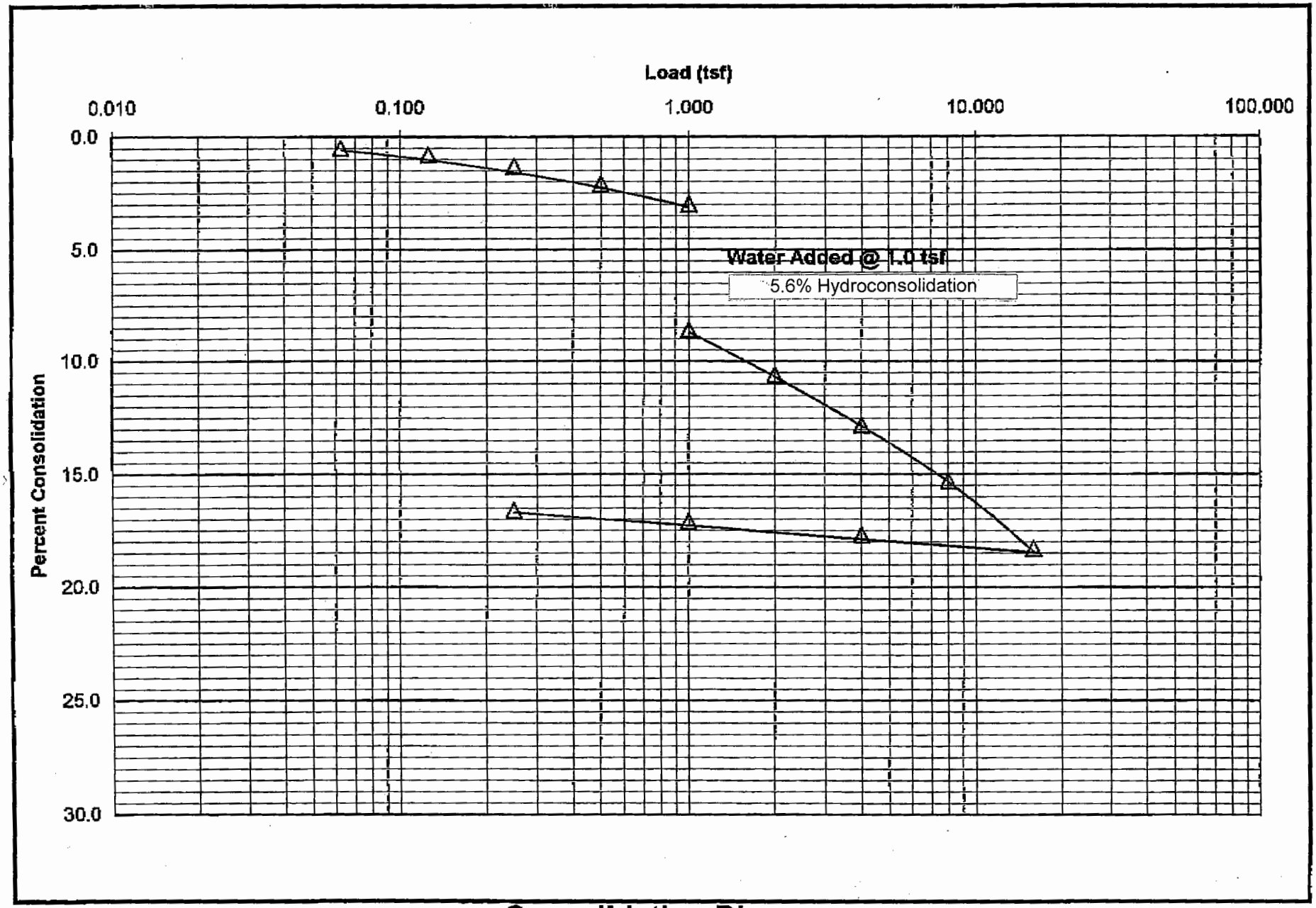
QC Consultants, Inc.
W.O. C05-340

QC Consultants, Inc.

Date of Test: 1/06

Moisture(%)
Before: 4.4 After: 13.3

Sample(in.)
Height: 1.00 Diameter: 2.41



B-7 @ 5.0'
Orange-brown, silty, very fine to coarse SAND, w/ gravel.

Consolidation Diagram

C05-340.5

Plate V

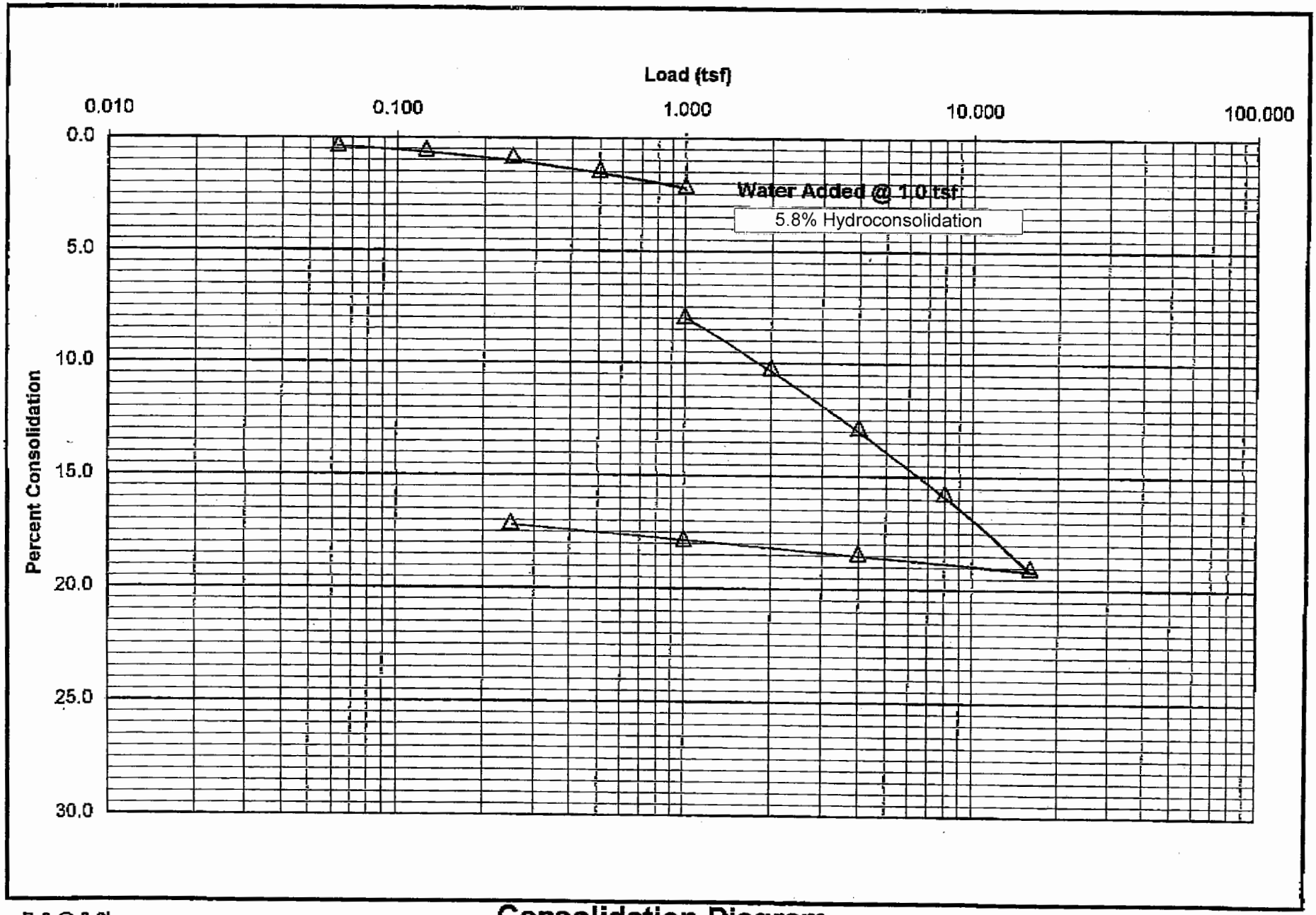
QC Consultants, Inc.
W.O. 340

Date of Test: 1/06

QC Consultants, Inc.

Moisture(%)
Before: 5.8 After: 12.9

Sample(in.)
Height: 1.00 Diameter: 2.41



B-6 @ 6.0'
Orange-brown, silty, very fine to coarse SAND, w/ gravel.

Consolidation Diagram

C05-340.4

Plate VI

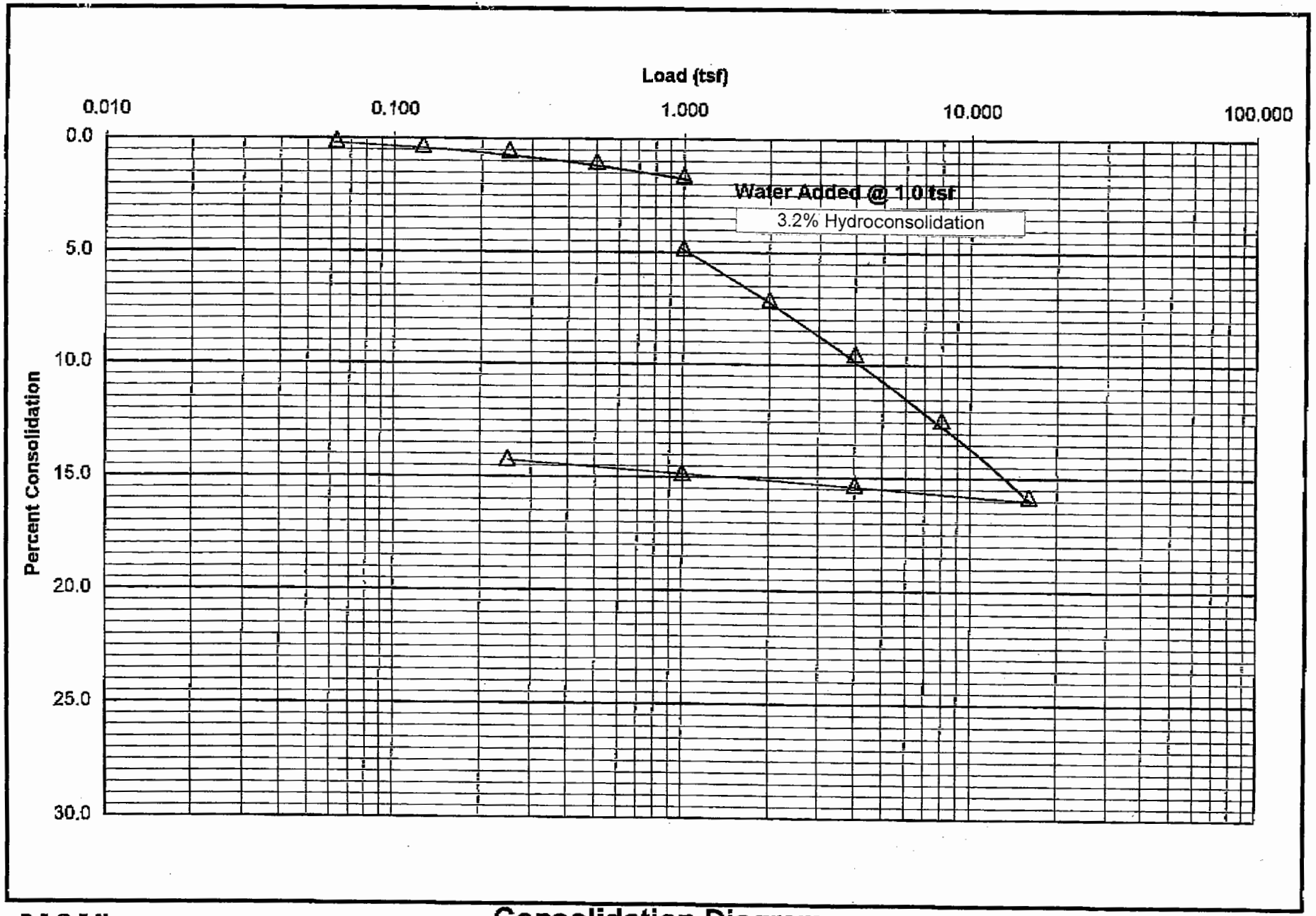
QC Consultants, Inc.
W.O. 140

Date of Test: 1/06

QC Consultants, Inc.

Moisture(%)
Before: 6.6 After: 13.4

Sample(in.)
Height: 1.00 Diameter: 2.41



B-5 @ 7.0'
Orange-brown, silty, very fine to fine SAND, w/ coarse sand gravel.

Consolidation Diagram

C05-340.3

Plate VII

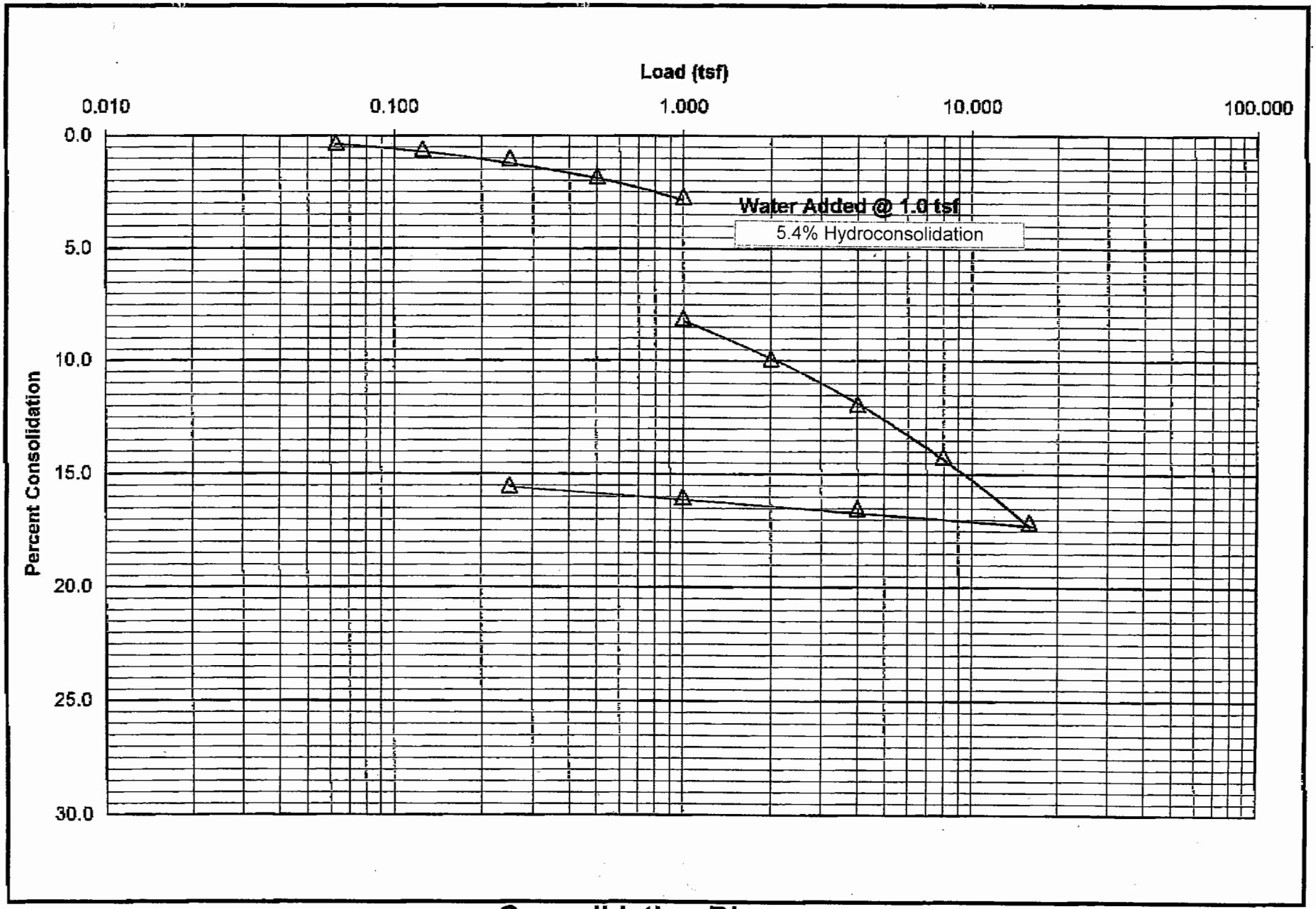
QC Co nts, Inc.
W.O.: 0 40

Date of Test: 1/06

QC Consultants, Inc.

ure(%)
Before: 4.0 er: 13.0

Sample(In.)
Height: 1.00 Diameter: 2.41



B-7 @ 7.0'
Orange-brown, silty, very fine to fine SAND, w/ coarse sand gravel.

Consolidation Diagram

C05-340.6

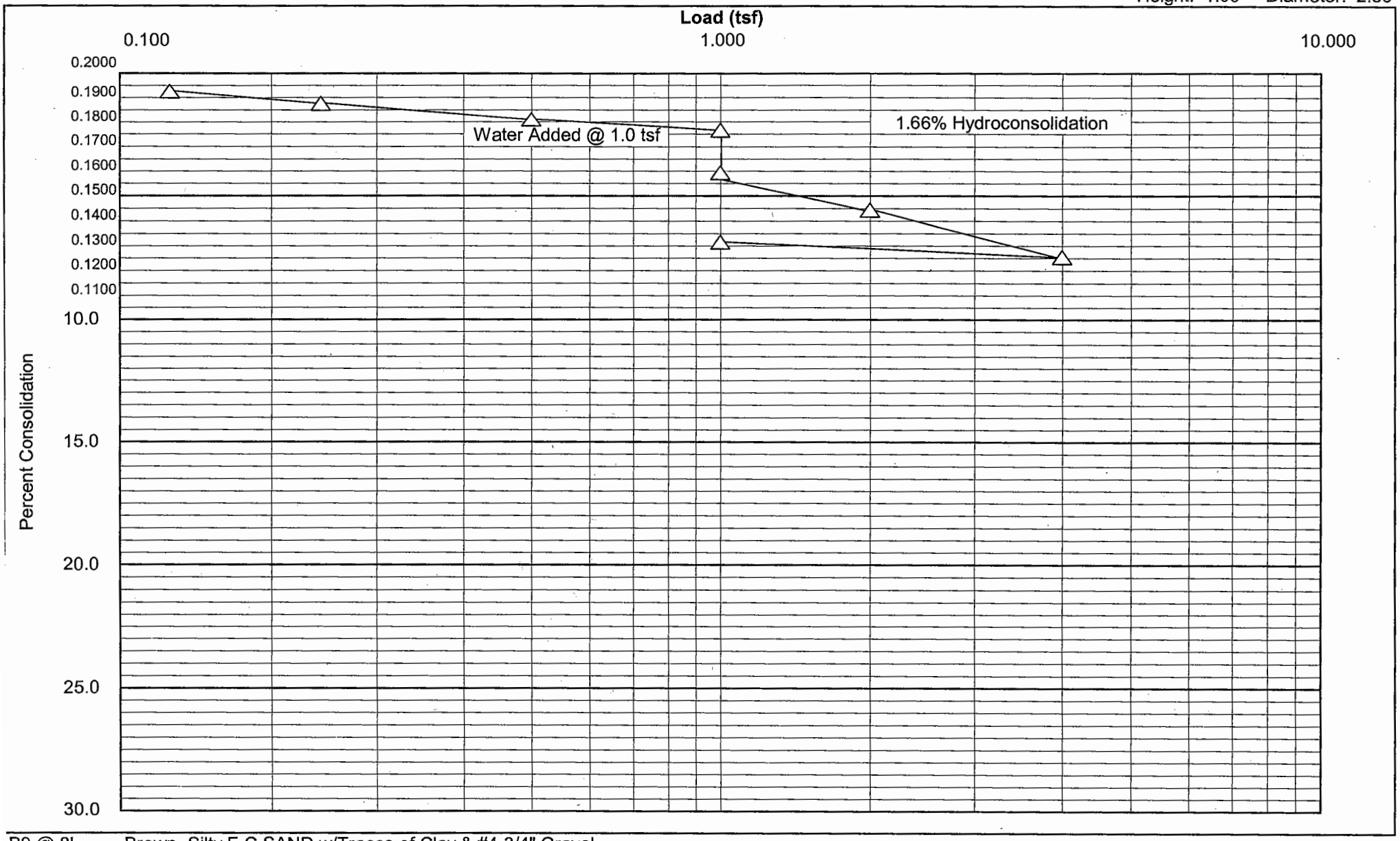
Plate VIII

JN 05-340

QC Consultants, Inc.

Date of Test: Feb-06

Sample (in.)
Height: 1.00 Diameter: 2.36



B9 @ 8' Brown Silty F-C SAND w/Traces of Clay & #4-3/4" Gravel

Plate IX

Consolidation Diagram

QC Consultants, Inc.
W.O.: 05-340

Date of Test: 1/06

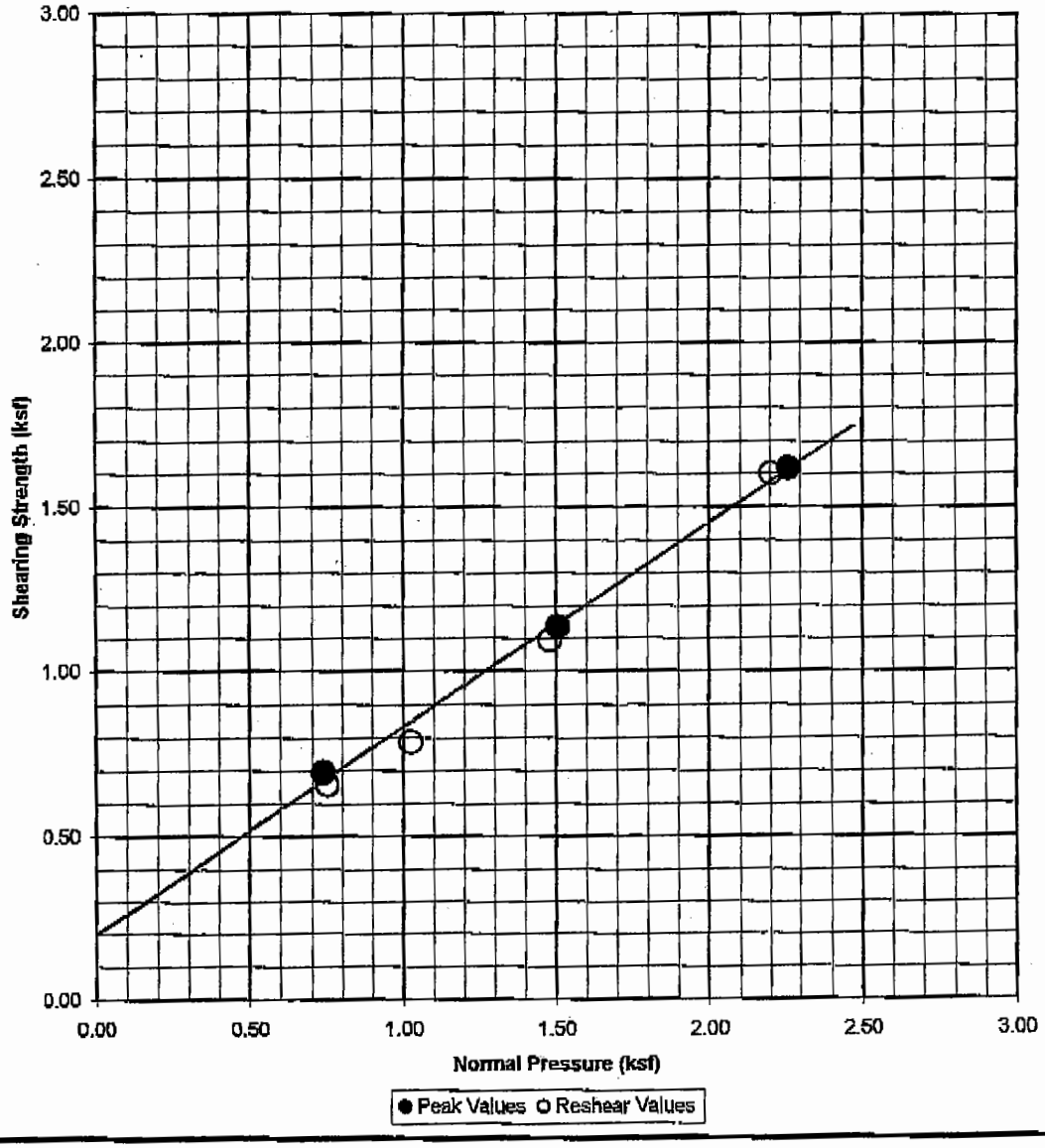
Sample: B-3 @ 0 - 5.0'

QC Consultants, Inc.

Shear Test Diagram

Peak
C(psf): **200** Phi (degrees): **34.0**

Reshear
C(psf): **200** Phi (degrees): **34.0**



Sample **Remolded** to 90% Relative Density, Saturated.
Rem Dry Den = 116.1 PCF

Orange-brown, silty, v.f. to f. SAND, w/ coarse sand.

MAX: 129.0 PCF: 8.5%

15.2% Sat. Moisture Content
05-340.1

Plate X

APPENDIX E

OC Consultants Inc., Percolation Testing for Proposed Dry Well Installation

QC CONSULTANTS INC.
Geotechnical And Materials Testing/QC Management

ON-SITE SEWAGE DISPOSAL FEASIBILITY

Proposed Drywell Construction
APN 3001-003-911
Avenue P and 30th Street West
Palmdale, California

Prepared for:

JP Eliopulos Enterprises

Project Number 05-340

March 10, 2006

42326 N. 10th Street West, Ste. A, Lancaster, CA 93534 • (661) 726-9424 • Fax (661) 726-9467

QC CONSULTANTS INC.
Geotechnical And Materials Testing/QC Management

March 10, 2006

JP Eliopulos Enterprises
42225 10th Street West, Suite 101
Lancaster, California 93534
(661) 942-8481 Fax (661) 949-9680

Regarding: Percolation Testing for Proposed Dry Well Installation
Proposed Townhome Site; APN 3001-003-911
Avenue P & 30th Street West
Palmdale, California
Project Number: 05-340

Dear Gentlemen:

In accordance with your request, QC Consultants Inc. has performed the subject percolation testing for the referenced project. The purpose of the percolation testing program was to determine soil percolation characteristics relative to the proposed dry well installation. It is our understanding the subject site will be developed as family condominiums or townhomes.

Property Description
The property is located West of Avenue P and 30th Street West in the City of Palmdale, Los Angeles County, California. Access to the site is available from Rancho Vista Boulevard a paved roadway, located at the northeastern border of the property.

Topography
Existing topography across the study site is gently sloping with surface drainage by sheet-flow to the Northeast. Total relief was approximately fifty to sixty feet (50'-60').

Field Procedures
The field testing program was performed on February 22, 2006, and consisted of drilling a test boring to a depth of fifty (50) feet below existing ground surface, utilizing a Mobile B-61 drill rig with eight (8)-inch hollow stem auger. The soil was logged and classified in accordance with the Unified Soil Classification System. No groundwater was encountered during drilling and is shown on State Maps to be at levels greater than 200 feet below the surface. The soil consisted of dense older alluvial deposits of silty and clayey sands (SM/SC). The log is attached as Appendix A.

Upon completion of the drilling operation, fifty feet of PVC pipe was placed down the hollow auger, twenty (20) feet of slotted pipe and thirty (30) feet of solid pipe. As the auger was extracted #3 well sand was placed in the hole and the outermost space between the pipe and earth were filled to a depth of twenty-eight (28) feet below existing ground surface. A (3-4) foot thick layer of bentonite chips were placed on top of the sand to seal the hole and assure only the targeted soils would be tested (see Appendix B). The test hole was then filled to the top of pipe with clean water to soak for twenty-four (24) hours prior to testing.

On February 23, 2006, the hole was again filled with water to the top of the pipe and allowed to stabilize at a level of thirty (30) feet below existing grade (measured with an electronic water level indicator). After 30 minutes, the water depth was measured, and the hole was again refilled to the top of the pipe and allowed to stabilize at thirty feet (30'). The above procedure was repeated for an approximate three (3)-hour duration, or until the final few readings were relatively stable. The final measurement was used to calculate the absorption rate of the soil.

Results and Recommendations

Based on the percolation testing performed as indicated, it is our professional opinion the proposed dry well is feasible from a geotechnical standpoint. An absorption rate of 26.3 gallons per square foot per day may be utilized for design. The dry well should be tested after installation to verify the design infiltration capacity.

Limitations

This report presents the results of one (1) percolation test performed at the referenced location to determine if dry wells are the appropriate system for removal of tract nuisance water. The opinions provided in this report are based on data from field testing program and our past experience. Hydro-geologic conditions will vary with subsurface conditions, precipitation, geologic setting, and topography.

Thank you for the opportunity to provide this report. We hope it is sufficient for your present needs. Please direct any questions to this office.

Respectfully submitted,

QC Consultants Inc.

M.R. Maevers

Marvin R. Maevers, P.E.
Project Engineer

MRM/ly

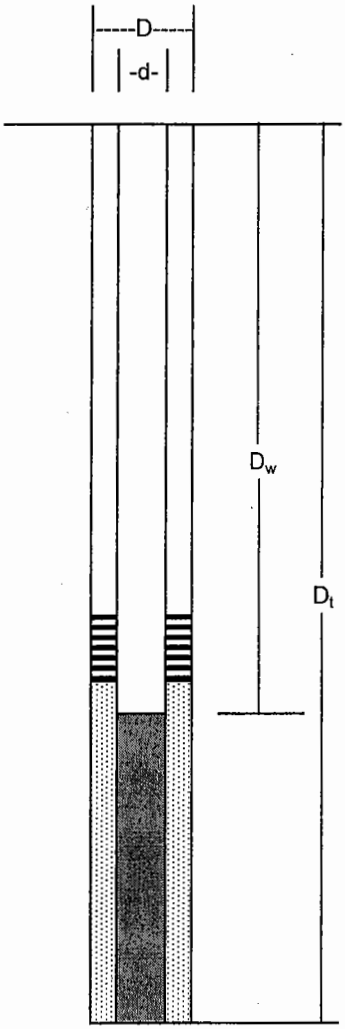
QC CONSULTANTS INC.

Geotechnical And Materials Testing/QC Management

Drywell Percolation Test

Project:	APN 3001-003-911	Logged By:	Richard Hoey
Location:	Avenue P and 30th Street West Palmdale, California	Diameter of Hole:	8.5" H.S. Auger
		Drill Rig Type:	Mobile B-61
Project No:	05-340		
Date Tested:	2/23/2006	Date Drilled:	2/22/2006

Depth To Bottom, ft (D_t) : 50'
Depth to Water, (D_w) : variable
Diameter of Hole, (D) : 8.5"
Diameter of Pipe, (d) : 2.0"
Aggregate Correction : 0.46945



Time Interval, D_t (min)	Change In Water Level (feet)	Percolation Rate (gal/Sqft*day)
30	12.6	27.4
30	12.5	27.2
30	12.5	27.1
30	12.4	26.8
30	12.3	26.4
30	12.2	26.3

Legend

2'-3' Bentonite Clay Chips

3 Well Sand

Bottom 20' is 2" Slotted PVC Pipe

Top 30' is 2" PVC Pipe

42326 N. 10th Street West, Ste. A, Lancaster, CA 93534 • (661) 726-9424 • Fax (661) 726-9467

APPENDIX A

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340
Project Name: JP Eliopulos Enterprises
Date: 2-20-06
Boring #: B-1
Location: APN 3001-003-911; Palmdale
Rig Type: Mobile B-61
Dia. 8" Hollow Stem
Elev.: N/A
Depth: 50'
Groundwater: N/A
Bedrock: N/A
Refusal: N/A
Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
0				SM	Brown, Silty F-C SAND w/# 4-3/4" Gravel, Medium Dense & Slightly Moist
10				SM	Reddish Yellow, Silty F-C SAND w/# 4-3/4" Gravel, Very Dense & Moist
					Very Firm Drilling to 35'

No Caving
No Groundwater Encountered

QC Consultants Inc.
Geotechnical and Materials Testing
42326 North 10th Street West, Suite A
Lancaster, CA 93534
(661) 726-9424

BORING LOG

Project #: 05-340
Project Name: JP Eliopulos Enterprises
Date: 2-20-06
Boring #: B-1
Location: APN 3001-003-911; Palmdale
Rig Type: Mobile B-61
Dia. 8" Hollow Stem
Elev.: N/A
Depth: 50'
Groundwater: N/A
Bedrock: N/A
Refusal: N/A
Logged by: RH

Depth in feet	Dry Density	Moisture Content	Blows per Foot*	USCS	Description
35				SM	Reddish Brown, Silty F-C SAND w/# 4-3/4" Gravel, Dense & Moist
					Easier Drilling to 50'

No Caving
No Groundwater Encountered

Terminated Drilling @ 50'

APPENDIX B

SITE LOCATION MAP

Project Name:
JP Eliopulos Enterprises

Project Number: 05-340

Location:
APN 3001-003-911
Avenue P & 30th Street West
Palmdale, California

Date: March 10, 2006

APPENDIX F

Southwest Geotechnical, Inc., Limited Geologic Investigation

Southwest Geotechnical, Inc.
Consulting Engineers & Geologists

21704 West Golden Triangle Road, Suite 425
Santa Clarita, California 91350
Tel: (661) 222-9544 - Fax: (661) 222-9549

FILE

November 14, 2006
SGI# 0509341

CCL Engineering, Inc.
C/O Mr. Tom Howser
43434 Sahuayo Street
Lancaster, California 93535

Subject: Limited Geologic Investigation for Proposed Cut Slope Grading Vesting Tentative Tract 53342, Vicinity of Sandstone Court Southwest of Rancho Vista Boulevard, Palmdale, California

References: See Plate R-1

INTRODUCTION

Per your request, Southwest Geotechnical, Inc. (SGI) has prepared this Limited Geologic Investigation Report to evaluate the currently proposed onsite grading of cut slopes required to achieve the desired grades for the proposed subject tract development. This Report has been completed in order to provide geologic findings with regards to the onsite bedrock's structural geologic conditions pertaining to the proposed grading.

An undated preliminary "Grading Plan" (scale of 1" = 60') prepared by and provided to our office by CCL Engineering, Inc. (CCL) served as a base map for our analyses and field investigation. An updated Grading Plan (no scale) prepared by CCL on October 19, 2006 depicting minor lot configuration revisions was also evaluated as a part of our current investigation. It should be understood that the findings presented herein are intended to specifically address the proposed development indicated by the aforementioned Grading Plans. Should the actual proposed onsite development vary significantly from the site configuration evaluated during our investigation, an addendum report addressing any such updated plans may be required, which may be subject to additional exploration and field data analyses.

The preliminary findings presented in this Report pertain to the geologic conditions of the onsite slopes in the explored areas of proposed cut slopes only. This is not considered a comprehensive "stand-alone" report intended for submittal to an applicable controlling agency for permit issuance purposes.

SCOPE AND PURPOSE

The intended purpose of this report is to present the findings of our limited geologic investigation performed onsite to evaluate the structural geologic conditions of the onsite bedrock slopes as they pertain to the feasibility of the proposed onsite grading. This Report is intended to be presented to the project geotechnical engineer for his review and ultimately to be incorporated into his preliminary geotechnical engineering report.

The scope of our investigation includes, but is not limited to, the following:

- General vicinity reconnaissance and project specific field observations onsite, performed on October 25, 2005
- Review of preliminary grading plans prepared by CCL Engineering, Inc., discussed above
- Review of available geologic references pertaining to the site's general vicinity, referenced herein (Plate R-1)
- Geologic field-mapping of the site and detailed logging of 6 exploratory trenches to a maximum depth of 8 feet using a backhoe October 25, 2005
- Preparation of this report, which summarizes and presents all procedures and findings accumulated during our investigation.

The findings presented herein, which pertain to the currently proposed onsite grading, are based in part upon: 1) our analyses of the field data obtained during our onsite exploration; 2) review of the referenced documents pertaining to the site and its vicinity; 3) the scope of the proposed development as indicated on the preliminary plans provided to our office; 4) site conditions observed by representatives of this firm at the time of our investigation and; 5) our professional knowledge of general geotechnical factors pertaining to the site and its vicinity.

FIELD EXPLORATION AND TESTING

On October 25, 2005, SGI conducted a visual reconnaissance of the site's surface conditions and logged in detail 6 exploratory trenches excavated onsite by CCL to a maximum depth of 8 feet using a rubber-tire backhoe. The onsite earth materials encountered in the onsite trenches were carefully examined and logged in detail, the descriptions for which are presented on the attached Trench Logs and discussed herein. Onsite earth materials exposed on the surface were mapped by visual examination, the approximate limits of which are illustrated on our Geologic Map. All test holes were backfilled following our observation of the subsurface materials exposed within the trenches.

It should be noted that the backfill placed within the onsite trenches upon the completion of our field exploration was not compacted to the City-required standards for engineered fill, and settlement of the backfilled material should be anticipated over time.

The Trench Logs and descriptions of the earth materials presented herein reflect conditions observed onsite at the time of our field exploration only. The subsurface conditions in unexplored areas of the site may vary from those presented herein, and minor discrepancy in subsurface conditions should be anticipated in such unexplored areas on the subject site at the time of onsite grading.

EARTH MATERIALS

Residual soil, alluvium, schist bedrock typical of the site's vicinity were encountered in our test holes and observed on the ground surface of the site at the time of our investigation. Detailed descriptions of the observed onsite earth materials are discussed below, in the order of increasing geologic age, and presented on our Test Hole Logs, appended herein.

Residual Soil (rs)

The onsite bedrock slopes are mantled with a layer of residual soil whose typical thickness observed in the exploratory trenches ranges from less than 1 foot to approximately 1½ feet. The residual soil consists of medium-brown, damp, moderately dense, fine- to medium-grained sand that contains numerous roots and rootlets.

Alluvium (Qal)

The onsite bedrock slopes are bounded along their easterly margins by alluvial deposits of the Holocene geologic age that underlie the flat portions of the site. The alluvium consists of medium-brown, dry to damp, moderately dense, silty fine- to coarse-grained sand that contains abundant small pebbles and occasional pebble stringers up to 2 inches in thickness.

Bedrock: Pelona Schist (Psp)

The site and its vicinity are underlain by schist bedrock assigned to the Pelona Formation of Precambrian geologic age. The bedrock was observed to be peppery light-orange-brown to tan in color, dry to damp, friable (weathered upper 2 feet) to hard. The bedrock has moderately well developed schistosity (foliation in schist), and is moderately fractured and jointed.

GEOLOGIC STRUCTURES

The primary geologic structure observed within the onsite bedrock is schistosity, or mineral alignment pattern (foliation) typical of schist and some other rock types of metamorphic origin. Schistosity, as observed within our onsite test holes and illustrated on regional geologic references of the site's vicinity, indicates the predominant orientation of the onsite bedrock is an east-west and northwest strike and a north and northeast dip ranging from 17 to 48 degrees. The generally steep angles of the schistose planes are considered supported with respect to the slope in its existing condition, and are considered favorable for the site's gross stability.

However, north-facing proposed cut slopes whose resulting slope gradients will exceed the angles of the schistose planes are anticipated to result in an unsupported condition with respect to the face of the excavation. This proposed condition should be evaluated and analyzed for stability by the project geotechnical engineer. In general, cut slopes graded to 2:1 (horizontal: vertical) or flatter slope gradients are anticipated to result in a supported condition with respect to the predominant orientation with the observed schistose planes.

Secondary structural elements, namely joints, were also observed within the bedrock exposed in the exploratory trenches. Two pervasive sets of joints were observed; a north- to northwest-striking steeply west-dipping joint set and a east-west-striking near-vertical set of joints. The geometric relationships between the two joint sets, as well as their orientations with respect to the schistosity, are considered supported with respect to the existing and proposed slopes.

The onsite bedrock is also moderately to highly fractured along randomly oriented, steeply dipping, and discontinuous fractures. These fractures are not anticipated to adversely affect the proposed onsite grading or the existing onsite slopes.

FAULTS

No faults were observed within the exploratory trenches excavated onsite examined by a representative of this firm. However, regional geologic references indicate that ancient faults, predominantly much older than those considered 'active' by the State of California, affect the bedrock underlying the site and its vicinity. These ancient faults are inferred to have resulted from the orogenic (mountain-building) uplift associated with the Precambrian rocks of the region, which are believed to be brought up to the surface from a great depth over a significant geologic time period due to regional 'compression' and uplifting. These ancient faults are not anticipated to have an adverse impact on the site's gross stability.

LIMITATIONS

The conclusions and recommendations submitted in this Report as they pertain to the future development of this particular property are based, in part, upon the data obtained from exploratory trenches examined by SGI, site conditions as they existed at the time our field work was completed, factual information contained within the referenced documents listed at the end of this report and past experience with similar projects in the general area.

Should changes occur to the property, or the project design vary significantly from that anticipated at the time of this report, revised recommendations may be warranted. The recommendations of this report should be incorporated into the design drawings for the site grading and construction. If conditions encountered during grading differ from those described in this document, this condition should be brought the attention of SGI immediately. Should this condition occur, the need for revision of the original recommendations would be assessed at that time.

SGI has attempted to prepare this Report in accordance with generally accepted geologic and geotechnical engineering methods as practiced in this community at this time. No warranty or guarantee is expressed or implied. This report has been prepared for the use of the client and their authorized agents.

The statements contained in this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the conclusions of this report may be invalidated, wholly or partially, by changes outside of our control, and should therefore be reviewed after one year.

CLOSURE

We hope that the recommendations presented in this Preliminary Report meets your needs for the currently proposed site development. Southwest Geotechnical, Inc., appreciates this opportunity to provide professional geologic and soils engineering services for this project. If you have any geologic or soils engineering questions regarding the information contained in this document, or if you require additional geologic and soils engineering input and services, please feel free to contact us.

Respectfully submitted,
SOUTHWEST GEOTECHNICAL, INC.

Johan Pae
Engineering Geologist
CEG #2302, Exp. 5-31-07

Michael J. Sprock
General Manager

JP/MJS:ma
HOWSER 0509341 LIMITED GEOLOGY.DOC

Attachments:

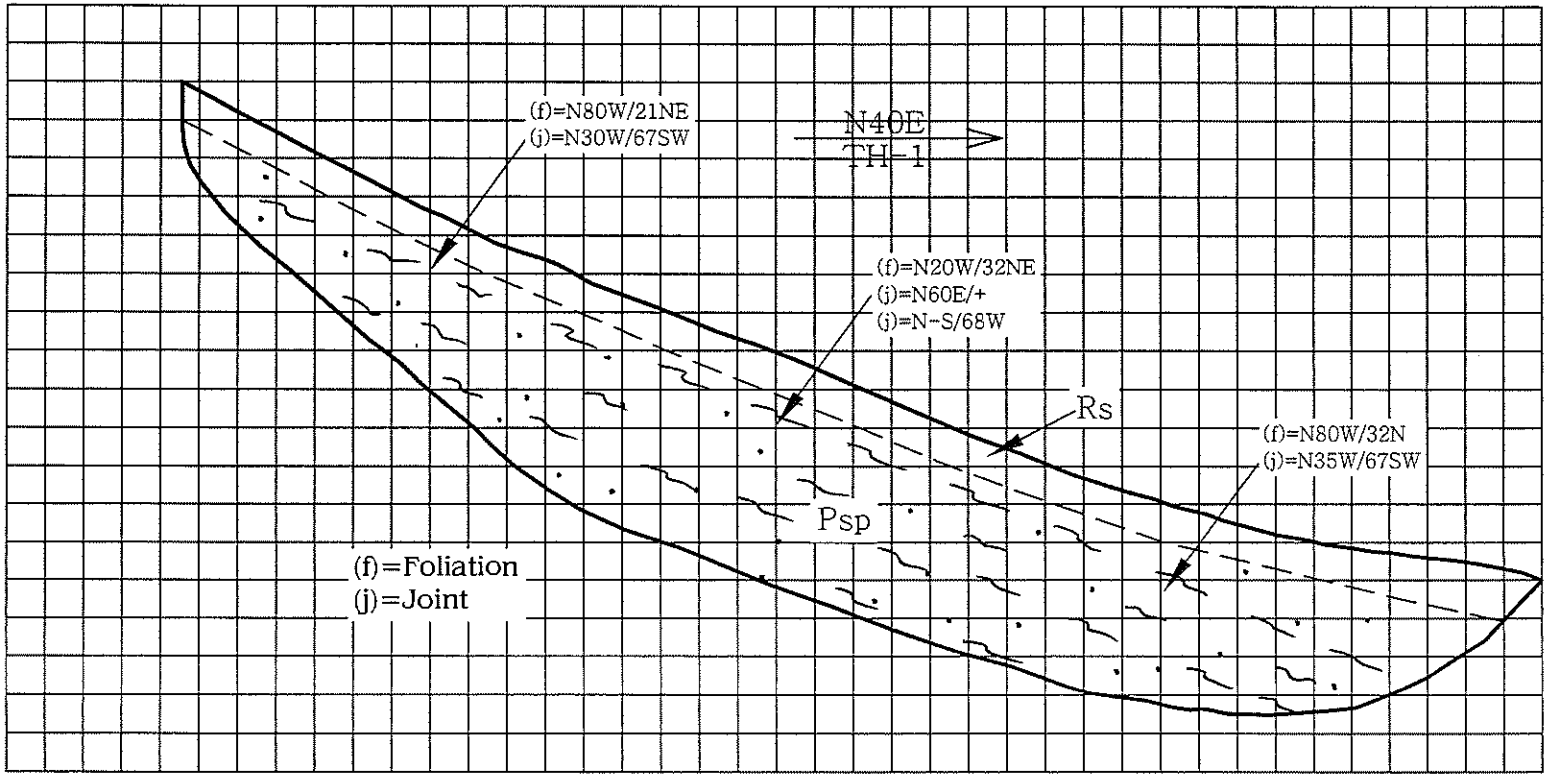
References (Plate R-1)
Geologic Map
Trench Logs (6)

REFERENCES

1) Dibblee, T.W., 1997, Geologic Map of the Sleepy Valley and Ritter Ridge Quadrangles, Los Angeles County, California; Dibblee Geological Foundation, Map No. DF-66, Scale=1:24,000.

2) Davis, J.F., 1979, Special Studies Zones Map of the Ritter Ridge 7½-Minute Quadrangle; California Division of Mines and Geology, Scale=1:24,000.

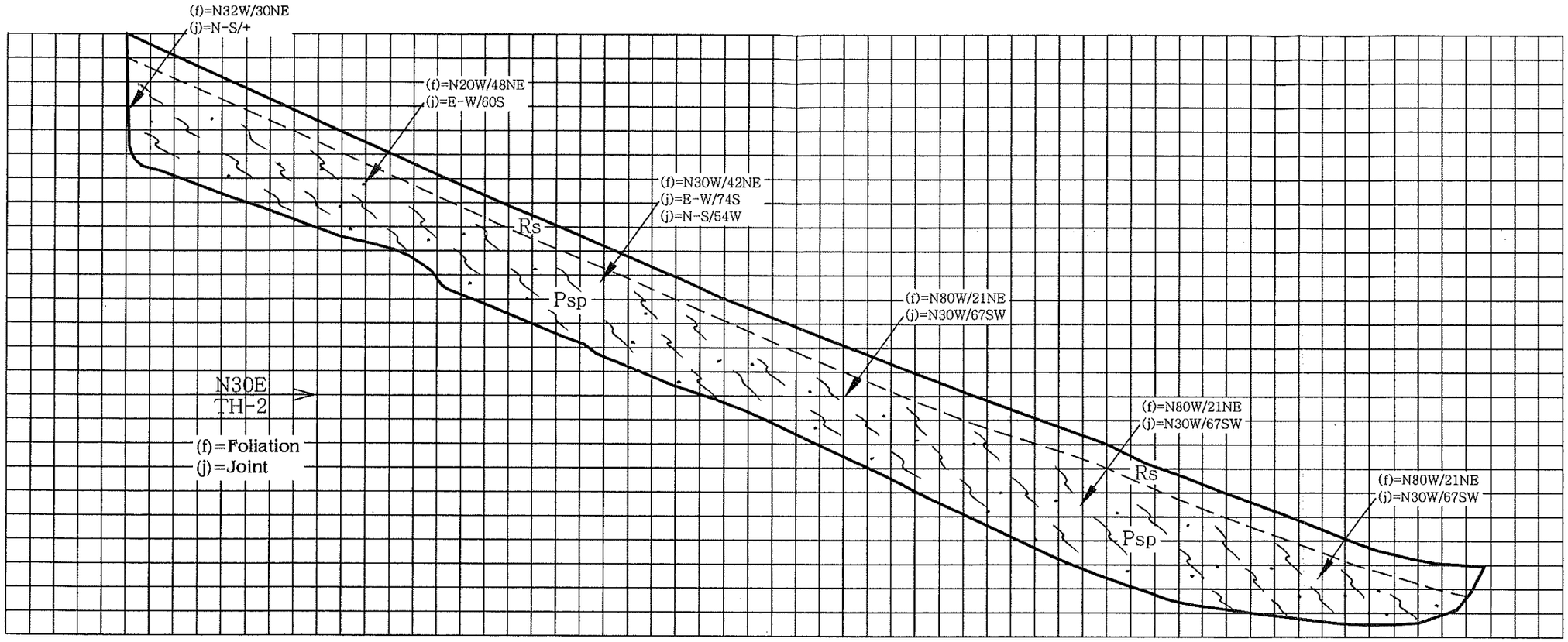
3) Davis, J.F., 2003, Seismic Hazard Zones Map of the Ritter Ridge Quadrangle; California Geological Survey, Scale=1:24,000.



Residual Soil (Rs): Fine- to medium-grained sand; medium brown, damp, moderately dense, with ~10% large angular pebbles (~1/2" to 2" in diameter)

Pelona Schist Bedrock (Psp): Schist; peppery light orange brown to tan, damp, friable (upper 2') to hard, well foliated, highly fractured and jointed

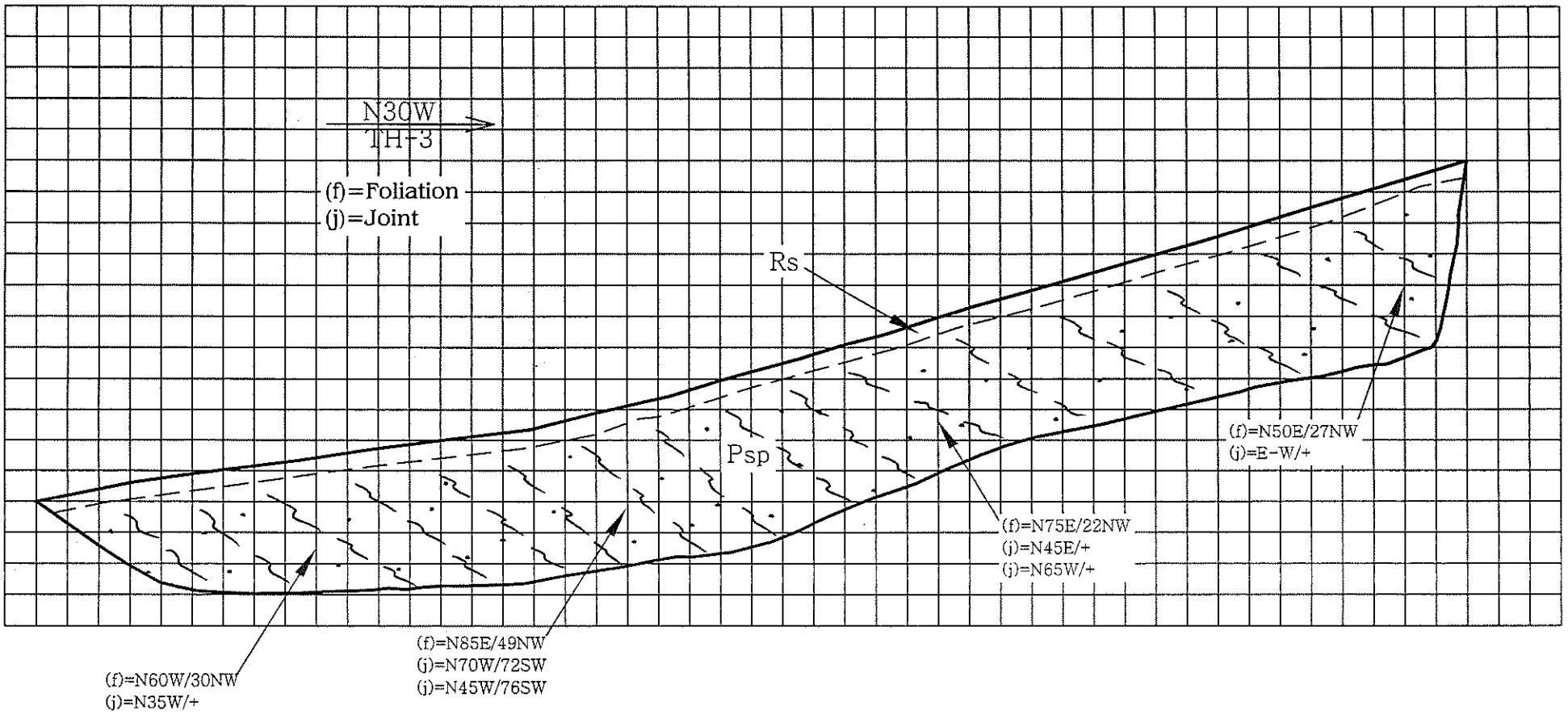
Southwest Geotechnical, Inc.	
Test Hole Log 1	
Project #: 0509341	Scale 1"=5'
Client: Howser	
Date: November '06	



Residual Soil (Rs): Fine- to medium-grained sand; medium brown, damp, moderately dense, with ~10% large angular pebbles (~1/2" to 2" in diameter)

Pelona Schist Bedrock (Psp): Schist; peppery light orange brown to tan, damp, friable (upper 2') to hard, well foliated, moderately fractured and jointed

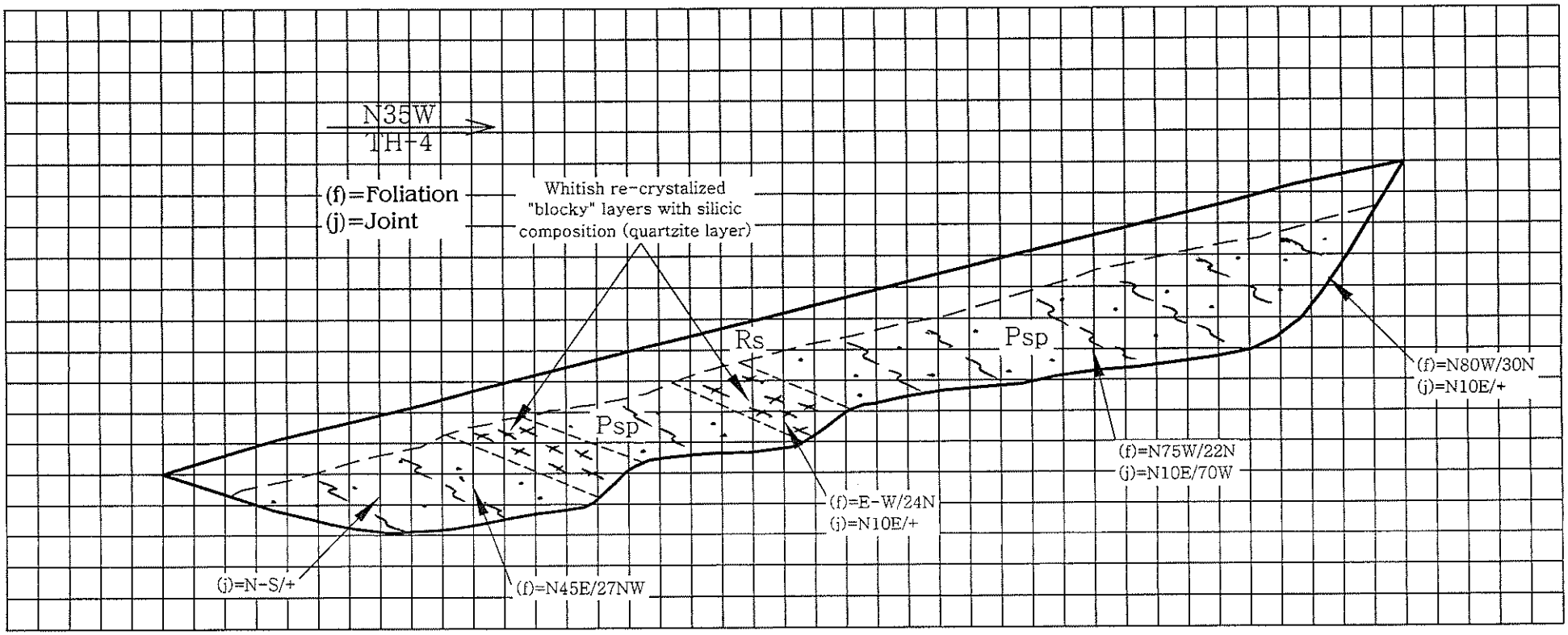
Southwest Geotechnical, Inc.	
Test Hole Log 2	
Project #: 0509341	Scale 1"=5'
Client: Howser	
Date: November '06	



Residual Soil (Rs): Fine- to medium-grained sand; medium brown, damp, moderately dense, with ~10% large angular pebbles (~1/2" to 2" in diameter)

Pelona Schist Bedrock (Psp): Schist; peppery light orange brown to tan, damp, friable (upper 2') to hard, well foliated, highly fractured and jointed

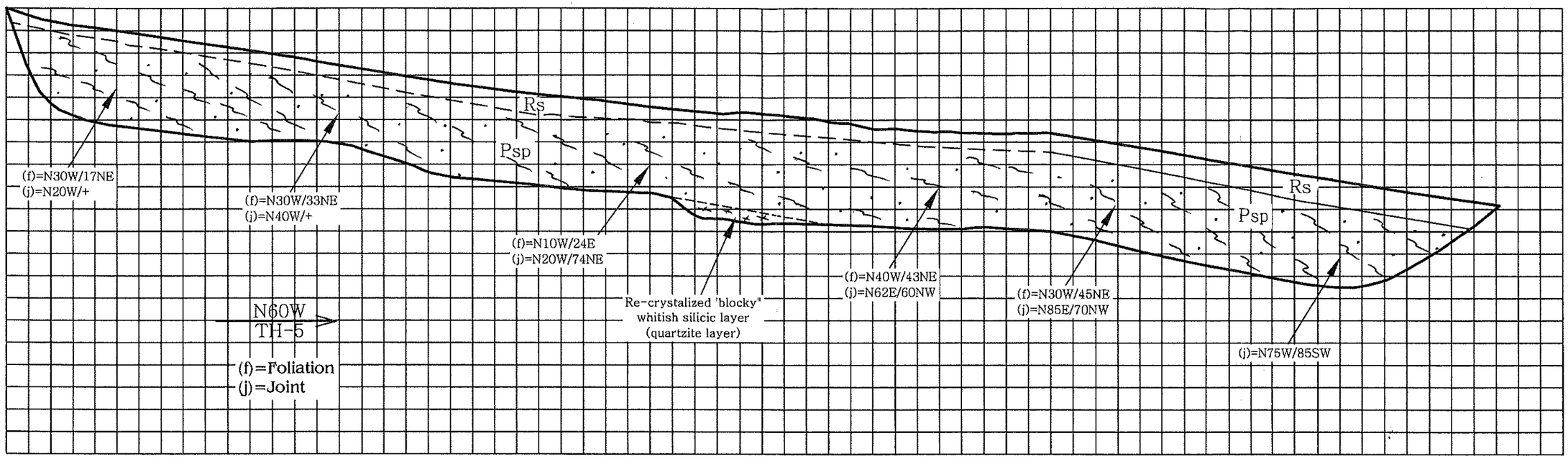
Southwest Geotechnical, Inc.	
Test Hole Log 3	
Project #: 0509341	Scale 1"=5'
Client: Howser	
Date: November '06	



Residual Soil (Rs): Fine- to medium-grained sand; medium brown, damp, moderately dense, with ~10% large angular pebbles (~1/2" to 2" in diameter)

Pelona Schist Bedrock (Psp): Schist; peppery light orange brown to tan, damp, friable (upper 2') to hard, well foliated, moderately fractured and jointed

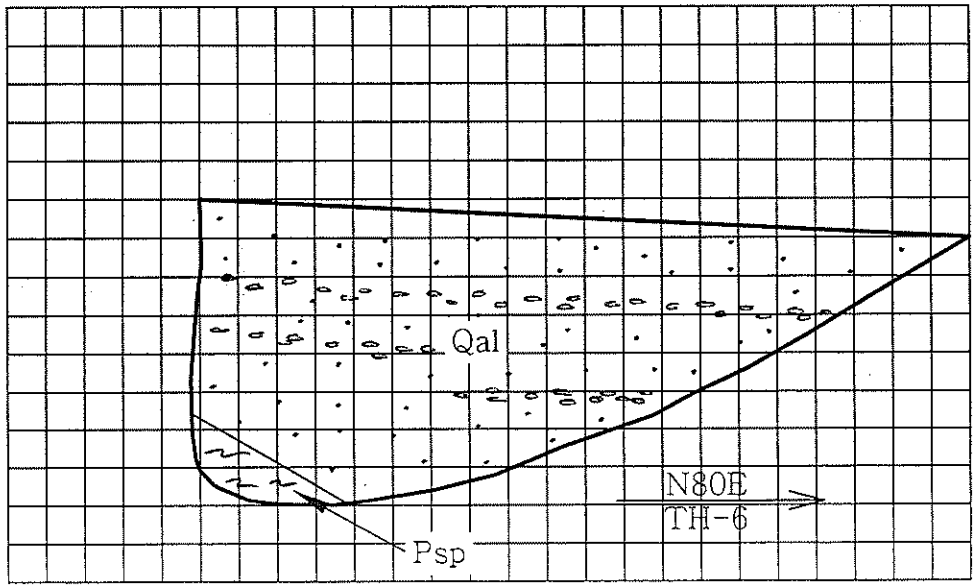
Southwest Geotechnical, Inc.	
Test Hole Log 4	
Project #: 0509341	Scale 1"=5'
Client: Howser	
Date: November '06	



Residual Soil (Rs): Fine- to medium-grained sand; medium brown, damp, moderately dense, with ~10% large angular pebbles (~1/2" to 2" in diameter)

Pelona Schist Bedrock (Psp): Schist; peppery light orange brown to tan, damp, friable (upper 2') to hard, well foliated, highly fractured and jointed

Southwest Geotechnical, Inc.	
Test Hole Log 5	
Project #: 0509341	Scale 1"=5'
Client: Howser	
Date: November '06	



Residual Soil (Rs): Fine- to medium-grained sand; medium brown, damp, moderately dense, with ~10% large angular pebbles (~1/2" to 2" in diameter)

Pelona Schist Bedrock (Psp): Schist; peppery light orange brown to medium gray, damp, friable (upper 2') to hard, well foliated, massive, highly fractured and jointed

Southwest Geotechnical, Inc.	
Test Hole Log 6	
Project #: 0509341	Scale 1"=5'
Client: Howser	
Date: November '06	

LEGEND

- TH-1 — Approximate Location and Number of Test Hole
- 21 — Strike and Dip of Foliation
- 67 — Strike and Dip of Joint
- Afc — Compacted Fill
- Qal — Alluvium
- Psp — **Bedrock:** Pelona Schist (Soil Covered)

Project Number **0509341** *Client* **Howser**	*Date* **November '06**	*Scale* **1"=50'**	*Reference* **Tentative Map, Original Scale: 1"=60'; CCI Engineering, Inc., No Date**	*Client* **Howser** *Project* **Tract 53342, Palmdale**	**Geotechnical Map**

Map Prepared in the Offices of
Southwest Geotechnical, Inc.
21704 W. Golden Triangle Rd., Suite 425
Santa Clarita, California 91350
(661) 222-9544 Fax (661) 222-9549

APPENDIX G

CCL Engineering Inc., Geotechnical Engineering Report, Grading Plan Review

GEOTECHNICAL ENGINEERING REPORT-
GRADING PLAN REVIEW

For

Proposed Residential Development
Tract No. 53342
Registry Way, south of Rancho Vista Blvd
Palmdale, CA

Developer

R.Y. Properties
212 S. Palm Avenue, Ste. 200
Alhambra, CA 91801

Prepared By

CCL Engineering, Inc.
Geotechnical Department

November 20, 2006
JN: 1615G

GEOTECHNICAL ENGINEERING REPORT

Tract No. 53342
Palmdale, CA

INTRODUCTION

As requested, we have performed a geotechnical study & review for the now proposed development of Tract 53342. Based on grading plans prepared by CCL Engineering, Inc., R.Y. Properties intends to grade the project, construct infrastructure, and construct 96 single family residential units on 100 developed lots; also to be constructed is a large drainage control (detention) basin on proposed Lots 1-3, and a smaller basin on proposed Lot 19. A copy of the reviewed Grading Plan is appended (Appendix A).

A geotechnical study of the property encompassing the subject Tract, along with several adjoining Tracts, was originally conducted by Buena Engineers, Inc. in 1989. The results of that study, and their preliminary recommendations for site development, were published in a report entitled:

> Geotechnical Engineering Report
> Tentative Tract 46395
> (Included Tracts 47932, 47933, 47934, and 47935)
> Rancho Vista Boulevard and Brisa Drive
> Palmdale, Los Angeles County, California (Proj. B-3393-L01)

Two adjacent (northerly) Tracts (46934 and 47935) were graded in 2002 and are presently developed. These Tracts were the subjects of the following reports, by CCL Engineering, Inc.:

- Geotechnical Engineering Review – Update Report
  Tract No. 47935, (Rancho Vista Blvd. @ Avenue O-8, Palmdale, CA), CCL JN: 1429F, August 17, 2001.

- Interim and Final As-Built Geotechnical Engineering Reports
  Tract No. 47935, (Rancho Vista Blvd. @ Avenue O-8, Palmdale, CA), CCL JN: 1429G, dated January 11, 2002 and August 12, 2002

- Geotechnical Engineering Review – Update Report
  Tract No. 46394, (Rancho Vista Blvd. @ Avenue O-8, Palmdale, CA), CCL JN: 1444F, dated February 5, 2002

- As-Built Geotechnical Engineering Report
  Tract No. 46394 (Rancho Vista Blvd. & Avenue O-8, Palmdale)
  CCL JN: 1444G, dated May 22, 2002

CCL Engineering's Geotechnical Department has worked on adjacent and nearby Tracts that have similar topography and site conditions as now proposed Tract 53342, and the now proposed grading is similar in scope to the grading performed on those Tracts.

In addition to the review of our previous adjacent work, we drilled three deep test borings on the "lower elevation" portions of the subject site, and in conjunction with Southwest Geotechnical, we excavated six test pits in the proposed cut slope areas of the site. The logs of our test borings, and test data from samples obtained from those borings, are appended (Appendix A).

CCL Engineering's Geotechnical Study (and this Report) was conducted in conjunction with geologic investigation of the site bedrock conditions by Southwest Geotechnical, Inc. Their Report, dated November 14, 2006, is appended (Appendix B). Logs of the test pits conducted for geologic analysis are contained in their Report.

SITE CONDITIONS

Recent surficial reconnaissance was made of the subject property. Since the time of Buena Engineer's study and the CCL Engineering work on adjacent sites, the natural site conditions have not changed significantly.

The project site (Tract 53342) encompasses moderately steep hilly terrain in its northwest and southwest portions, flattening to more gently north sloping terrain across the northeast, central and east portions of the Tract. Topographic relief (from the southwest corner of the Tract to its northeast corner) is approximately 40 feet. A protruding ridge in the northwest portion of the Tract is another 50' to 60' higher, however this area is not proposed to be developed. The lower (northerly and central) portions of the site are primarily underlain by alluvial (Qal) and colluvial soil deposits, while the northwest and southerly portions of the site are underlain by Pelona Schist (Psp) bedrock. The southwest and northwest portions of the site can be typified as north to east trending ridges (bedrock, with thin soil cover), separated by several more gently north and east trending ravines or swales, which contain alluvial soil deposits. The majority of the site (northerly, middle, & easterly portions) consist of a sloping alluvial fan that is underlain by slope wash soils (Qsw), more recent alluvial / colluvial (Qal) deposits, and older alluvial soils at depth. The appended Geology Map (by Southwest Geotechnical) illustrates the approximate extent of these soil/bedrock areas. (Appendix B). Logs of test trenches made by Southwest Geotechnical throughout the higher (bedrock) portions of Tract 53342 are also contained in Appendix B.

The "lower elevation" (northerly and easterly portions) of the project site are mostly covered by a sparse native weed and grass cover; the southerly and northwest portions (hills) support a sparse to moderate growth of desert grasses and shrubs, cedar and Joshua trees, and other scrub brush.

Site soils are generally granular and are highly erosive as evidenced by several eroded gullies that cut through the alluviated soil areas. The character of the upper native alluvial soils (silty to slightly clayey sands - SM & SC soil classifications by the Unified Soil Classification System), was readily verified by our site observations and during excavation and testing of three (3) deep borings and the six geological test pits.

The bedrock (Pelona Schist) exposed along the ridges in the westerly & southerly portions of the Tract and as encountered in the Geologic Trenches, is dense and contains some highly resistant (very dense) quartzite strata and more massive zones of non-foliated material. The schist is typically well foliated and fractured and the surface (2'-4' ±) is weathered. The rock is classified as "soft to moderately hard", and will present moderate resistance to excavation with large earthmoving equipment. Locally, strata of denser rock (quartz/quartzite) and very fresh (unweathered) rock in the deeper cuts will require ripping with large bulldozers (D-9 with single shank rippers). Some of this rock (1% -2%) will not break down to sizes small enough to incorporate into the proposed fills and will have to be disposed of offsite or used in slope-protection areas.

The geologic characteristics of the bedrock materials, as exposed in Southwest's exploration trenches (locations shown on attached Geologic Map in Appendix B), are detailed in the geologic text and trench logs by Southwest Geotechnical (Appendix B). Note that some of the bedrock exposed in the trenches was moderately fractured.

CONCLUSIONS

Based upon our current field review and exploration borings and trenches (both soils' and geologic), review of previous geotechnical reports for adjacent projects, a review of the proposed development (grading) plan, and past experience, it is our opinion that the site, when modified as recommended in this report, is suitable for the intended grading and construction. The major concern with the natural alluvial and slope-wash surface soils (upper three feet ± of natural soils) in the "lower" portions of the site is the non-uniform densities of these soils and the inability of these soils to provide uniform bearing support due to their slight hydroconsolidation potentials.

To provide more uniform support for the proposed structures and fills founded in the alluviated areas, it is recommended that specified amounts of the natural soils be removed from below the proposed fill areas and be recompacted. Additional fill placed to bring the pads to proposed finish grade should also be properly compacted.

Bedrock (Pelona Schist) lies at relatively shallow depths in the southwesterly and northwesterly portions of the site, and will be exposed in the graded pads in the proposed cut areas; the bedrock will supply excellent vertical bearing support and has negligible consolidation characteristics, but will be difficult to excavate with small equipment (as in utility or footing trenches), therefore we recommend over cutting and refilling these pads.

The site is underlain at shallow depths by either bedrock or dense older alluvial soils & ground water levels are at least 100' below the site; therefore liquefaction potentials at the site are considered to be nil.

Our recent exploration suggests that some of the proposed cut slopes may encounter broken bedrock and adverse foliation plane attitudes (attitudes approximating the 27° inclination of the proposed 2:1 cut slopes). See Logs in the attached Geologic Report (Appendix B). If such undercut or broken rock surfaces are exposed during grading, such slopes would have to be over cut and returned to the proposed 2:1 gradient as stabilization fills. Such remedial grading for stabilization fills would have to contain a back drain system. The drain system would need to be outletted (via closed pipe) at every other lot line. Based on our exploration and observations of the bedrock conditions to date, we do not believe such stabilization methods will be required at this site; however the cut slopes (in bedrock) will need to be monitored by the project geologist and geotechnical consultant during grading to ascertain the need for stabilization.

GRADING RECOMMENDATIONS

The site is planned to be graded into 100 residential lots (96 building pads), as shown on the attached copy of the Grading Improvement Plan, Tract No. 53342 (Appendix A). As can be seen, this will be accomplished by large scale cut/fill grading techniques, with the deepest cuts of approximately 50 feet (vertical depth) being made through the northwesterly ridges (at rear of proposed Lots 97/98). Cuts adjacent to the southwest property line (behind Lots 25, 26 & 32) will be about 20' maximum depth. Approximately 75%-80% of the site (central and easterly portions) will be filled above existing site grades, with up to 25' deep fills being placed across proposed Lots 68-70. It is expected that much of the proposed fill will be "imported" from adjacent/nearby Tracts to the west.

We have reviewed the attached grading plan to formulate the following grading recommendations.

LOT BY LOT GRADING RECOMMENDATIONS

Lot No's	Proposed Cut and/or Fill	Overexcavation Recommendations
4-22, 35-37, 39-74, 77-89, & 91-95	Proposed Fill, 1'-25' depths above existing site grades.	Excavate 36" (3') below existing (natural) grades. Prior to re-filling, scarify & saturate the base of the excavations. Over-excavation is to be the entire area (below pads, yards, streets, etc.) throughout the proposed fill lots.
23, 24, 33, 34, 38, 75, 76, 90, 96, 99, &100	Cut/Fill (Transition Lots)	Excavate 24" (2') below existing natural grades or the proposed pad grade (whichever is deeper). Prior to re-filling, scarify and saturate base of excavation. Over-excavation to extend full width of lot, at least 5' laterally beyond proposed house footprint.
25-32, 97& 98	Deeper cut lots – greater than 2' cut (below natural grades) everywhere on pad	Over-excavate pad 24" ± deep (below proposed pad grade), moisture condition exposed subgrade and replace (fill) to pad grade with compacted soils. *

*Building pads cut into bedrock are to be over-excavated (as well as street subgrades in bedrock areas) at least 2' below the proposed grades and restored to grade with compacted fill soils to facilitate installation of foundations and shallow utilities. If bedrock is left in-place on the lots, it is expected to be difficult to excavate with small trenching equipment (for footings or utility trenches).

Prior to commencement of grading, the site should be stripped of all vegetation. Root bulbs of larger vegetation (trees, large bushes) should be excavated and removed. All organic (vegetative) debris should be removed from the site.

After the proposed fill areas are excavated to the required depths, the exposed bottoms should be scarified (6" - 8"), be moisture conditioned (saturated) as required, and be compacted prior to fill placement thereon.

All exposed bottoms of over excavated areas and fill slope keyways should be observed by the project geotechnical consultant prior to placement of fills thereon.

The bedrock cut pads may expose clay-rich strata (seams, layers) that could be expansive in nature. Any such areas encountered at finished pad grade will require 5' over-excavation of the entire pad area and replacement of non-expansive soils as compacted fill.

All soils to be placed as fill should be uniformly moisture conditioned to at or slightly above the soil's optimum-moisture content, be placed in uniform, level layers not exceeding eight inches in depth, and be uniformly compacted to at least 90% of the soil's maximum density as determined by ASTM Test Method D-1557. No rocks greater than 1’ in dimension may be placed in the structural fill pads; no rocks greater than 6” in dimension may be placed in the upper 3’ of the pads. As the deeper cuts will produce very rocky material, it may be necessary to utilize large, steel wheeled compaction apparatus to break down oversize rocks and to blend the rocks/soil together into a non-voided, well-compacted fill mass. All placed fill is to be observed and tested by the geotechnical engineer's representative to verify compliance with these recommendations.

Cut and fill slopes are programmed (planned) at 2 horizontal to 1 vertical slope inclinations; such slopes, after remedial grading is performed where necessary, should be grossly stable. Some of the proposed graded slopes are programmed as fill over cut (see attached grading plans and Slope Grading Recommendations). All such slope conditions (proposed fill over cut) should have the cut portion overcut to at least 1’ below the “low” pad or street elevation and be refilled so as to create a uniform fill slope face; such fills should be at least 8’ width (in horizontal dimension).

SLOPE GRADING RECOMMENDATIONS

Slope	Proposed Condition	Recommended Grading
- Basin side slopes (Lots 1-3 & 19) - Slope below Lots 92/93, descending to Lot 96 - Side yard slopes Lots 20, 45, 59, 60, 84, 85, 94 & 95, descending to Registry Way	Proposed Fill over Cut slopes	Overcut to elevation of pad, street, or basin floor below to make entirely fill, keyway (at base) to be at least 1' below adjacent proposed grade and 8' wide (into slope).
- Slopes above Lots 23-34, 38, 75, 76, 97, 98, & 100	Cuts - should expose bedrock w/ 1' / 3' of topsoil at top.	Excavate (cut) as proposed (*see following Note)
All interior fill lots	Interior Fill slopes	Fill as proposed. Track-walk finish slope surface or over-cut to expose compacted core.
Lots 3-19	Descending fill slope (offsite)	Keyway at base of this slope should extend at least two (2) feet into natural ground, at least two (2) feet beyond the toe of slope, and be inclined 1%-2% into slope.

*Note: The project geologist and geotechnical engineer will evaluate all bedrock cut slopes and building pads as they are constructed to determine the need for stabilization or relief drainage systems. Cut slopes may need to be stabilized if the bedrock foliation planes at that location are flatter than or just slightly steeper than the cut slope face (2:1 = 27°). The need for back drainage of stabilized or rebuilt (fill over cut) slopes will have to be made on an individual basis, once the slopes are initially cut. Initial geologic evaluation suggests that stabilization fills against the cut slopes will not be necessary; some of the cut slopes may, however, have to be "cleaned" of broken or disturbed rock after grading.

Structural Foundation Recommendations

After the site grading is performed as outlined above, all structural foundations will be supported in either compacted fill or in dense older alluvium or bedrock (on the cut lots). Soils at this site are expected to be non-expansive (E.I. < 20), or at worst, slightly expansive (E.I. in the 21-50 range). If expansive layers/seams are encountered in cut lots, they should be re-graded as previously recommended. The final expansive nature of the soils will necessarily have to be determined during/after the pads are graded, when the on-site soils have been mixed/blended.

Provided the grading recommendations outlined above are implemented, the following design recommendations are offered:

A) Due to the proximity of the site to the San Andreas Fault system, the site is expected to undergo moderate to severe ground shaking at some point in the future. Modified Mercalli intensities of IX to X may be experienced. Appendix C contains a description of damage that might occur under these conditions.

All structures are to be designed to at least the minimum standards for Seismic Zone 4 as designated by the current edition of the California Building Code. The lots underlain by compacted fill/alluvial soils are assigned to Soil Profile Type S_D (Stiff soil profile); lots underlain by bedrock are assigned to Soil Profile Type S_C (Dense soil/soft bedrock), per Table 16-J of the Code. The project site lies within 1 mile of the San Andreas Fault system, a Type A seismic source. Per Table 16-S of the C.B.C., a near source factor (N_a) of 1.5 should be utilized in seismic design.

B) Foundations on the graded pads should bear at least 12" into the designated soil strata (compacted fill).

C) Continuous foundations (minimum 12" wide by 12" deep) may be designed to exert a net allowable vertical pressure of 2000 pounds per square foot. Isolated (pad) foundations (minimum 24" wide, 12" deep) may exert an allowable vertical pressure of 2500 psf.

D) Continuous foundations should be reinforced with at least 2 No. 4 bars of steel; one placed near the top of the foundation and one placed near the base of the foundation.

E) A coefficient of friction of 0.4 (between concrete and compacted soil or bedrock), and an allowable passive resistance of 300 psf (E.F.P.), may be utilized when computing resistance to horizontal loadings.

F) Concrete (on-grade) floor slabs should have a nominal minimum thickness of 4". It is suggested that on-grade concrete slabs be reinforced with heavy wire mesh reinforcement or #3 bars at 18" on-center both ways. **Reinforcement in slabs should be placed in the center of the slab.**

G) All interior slabs to have moisture sensitive floor coverings should be underlain by a moisture membrane. The membrane should be covered with two (2) inches of clean sand to protect it during construction. Sand should be moistened just prior to concrete placement.

H) Retaining walls with level backfill should be designed to resist an active equivalent fluid pressure of 30 pcf. Walls retaining a 2:1 sloping backfill should resist an equivalent fluid pressure of 45 pcf. All walls should contain a back drainage system to relieve possible hydrostatic force buildup against the wall.

I) Results of initial soil-chemical content tests indicate that the site soils and bedrock are slightly alkaline, posses high resistance to electric conductivity and contain low to negligible levels of soluble sulfates or chlorides. Type II cement should be utilized in concrete mixes. Further soil-chemical testing should be performed after the site is graded to verify these conditions. (Test results are contained in Appendix A).

J) Initial R-Value test results indicate that minimal depth structural paving sections (3 ½" A.C. on 4"-5" C.A. Base) should be satisfactory for the interior Tract streets.

CLOSURE

We trust this Report is sufficient at this time and meets your current needs. We appreciate this opportunity to provide professional geotechnical engineering services for this project. If you have any questions regarding the information contained in this report, or if you require additional geotechnical engineering services, please contact us.

Sincerely,

CCL ENGINEERING, INC.

Thomas J. Howser, G.E.
Geotechnical Manager

TJH/pk

Attached: Appendix A
Grading Improvement Plan with Locations of Test Borings & Test Pits
Logs of Test Borings
Test Data

Appendix B
Geologic Investigation of Proposed Cut Slope Grading
-Tract 53342, Palmdale, CA, by Southwest Geotechnical, Inc., November 14, 2006 (SGI # 0509341)

Appendix C
Modified Mercalli Index

APPENDIX A

Site Plan: Location of Test Borings &
Geologic Test Pits
Legend for Logs of Test Borings
Test Data

CCL ENGINEERING, INC. BORING LOG

Boring Number: B-1

Project: Tract No: 53342
Registry Way, S/O R.V. Blvd.
Palmdale, CA

Project Number: 1615G

Date Drilled: 08/29/05

Location: See Geotechnical Study Plan

Logged By: Suja Ahmed

Diameter of Hole: 8" H.S. Auger

Drill Rig Type: Mobil B-61

Depth (feet)	Symbol	Pen Resist. (blows/ ft.)	Description	Soil Type	Dry Density (pcf)	Moisture Content (%)	Remarks
0							
		24	Brown, Fine-Coarse SILTY SAND	SM	107.7	1.3	
			- Medium Dense, Dry				
		19	- Slightly Moist @ 3'		105.2	2.5	
5		25	- Some Gravels to 1/2" ±		113.0	2.3	
		21	Brown, Fine-Coarse SAND w/ sl. Silt	SP	112.1	3.7	
			- Medium Dense, Slightly Moist				
10		26	- @ 10' Moist		108.9	5.5	
			- Some Gravels to 1/2" ±				
15		18*	- Slightly Moist		-	4.3	
20		50(6")*	- @ 20' Dense, Moist		-	5.8	
	x x x x x x	50(1")*	Bedrock (Schist)- Very Dense		-	-	No Recovery
25			* Standard Penetration Test Count				
30							

CCL ENGINEERING, INC. BORING LOG

Boring Number: B-2

Project: Tract No: 53342
Registry Way, S/O R.V. Blvd.
Palmdale, CA

Project Number: 1615G

Date Drilled: 08/29/05

Location: See Geotechnical Study Plan

Logged By: Suja Ahmed

Diameter of Hole: 8" H.S. Auger

Drill Rig Type: Mobil B-61

Depth (feet)	Symbol	Pen Resist. (blows/ ft.)	Description	Soil Type	Dry Density (pcf)	Moisture Content (%)	Remarks
0		24	Brown, Fine-Coarse SILTY SAND - Medium Dense, Slightly Moist	SM	112.5	2.8	
5		20	Brown, Fine-Coarse SAND	SP	111.3	5.0	
		15	- Slightly Silty, Moist - Medium Dense to Dense		110.8	3.8	
		24	- Trace Gravels to 3/4" ±		118.5	5.3	
10		23			113.2	6.1	
15		19*	- @ 15' GRAVELLY SAND - Medium Dense, Moist		-	5.7	
20		73*	- Dense @ 20'		-	1.4	
25		50(5")*			-	2.3	
		50(1")*	Bedrock (Schist)- Very Dense		-	-	No Recovery
30			* Standard Penetration Test Count				

CCL ENGINEERING, INC. BORING LOG

Boring Number: B-3

Project: Tract No: 53342
Registry Way, S/O R.V. Blvd.
Palmdale, CA

Project Number: 1615G

Date Drilled: 08/29/05

Location: See Geotechnical Study Plan

Logged By: Suja Ahmed

Diameter of Hole: 8" H.S. Auger

Drill Rig Type: Mobil B-61

Depth (feet)	Symbol	Pen Resist. (blows/ ft.)	Description	Soil Type	Dry Density (pcf)	Moisture Content (%)	Remarks
0							
		23	Brown, Fine-Coarse SILTY SAND - Medium Dense, Slightly Moist	SM	107.1	1.2	
		46	- Trace Gravels to 1/4" ±		116.6	2.5	
5		44			115.2	2.6	
		29	Brown, Fine-Coarse SAND	SP	117.3	2.4	
			- Medium Dense, Slightly Moist				
10		17*	- Some Gravels to 1/2" ±		-	4.4	
15		12*	- @ 15' Moist		-	5.9	
20		51*	- GRAVELLY SAND @ 20'		-	4.2	
			- Dense, Slightly Moist				
25		82*			-	3.7	
30	x x x x x x	50(4")*	Bedrock (Schist)- Very Dense		-	2.7	
			* Standard Penetration Test Count				

LEGEND

B-1 TP-G1

APPROX. LOCATION/NO. OF TEST BORINGS & TEST PITS.

GEOTECHNICAL STUDY PLAN

PROPOSED RESIDENTIAL DEVELOPMENT

TRACT NO: 53342

REGISTRY WAY, S/O RANCHO VISTA BOULEVARD, PALMDALE, CA.

NOVEMBER 20, 2006 | CCL JN: 1615G

CCL ENGINEERING, INC.

APPENDIX B

Geologic Report
(Southwest Geotechnical, Inc.)

APPENDIX C

Modified Mercalli Index Scale