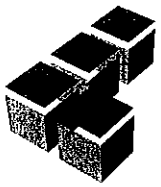
PRELIMINARY GEOTECHNICAL INVESTIGATION, PROPOSED 104-ACRE RESIDENTIAL DEVELOPMENT, NORTHWEST OF PERRIS BOULEVARD AND IRIS AVENUE, CITY OF MORENO VALLEY, CALIFORNIA

Prepared for:

YOUNG HOMES
10370 Trademark Street
Rancho Cucamonga, California 91730

Project No. 021164-001

June 9, 2004



Leighton and Associates, Inc.
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June 9, 2004

Project No. 021164-001

To: Young Homes
10370 Trademark Street
Rancho Cucamonga, California 91730

Attention: Mr. Thomas Owen

Subject: Preliminary Geotechnical Investigation, Proposed 104-Acre Residential Development, Northwest of Perris Boulevard and Iris Avenue, City of Moreno Valley, California

In response to your request, Leighton and Associates, Inc. has conducted a preliminary geotechnical investigation of the proposed residential development to be located northwest of Perris Boulevard and Iris Avenue in the City of Moreno Valley, California. The purpose of our investigation has been to explore the subsurface conditions at the site, to evaluate the general soil characteristics, and to provide preliminary geotechnical recommendations for the design and construction of the proposed improvements.

Based upon our investigation, the proposed development is feasible from a geotechnical viewpoint, provided our recommendations are incorporated in the design and construction of the project. The following report presents our geotechnical findings, conclusions, and preliminary recommendations. Additional geotechnical investigation and analysis may be necessary, based on the actual development plans for submittal with the project grading plans.

10532 Acacia Street, Suite B-6 ▪ Rancho Cucamonga, CA 91730
909.484.2205 ▪ Fax 909.484.2170 ▪ www.leightongeo.com

We appreciate the opportunity to work with you on this project. If you have any questions, or if we can be of further service, please call us at your convenience.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

Jason Hertzberg, RCE 61778
Project Engineer

Philip A. Buchiarelli, CEG 1715
Senior Associate Geologist

David C. Smith, RCE 46222
Vice President/Principal Engineer

DAG/JDH/PB/DCS/rsh

Distribution: (4) Addressee

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1.0 INTRODUCTION

1.1 Site Location and Project Description

The site is located northwest of Perris Boulevard and Iris Avenue in the City of Moreno Valley, California (see Figure 1, Site Location Map). The project area is bounded on the east by Perris Boulevard and the Home Depot shopping center, on the south by Iris Avenue, on the west by Indian Street and an elementary school, and on the north by vacant land. March Air Reserve Base is approximately one mile west. The East Branch California Aqueduct crosses the eastern portion of the site. The approximately 104-acre flat site is irregular in shape and is currently vacant. Vegetation consists of seasonal grasses, brush, and several scattered small trees.

Based on our review of historic aerial photographs, the site was used for agricultural purposes within the period of at least 1953 to 1980, and was otherwise vacant.

It is our understanding that the intended use of the site is a residential development. Although grading and construction plans are not yet available, we anticipate that minor cuts and fills will be required to attain the desired finish grades. We anticipate the one- and two-story single-family residences will be constructed. A parcel map provided by you was used as the base map for our Geotechnical Map, Figure 2 (rear of text).

1.2 Purpose of Investigation

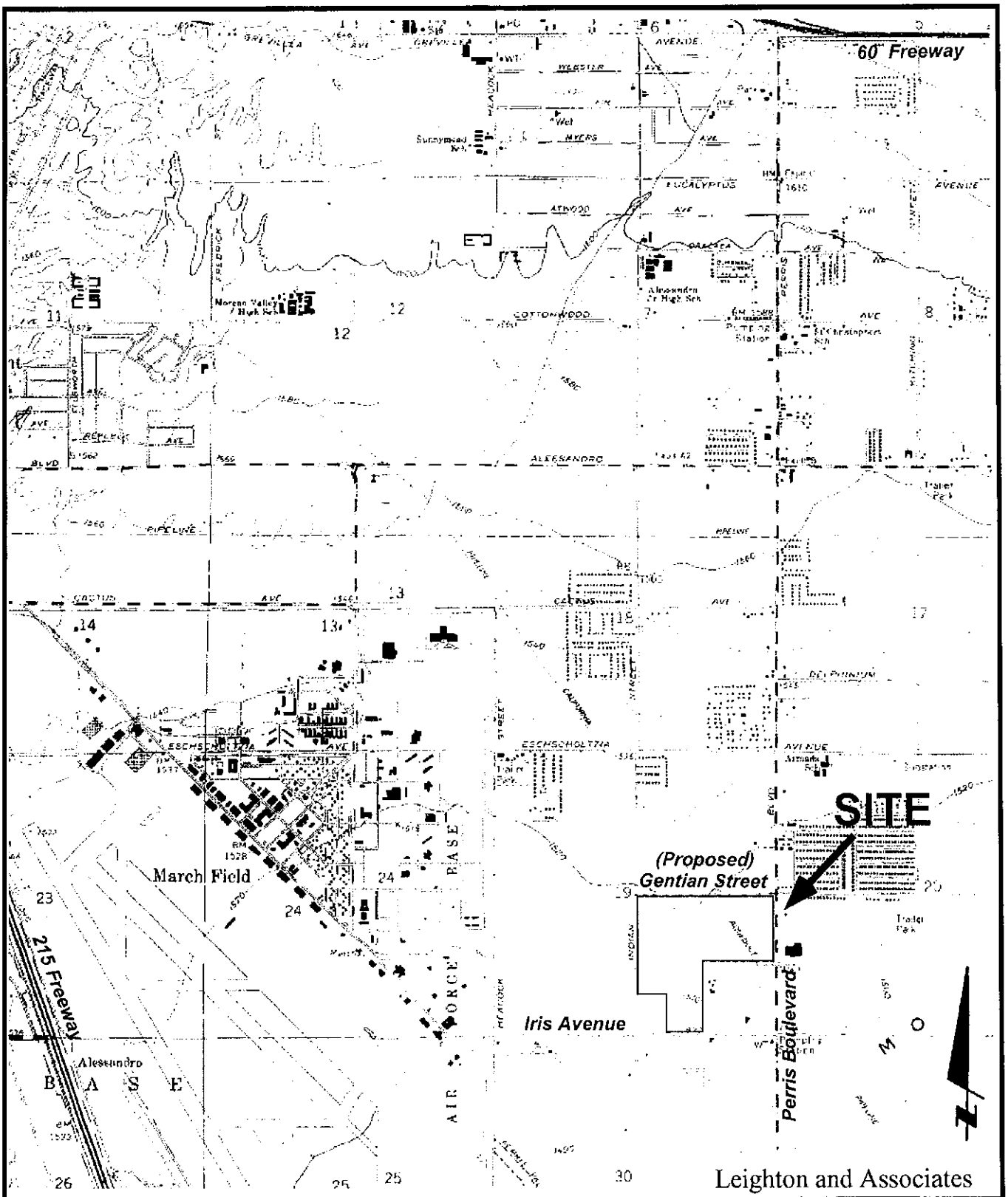
The purpose of this study has been to evaluate the general geotechnical conditions at the site, to identify significant geotechnical or geologic issues that would impact site development, and to provide preliminary geotechnical recommendations for design and construction.

1.3 Scope of Investigation

The scope of our investigation has included the following tasks:

- Background Review - A background review of readily available, relevant, in-house geotechnical literature, and aerial photographs was performed.

- Pre-field Investigation Activities - Coordinated with Underground Service Alert (USA) to have existing underground utilities located and marked prior to our subsurface investigation.



PROPOSED 104-ACRE RESIDENTIAL DEVELOPMENT NORTHWEST OF PERRIS BOULEVARD AND IRIS AVENUE, City of Moreno Valley, California	**SITE LOCATION MAP**	PROJECT NO. **021164-001** DATE **June, 2004**

Figure 1

- Field Investigation - Our field investigation consisted of the excavation of borings and test pits as follows:

  Borings

  Eight hollow-stem auger borings were excavated, logged and sampled at representative locations within the site. One boring was excavated to a depth of 51.5 feet and seven borings were excavated to depths of 21.5 feet below the existing ground surface. Each boring was logged by a member of our technical staff. Relatively undisturbed soil samples were obtained at selected intervals within the borings using Standard Penetration Testing and a California Ring Sampler. Logs of the geotechnical borings are presented in Appendix B. Approximate boring locations are shown on the accompanying Geotechnical Map, Figure 2.

  Test Pits

  Eight backhoe test pits were excavated and logged at representative locations within the site to a maximum depth of 5.5 feet below the existing ground surface. Each test pit was logged by a member of our technical staff. Bulk soil samples were obtained from the test pits. Logs of the test pits are presented in Appendix C. Approximate test pit locations are shown on the accompanying Geotechnical Map, Figure 2.

- Laboratory Tests - Laboratory tests were conducted on selected relatively undisturbed and bulk soil samples obtained during our field investigation. The laboratory testing program was designed to evaluate the engineering characteristics of the onsite soil. Results of the laboratory testing are presented in Appendix D. The laboratory tests conducted during this investigation include:

  - In situ moisture content and dry density.
  - Sieve analysis for grain size distribution.
  - Consolidation and hydrocollapse characteristics.
  - Expansion Index.
  - Maximum dry density and optimum moisture content.
  - R-value for pavement recommendations.

- Water-soluble sulfate concentration in the soil for cement type recommendations.

- Resistivity, chloride content and pH to evaluate corrosion potential.

- Engineering Analysis - The data obtained from our background review and field exploration was evaluated and analyzed in order to provide the conclusions and preliminary recommendations in the following sections.

- Report Preparation - The results of our geotechnical investigation have been summarized in this report, presenting our findings, conclusions and preliminary recommendations.

2.0 FINDINGS

2.1 Site Geology

The site is located in the Perris block of the Peninsular Ranges Geomorphic Province of southern California. The Perris block is a structural block bounded on the north by the San Jacinto Fault Zone (located 8 kilometers northeast of the site) and on the south by the Elsinore Fault Zone (located 29 kilometers southwest of the site). These faults have experienced significant activity in the recent geologic past. These and other northwest-trending right lateral strike slip faults dominate the structure of the Peninsular Ranges. Cretaceous igneous rocks of the Southern California Batholith underlie the Peninsular Ranges in this area. Locally, the site vicinity is underlain by older alluvial soil deposits of clay, silt, sand and gravel (SCGS, 1982; Morton, 1978). Bedrock outcrops of quartz diorite are present approximately ¾ mile east of the site.

2.2 Subsurface Soil Conditions

Based upon our review of pertinent geotechnical literature, and our subsurface exploration, the site is underlain by alluvial soil deposits. The soil encountered during our subsurface exploration in the upper 15 feet generally consisted of loose to medium dense silty sand to gravelly sand and soft to stiff sandy silt. Below a depth of 15 feet, the soil generally consisted of stiff to very stiff sandy silt to clay. These soils were typically characterized as slightly moist to very moist to the depths excavated. Moisture contents in the upper 10 feet ranged from 2 to 10 percent.

2.3 Groundwater

Groundwater was not encountered in any of our borings performed during this investigation to a depth of 51.5 feet. Based on our review of regional groundwater data, groundwater is expected to be on the order of 120 to 140 feet below the ground surface in the site vicinity (CDWR, 2000). However, relatively shallow perched ground water may occur locally (WMWD, 2003).

2.4 Faulting and Seismicity

The two principal seismic considerations for most sites in southern California are surface rupture along active fault traces and damage to structures due to seismically-induced ground shaking. An active fault is one that has moved in the Holocene (last 11,000 years). The closest mapped active fault that could affect the site is the San Jacinto (San

Jacinto Valley) fault, located approximately 9 kilometers northeast of the site. The San Jacinto fault is capable of producing a maximum moment magnitude of 6.9 and an average slip rate of 12 millimeter per year (CDMG, 1998). Other known regional active faults that could affect the site include the San Jacinto (San Bernardino), San Andreas, Elsinore, Chino-Central Avenue and Cucamonga faults.

No traces of active or potentially active faults have been observed to cross the project site. The site is not within an Alquist-Priolo Earthquake Fault Zone (CDMG, 2000). The potential for fault ground rupture at the site is considered very low.

Peak Horizontal Ground Accelerations (PHGA) for the site were estimated using a deterministic seismic hazard analysis, based on currently available earthquake and fault information. The analysis computes the site PHGA that could be expected to result from an earthquake on a specific fault using the estimated maximum magnitude earthquake event. PHGA's were estimated using the EQFAULT computer program (Blake, 2000), based on the attenuation relationship by Sadigh et al. (1997). Based on the analysis, the San Jacinto (San Jacinto Valley) Fault Zone is potentially capable of producing the greatest PHGA at the site, due to its proximity, fault type, and its maximum earthquake magnitude of 6.9 (M_W). It is estimated that such an earthquake on this fault near the site could produce seismic shaking with a PHGA of 0.32g.

The PHGA was also estimated using a probabilistic seismic hazard analsyis. The computer program FRISKSP (Blake, 2000) was used for the analysis. Attenuation relationships used in the computer analysis were developed by Abrahamson and Silva (1997) for soil, Campbell (1997 and 2000) for alluvium, and Sadigh et al. (1997) for deep soil deposits. The analysis indicated an average value of 0.59g for peak horizontal ground acceleration (PHGA) with a 10 percent probability of exceedance in 50 years. The predominant magnitude is approximately 6.8 (Mw) at a distance on the order of 10 kilometers.

2.5 Secondary Seismic Hazards

Liquefaction Potential

Liquefaction is the loss of soil strength or stiffness due to a buildup of excess pore-water pressure during strong ground shaking. Liquefaction is associated primarily with loose (low density), granular, saturated soil. Effects of severe liquefaction can include sand boils, excessive settlement, bearing capacity failures, and lateral spreading.

The Generalized Liquefaction Map for Riverside County (2003) indicates the site is located in an area of shallow groundwater with sediments considered highly susceptible to liquefaction. Our exploratory borings indicate that moderately dense soil underlies the site. In addition, regional groundwater data indicates that shallow groundwater conditions do not exist locally, nor have they existed historically. Based on these findings, the potential for liquefaction appears to be low.

Seismically Induced Settlement

During a strong seismic event, seismically induced settlement can occur within loose to moderately dense, dry or saturated granular soil. Settlement caused by ground shaking can be nonuniformly distributed, resulting in differential settlement. We have performed analyses to estimate seismically-induced settlement using the simplified method set forth by Tokimatsu and Seed (1987).

Based on this preliminary study, the potential total settlement resulting from seismic loading is estimated to be approximately 1½ inches. Differential settlement resulting from seismic loading is generally assumed to be one-half of the total seismically induced settlement over a distance of 40 feet. Seismic settlement is not considered a geotechnical constraint to the project.

2.6 Compressible and Collapsible Soil

Based on our investigation, the upper 5 to 15 feet of older alluvium is generally considered to be slightly to moderately compressible. Partial removal and recompaction of this material will be necessary to reduce the potential for excessive total and differential settlement of the proposed structures.

Hydrocollapse potential refers to the potential settlement of a soil under existing stresses upon being wetted. Representative samples of the upper 5 to 20 feet of the subsurface soil were tested for hydrocollapse potential. Test results indicate that the near-surface soil onsite has a negligible to minor hydrocollapse potential (1 percent or less).

2.7 Expansive Soils

Representative samples of the subsurface soil were tested for expansion potential. Test results indicate an Expansion Index of 0 to 5. Based on these results and the relatively granular nature of the near-surface soil, the onsite soil generally has a very low expansion potential.

2.8 Sulfate Content

Water-soluble sulfates in soil can react adversely with concrete. However, concrete in contact with soil containing sulfate concentrations of less than 0.10 percent are considered to have negligible sulfate exposure (UBC, 1997 edition, Chapter 19).

Near-surface soil samples were tested during this investigation for soluble sulfate content. The results of these tests indicated sulfate contents of less than 0.01 percent by weight, indicating negligible sulfate exposure. As such, the soils exposed at pad grade are not expected to pose a significant potential for sulfate reaction with concrete.

2.9 Resistivity, Chloride and pH

Soil corrosivity to ferrous metals can be estimated by the soil's pH level, electrical resistivity, and chloride content. In general, soil having a minimum resistivity less than 2,000 ohm-cm is considered corrosive. Soil with a chloride content of 500 ppm or more is considered corrosive to ferrous metals.

As a screening for potentially corrosive soil, representative soil samples were tested during this investigation to determine minimum resistivity, chloride content, and pH level. The tests indicated a chloride content of 42 ppm, a pH value of approximately 7.0, and a minimum resistivity of 7,000 ohm-cm. Based on the test results, the onsite soil is considered mildly corrosive to buried ferrous metals.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon this study, the proposed improvements are feasible from a geotechnical standpoint. The recommendations presented below are preliminary. Additional geotechnical investigation and analysis may be necessary, based on the actual development plans for submittal with the project grading plans.

3.1 General Earthwork and Grading

All grading should be performed in accordance with the General Earthwork and Grading Specifications presented in Appendix D, unless specifically revised or amended below or by future recommendations based on final development plans.

Site Preparation

Prior to construction, the site should be cleared of vegetation, trash, and debris. Trees should be removed and grubbed out, and the excavations should be backfilled with compacted fill. Any underground obstructions onsite should be removed. The resulting cavities should be properly backfilled and compacted. Efforts should be made to locate any existing utility lines. Those lines should be removed or rerouted if they interfere with the proposed construction, and the resulting cavities should be properly backfilled and compacted. In addition, any uncontrolled artificial fill, if encountered, should be removed.

Overexcavation and Recompaction

To reduce the potential for adverse differential settlement of the proposed structures, the underlying subgrade soil should be prepared in such a manner that a uniform response to the applied loads is achieved. The soil underneath conventional shallow footings should be overexcavated and recompacted to a minimum depth of 3 feet below the bottom of the proposed foundations for residential structures or 3 feet below the existing grade, whichever is deeper. The overexcavation and recompaction should extend a minimum lateral distance of 5 feet from the footings. Local conditions may require that deeper overexcavation be performed; such areas should be evaluated by Leighton and Associates during grading.

Areas outside the overexcavation limits of buildings planned for asphalt or concrete pavement, flatwork, site walls, and retaining walls (less than 6 feet in height), and areas to

receive fill should be overexcavated to a minimum depth of 12 inches below the existing ground surface or 12 inches below the proposed finish subgrade, whichever is deeper.

After completion of the overexcavation, and prior to fill placement, the exposed surfaces should be scarified to a minimum depth of 6 inches, moisture-conditioned to or slightly above optimum moisture content, and recompacted to a minimum 90 percent relative compaction.

Fill Placement and Compaction

The onsite soil is suitable for use as compacted structural fill, provided it is free of debris, and oversized material (greater than 8 inches in largest dimension). Any soil to be placed as fill, whether onsite or imported material, should be accepted by Leighton and Associates.

All fill soil should be placed in thin, loose lifts, moisture-conditioned, as necessary, to near optimum moisture content, and compacted to a minimum 90 percent relative compaction as determined by ASTM Test Method D1557. Aggregate base should be compacted to a minimum of 95 percent relative compaction.

Shrinkage and Subsidence

The change in volume of excavated and recompacted soil varies according to soil type and location. This volume change is represented as a percentage increase (bulking) or decrease (shrinkage) in volume of fill after removal and recompaction. Subsidence occurs as natural ground is moisture-conditioned and densified to receive fill. Field and laboratory data used in our calculations included laboratory-measured maximum dry densities for soil types encountered at the subject site and the measured in-place densities of soils encountered. We estimate the following earth volume changes will occur during grading:

Shrinkage	Approximately 15 percent
Subsidence	Approximately 0.15 foot

The level of fill compaction, variations in the dry density of the existing soils and other factors influence the amount of volume change. Some adjustments to earthwork volume should be anticipated during grading of the site.

3.2 Foundations

Based on our preliminary investigation and our experience in the region, conventional shallow or post-tensioned foundations may be used to support the loads of one- to two-story, frame-type structures. Overexcavation and recompaction of the footing subgrade soil should be performed as detailed in Section 3.1.

Conventional Shallow Foundations

Based on our preliminary investigation, the footings for 2-story structures should have an embedment depth of 18 inches, with a minimum width of 24 and 15 inches for isolated and continuous footings, respectively. The footings for 1-story residential structures should have an embedment depth of 12 inches, with a minimum width of 24 and 12 inches for isolated and continuous footings, respectively.

An allowable bearing capacity of 2,000 psf may be used for preliminary design, based on the minimum embedment depth and width. The allowable bearing value may be increased by 300 psf per foot increase in depth or width to a maximum allowable bearing pressure of 3,500 psf. The allowable bearing pressure is for the total dead load and frequently applied live loads.

The soil resistance available to withstand lateral loads on a shallow foundation is a function of the frictional resistance along the base of the footing and the passive resistance that may develop as the face of the structure tends to move into the soil. The frictional resistance between the base of the foundation and the subgrade soil may be computed using a coefficient of friction of 0.35. The passive resistance may be computed using an equivalent fluid pressure of 350 pounds per cubic foot (pcf), assuming there is constant contact between the footing and undisturbed soil.

The allowable bearing pressure and coefficient of friction values may be increased by one third when considering loads of short duration, such as those imposed by wind and seismic forces.

Footing reinforcement should be designed by the structural engineer.

The recommended allowable bearing capacity is generally based on a total allowable, post construction settlement of 1 inch. Differential settlement is estimated at ½ inch over a horizontal distance of 30 feet. Since settlement is a function of footing size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls

where a large differential loading condition exists. These settlement estimates should be reevaluated by Leighton and Associates when foundation plans for the proposed structures become available.

Post-Tensioned Foundations

As an alternative to conventional spread footings, post-tension foundation systems can be used. Post-tension slab foundations should be designed by the project structural engineer. The following table provides post-tension slab design information for soil with a low expansion potential. Post-tension slabs should be designed in accordance with Section 1816 of the current edition of the UBC.

Post-Tension Foundation Design Recommendations		
Very Low Expansion		
Edge Moisture Variation Distance, e_m	Center Lift	5.5 feet
	Edge Lift	3.0 feet
Differential Swell, Y_m	Center Lift	1.0 inch
	Edge Lift	0.4 inch
Modulus of subgrade Reaction		120 pci

Exterior footings (thickened edges) should have a minimum depth of 12 inches below the lowest adjacent soil grade and a minimum width of 12 inches. These footings may be designed for a maximum allowable bearing pressure of 2,000 pounds per square foot. The allowable bearing capacity may be increased by one-third for short-term loading.

These recommendations are based on preliminary data. Additional testing of the soil present near finish grade will be conducted to confirm the final foundation design information. Local agencies, the structural engineer or the Uniform Building Code may have requirements that are more stringent.

3.3 Slab-On-Grade

Concrete slabs subjected to special loads should be designed by the structural engineer. Where conventional light floor loading conditions exist, the following minimum recommendations, which are based on a very low soil expansion potential, should be used:

- A minimum slab thickness of 4 inches (nominal). Reinforcement steel should be design by the structural engineer, but as a minimum should be No. 3 rebar placed at 24 inches on center. Reinforcement should be supported on "chairs" to position the reinforcement within the middle third of the slab thickness.

- A moisture barrier consisting of 6-mil Visqueen (or equivalent) placed below slabs where moisture-sensitive floor coverings or equipment is planned. The moisture barrier should be covered with a minimum of 2 inches of sand.

- The subgrade soil should be moisture conditioned to at least optimum moisture content to a minimum depth of 12 inches prior to placing the moisture barrier, steel or concrete.

The use of reinforcement or post-tensioned cables in slabs and foundations can generally reduce the potential for concrete cracking. However, minor cracking of the concrete as it cures, due to drying and shrinkage, is normal and should be expected. However, cracking is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low slump concrete can reduce the potential for shrinkage cracking.

Moisture barriers can retard, but not eliminate moisture vapor movement from the underlying soils up through the slab. Floor covering manufacturers should be consulted for specific recommendations.

3.4 Seismic Design Parameters

Seismic parameters presented in this report should be considered during project design. In order to reduce the effects of ground shaking produced by regional seismic events, seismic design should be performed in accordance with the most recent edition of the Uniform Building Code (UBC). The following data should be considered for the seismic analysis of the subject site:

Seismic Design Parameters	
Seismic Source	San Jacinto (San Jacinto Valley) Fault
Distance	Approximately 9 km
Seismic Source Type (UBC, Table 16-U):	B
Seismic Zone Factor, Z (UBC, Table 16-I):	0.4
Soil Profile Type (UBC, 16-J):	S_D
Near-Source Factor N_a (UBC, Table 16-S):	1.0
Source Factor N_v (UBC, Table 16-T):	1.04

3.5 Retaining Walls

We recommend that retaining walls be backfilled with onsite, very low expansive soil and constructed with a backdrain in accordance with the recommendations provided on Figure 3 (rear of text). Using expansive soil as retaining wall backfill will result in higher lateral earth pressures exerted on the wall. Based on these recommendations, the following parameters may be used for the design of conventional retaining walls up to 6 feet tall:

Static Equivalent Fluid Weight (pcf)	
Conditions	Level
Active	35
At-Rest	55
Passive	350 (Maximum of 3,500 psf)

The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Cantilever walls that are designed to yield at least 0.001H, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition.

Passive pressure is used to compute soil resistance to lateral structural movement. In addition, for sliding resistance, a frictional resistance coefficient of 0.35 may be used at the concrete and soil interface. The lateral passive resistance should be taken into account only if it is ensured that the soil providing passive resistance, embedded against the foundation elements, will remain intact with time.

In addition to the above lateral forces due to retained earth, surcharge due to improvements, such as an adjacent structure or traffic loading, should be considered in the design of the retaining wall. Loads applied within a 1:1 projection from the surcharging structure on the stem of the wall should be considered in the design.

A soil unit weight of 120 pcf may be assumed for calculating the actual weight of the soil over the wall footing.

Retaining wall footings should have a minimum width of 12 inches and a minimum embedment of 12 inches below the lowest adjacent grade. An allowable bearing capacity of 2,000 psf may be used for retaining wall footing design, based on the minimum footing width and depth. This bearing value may be increased by 300 psf per foot increase in width or depth to a maximum allowable bearing pressure of 3,500 psf.

3.6 Pavement Design

A representative soil sample tested during this investigation had an R-value of 61. Based on the design procedures outlined in the current Caltrans Highway Design Manual, preliminary flexible pavement section recommendations are presented in the following table for the Traffic Indices indicated. Final pavement design should be based on the Traffic Index determined by the project civil engineer and R-value testing provided near the completion of street grading. These pavement sections meet the City of Moreno Valley's current minimum pavement requirements.

AC PAVEMENT SECTION THICKNESS		
Traffic Index	Asphaltic Concrete (AC) Thickness (feet)	Class 2 Aggregate Base (AB) Thickness (feet)
6 or less	0.30	.040
7	0.35	0.40

If the pavement is to be constructed prior to construction of the structures, we recommend that the full depth of the pavement section be placed in order to support heavy construction traffic.

All pavement construction should be performed in accordance with the Standard Specifications for Public Works Construction. Field inspection and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled. Prior to placement of aggregate base, the subgrade soil should be processed to a minimum depth of 6 inches,

moisture-conditioned, as necessary, and recompacted to a minimum of 90 percent relative compaction. Aggregate base should be moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

3.7 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations, etc. should be performed in accordance with project plans, specifications and all OSHA requirements.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the slope, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing structure should be properly shored to maintain support of the structure.

Typical cantilever shoring should be designed based on the active fluid pressure presented in the retaining wall section. If excavations are braced at the top and at specific design intervals, the active pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to 22H, where H is equal to the depth of the excavation being shored.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

3.8 Trench Backfill

Utility-type trenches onsite can be backfilled with the onsite material, provided it is free of debris, significant organic material and oversized material. Prior to backfilling the trench, pipes should be bedded and shaded in a granular material that has a sand equivalent of 30 or greater. The sand should extend 12 inches above the top of the pipe. The bedding/shading sand should be densified in-place by jetting. The native backfill should be placed in loose layers, moisture conditioned, as necessary, and mechanically compacted using a minimum standard of 90 percent relative compaction.

3.9 Surface Drainage

Surface drainage should be designed to be directed away from foundations and toward approved drainage devices. Irrigation of landscaping should be controlled to maintain, as much as possible, a consistent moisture content sufficient to provide healthy plant growth without overwatering.

3.10 Cement Type and Corrosion Protection

Based on the results of laboratory testing, concrete structures in contact with the onsite soil will have negligible exposure to water-soluble sulfates in the soil. Common Type II cement may be used for concrete construction onsite and the concrete should be designed in accordance with Table 19-A-4 of the Uniform Building Code.

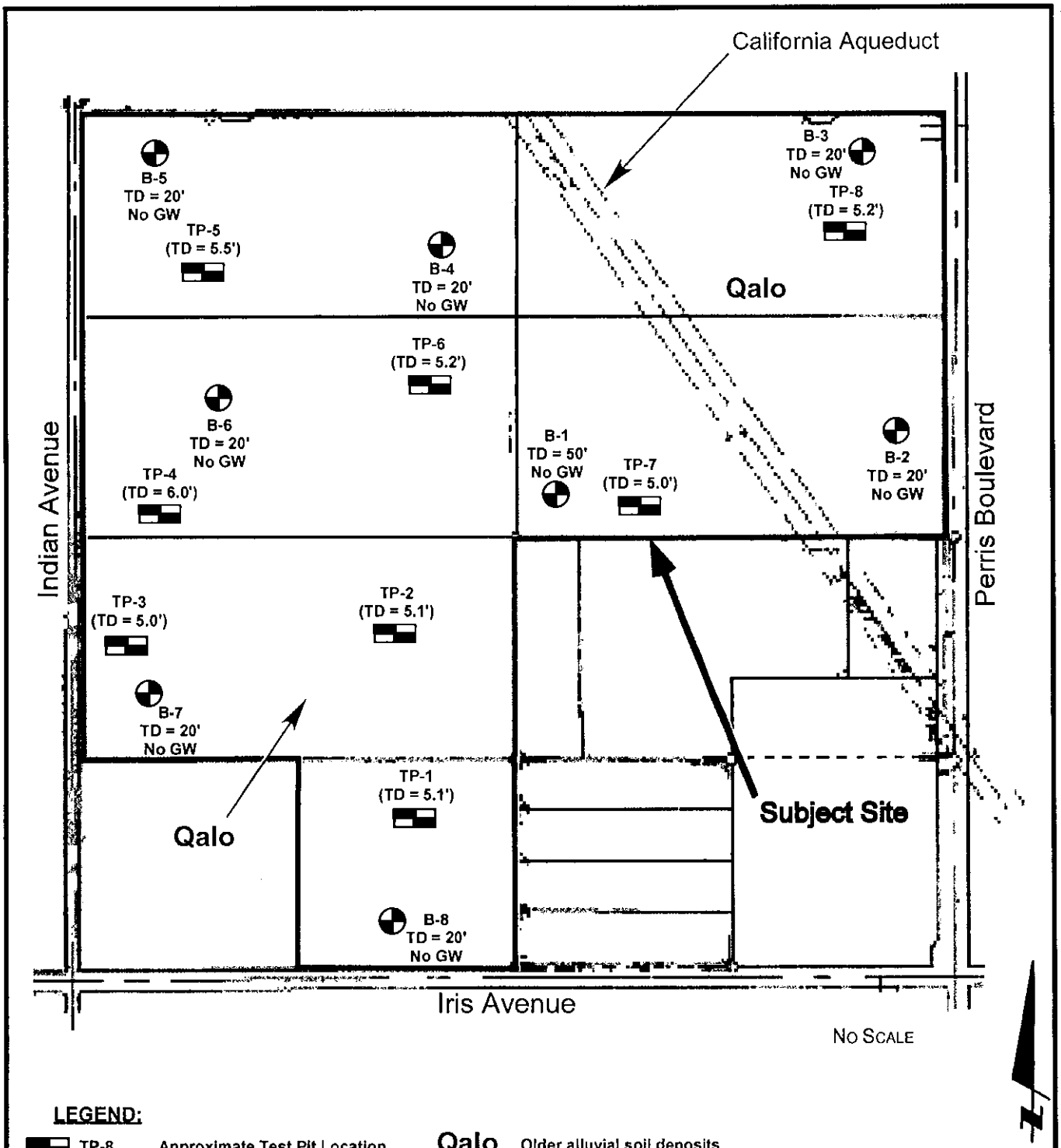
Based on our laboratory testing, the onsite soil is considered mildly corrosive to ferrous metals. The corrosion information presented in this report should be provided to your underground utility subcontractors.

3.11 Additional Geotechnical Investigation and Services

The preliminary geotechnical recommendations presented in this report are based on subsurfacc conditions as interpreted from limited subsurface explorations and limited laboratory testing. Our preliminary geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. Additional geotechnical investigation and analysis may be required based on final development plans. Leighton and Associates should review the site and grading plans when available and comment further on the geotechnical aspects of the project. Geotechnical observation and testing should be conducted during excavation and all phases of grading operations. The conclusions and preliminary recommendations presented herein should be reviewed and verified by Leighton and Associates during construction and revised accordingly if geotechnical conditions encountered vary from our preliminary findings and interpretations. Geotechnical observation and testing should be provided:

- After completion of site clearing.
- During overexcavation of compressible soil.
- During compaction of all fill materials.

- After excavation of all footings and prior to placement of concrete.
- During utility trench backfilling and compaction.
- During pavement subgrade and base preparation.
- When any unusual conditions are encountered.



LEGEND:

TP-8 / TD = 5.8' — Approximate Test Pit Location; Total Depth of Test Pit

B-8 / TD = 20' / No GW — Approximate Boring Location; Total Depth of Boring; No Groundwater Encountered

Qalo — Older alluvial soil deposits

PROPOSED 104-ACRE RESIDENTIAL DEVELOPMENT NORTHWEST OF PERRIS BOULEVARD AND IRIS AVENUE, City of Moreno Valley, California	**GEOTECHNICAL MAP**	PROJECT NO. 021164-001 DATE June, 2004 Figure 2

APPENDIX A

References

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Aerial Photographs Reviewed

Date	Flight	Frame	Agency
10/16/1959	R 10165 9	33 and 34	RCFCD
5/24/1974	RCFC 74	234	RCFCD
2/7/1984	RCFC 83	1341	RCFCD

GEOTECHNICAL BORING LOG B-1

Date 3-31-04 **Sheet** 1 **of** 2

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION
		N S							**Logged By** RSB **Sampled By** RSB
	0								**ALLUVIUM (Qal)**
				R-1	5	116.2	10.8	ML	2': TOP: Sandy SILT, yellow brown, slightly moist, soft, fine to medium sand, trace gravel up to 1/16" diameter BOTTOM: Sandy SILT, dark brown, very moist, soft, fine to coarse sand, trace gravel up to 1/16" diameter
	5			R-2	7			SM	5': Silty SAND, dark brown, very moist, loose, fine to coarse sand, trace gravel up to 1/8" diameter
	10			R-3	15	105.7	1.8	SW	10': Gravelly SAND, well graded, light yellow brown, moist to very moist, loose, fine to coarse sand, trace gravel up to 1/4" diameter
	15			R-4	22	124.2	11.2	ML	15': Sandy SILT/Clayey SILT, dark brown, very moist, stiff, fine to medium sand, trace gravel up to 1/8" diameter
	20			S-1	13			CL	20': Sandy CLAY/Silty CLAY, dark brown, very moist, medium stiff to stiff, fine to medium sand
	25			S-2	11			CL	25': Silty CLAY, dark brown, very moist, medium stiff, trace fine sand
	30								

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

GEOTECHNICAL BORING LOG B-1

Date 3-31-04 **Sheet** 2 **of** 2

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION Logged By RSB Sampled By RSB
	30			S-3	13			SM ML	30': TOP: Silty SAND, yellow brown, very moist, loose, fine sand BOTTOM: Sandy SILT, yellow brown, very moist, medium stiff to stiff, fine to medium sand, trace gravel up to 1/8" diameter
	35			S-4	12			ML CL	35': TOP: Sandy SILT, yellow brown, very moist, medium stiff, fine to medium sand, trace gravel up to 1/16" diameter BOTTOM: Sandy CLAy/Silty CLAY, dark brown, very moist, medium stiff, fine to medium sand, trace gravel up to 1/16" diameter
	40			S-5	14			ML	40': Sandy SILT, yellow brown, very moist, stiff, fine to medium sand, trace gravel up to 1/16" diameter
	45			S-6	27			SM ML	45': TOP: Silty SAND, yellow brown, moist, medium dense, fine to coarse sand, some gravel up to 1/4" diameter BOTTOM: Sandy SILT, yellow brown, moist, very stiff, fine to medium sand, trace gravel up to 1/8" diameter
	50			S-2	19			ML	50': TOP: Sandy SILT, yellow brown, very moist, stiff, fine to medium sand, trace gravel up to 1/8" diameter BOTTOM: SILT, dark yellow brown, very moist, stiff, some fine
	55								Total Depth 50 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	60								

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-2

Date 3-31-04 **Sheet** 1 **of** 1

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Logged By RSB

Sampled By RSB

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION
	0								**ALLUVIUM (Qal)**
				R-1	8	117.6	5.4	SM	2': TOP: Silty SAND, light yellow brown, slightly moist, loose, fine to medium sand, trace gravel up to 1/4" diameter, rootlets
								ML	BOTTOM: Sandy SILT, dark brown, very moist, medium stiff, fine to coarse sand, trace gravel up to 1/4" diameter
	5			R-2	11			ML	5': TOP: Sandy SILT, dark brown, very moist, medium stiff, fine to medium sand, trace gravel up to 1/4" diameter
								SM	BOTTOM: Silty SAND, dark yellow brown, very moist, loose, fine to coarse sand, trace gravel up to 1/4" diameter
				R-3	14	105.3	1.4	SW	7': Gravelly SAND, well graded, light yellow brown, moist to very moist, loose, fine to coarse sand, gravel up to 1" diameter
	10			R-4	21	124.7	8.4	SW	10': TOP: Gravelly SAND, well graded, light yellow brown, moist to very moist, medium dense, fine to coarse sand, gravel up to 1/2" diameter
								SM	BOTTOM: Silty SAND, dark brown, very moist, medium dense, fine to coarse sand, trace gravel up to 1/4" diameter
	15			R-5	35	127.5	10.3	ML	15': TOP: Sandy SILT, dark brown, very moist, very stiff, fine to medium sand, trace gravel up to 1/8" diameter
								CL	BOTTOM: Silty CLAY/Sandy CLAY, dark brown, very moist, very stiff, some fine sand, trace gravel up to 1/8" diameter
	20			R-6	25			SM	20': Silty SAND, yellow brown, very moist, medium dense, fine to coarse sand, gravel up to 1/4" diameter
	25								Total Depth 20 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	30								

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-3

Date 3-31-04 **Sheet** 1 of 1

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Logged By RSB

Sampled By RSB

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION
	0								**ALLUVIUM (Qal)**
				R-1	18	107.9	4.2	ML	2': Sandy SILT, dark yellow brown, slightly moist, stiff, fine to medium sand, trace gravel up to 1/8" diameter, porosity 3%, rootlets
	5			R-2	12			SM	5': Silty SAND, yellow brown, slightly moist to moist, loose, fine to medium sand, trace gravel up to 1/4" diameter
	10			R-3	17			CL	10': Sandy CLAY/Silty CLAY, dark brown, very moist, stiff, some fine sand, trace gravel up to 1/8" diameter
	15			S-1	17			ML	15': Sandy SILT, dark brown, moist to very moist, stiff, fine to medium sand
	20			S-2	8			SM	20': Silty SAND, yellow brown, very moist, loose, fine to coarse sand, some gravel up to 1/4" diameter
	25								Total Depth 20 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	30								

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-4

Date 3-31-04 **Sheet** 1 **of** 1

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION
		N S							**Logged By** RSB **Sampled By** RSB
	0								**ALLUVIUM (Qal)**
				R-1	15	116.6	2.7	SW	2': Gravelly SAND, well graded, yellow brown, slightly moist to moist, loose, fine to coarse sand, gravel up to 1/4" diameter
	5			R-2	10	103.5	1.1	SW	5': Gravelly SAND, well graded, yellow brown, slightly moist to moist, loose, fine to coarse sand, gravel up to 1/2" diameter
				R-3	16	103.5	1.6	SW	7': Gravelly SAND, well graded, yellow brown, slightly moist, loose, fine to coarse sand, gravel up to 1/2" diameter
	10			R-4	15	102.0	1.9	SW	10': Gravelly SAND, well graded, yellow brown, slightly moist, loose, fine to coarse sand, gravel up to 1/2" diameter
	15			R-5	33			SM	15': Silty SAND, dark brown, very moist, medium dense, fine to coarse sand, trace gravel up to 1/4" diameter
	20			R-6	36			ML CL	20': TOP: Sandy SILT/Clayey SILT, dark brown, very moist to wet, very stiff, fine to medium sand, trace gravel up to 1/4" diameter BOTTOM: Sandy CLAY/Silty CLAY, dark red brown, very moist, very stiff, fine to medium sand, trace gravel up to 1/4" diameter
	25								Total Depth 20 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	30								

SAMPLE TYPES:

- **S** SPLIT SPOON
- **R** RING SAMPLE
- **B** BULK SAMPLE
- **T** TUBE SAMPLE
- **G** GRAB SAMPLE
- **SH** SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-5

Date 3-31-04 **Sheet** 1 of 1

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION Logged By RSB Sampled By RSB
	0								**ALLUVIUM (Qal)**
				R-1	8	109.5	6.8	ML	2': Sandy SILT, dark brown, very moist, medium stiff, fine to coarse sand, trace gravel up to 1/8" diameter
	5			R-2	10			SM	5': Silty SAND, yellow brown, highly moist, loose, fine to medium sand, trace gravel up to 1/4" diameter
	10			R-3	22			SW	10': SAND, well graded, light brown, very moist, medium dense, fine to coarse sand, gravel up to 1/8" diameter, some fines
	15			S-1	13			SM	15': Silty SAND, dark brown, very moist to wet, loose, fine to medium sand, trace gravel up to 1/8" diameter
	20			S-2	50/3"			CL	20': Sandy CLAY/Silty CLAY, dark brown, very moist, hard, fine to medium sand, some black stain
									Total Depth 20 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	25								
	30								

SAMPLE TYPES:

S SPLIT SPOON
R RING SAMPLE
B BULK SAMPLE
T TUBE SAMPLE
G GRAB SAMPLE
SH SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-6

Date 3-31-04 **Sheet** 1 **of** 1

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION Logged By RSB Sampled By RSB
	0								**ALLUVIUM (Qal)**
				R-1	12	112.0	4.3	ML	2': Sandy SILT, yellow brown, slightly moist to moist, medium stiff, fine to medium sand, trace gravel up to 1/8" diameter
	5			R-2	22	114.7	1.7	SM	5': Silty SAND, yellow brown, slightly moist to dry, medium dense, fine to coarse sand, with gravel up to 1/4" diameter
				R-3	13			SW	7': Gravelly SAND, well graded, yellow brown, slightly moist to dry, loose, fine to coarse sand, gravel up to 1/4" diameter
	10			R-4	31	117.7	5.3	ML	10': Sandy SILT, dark brown, moist to very moist, very stiff, fine sand
	15			R-5	20			ML SM	15': TOP: Sandy SILT, dark brown, moist to very moist, stiff, fine to medium sand, trace gravel up to 1/8" diameter BOTTOM: Silty SAND, dark brown, very moist, medium dense, fine to medium sand, trace gravel up to 1/8" diameter
	20			R-6	23			SW CL	20': TOP: Gravelly SAND, well graded, dark yellow brown, very moist, medium dense, fine to coarse sand, gravel up to 1/2" diameter BOTTOM: Silty CLAY, olive brown, very moist, stiff, trace fine sand
	25								Total Depth 20 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	30								

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-7

Date 3-31-04 **Sheet** 1 **of** 1

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION
									Logged By RSB **Sampled By** RSB
	0								**ALLUVIUM (Qal)**
				R-1	13	120.7	3.4	SM	2': Silty SAND, dark brown, moist, loose, fine to coarse sand, with gravel up to 1/8" diameter
	5			R-2	11	109.9	1.6	SW	5': Gravelly SAND, well graded, yellow brown, very moist, loose, fine to coarse sand, gravel up to 1/4" diameter, some fines
	10			R-3	19			SW	10': Gravelly SAND, well graded, light yellow brown, slightly moist to moist, medium dense, fine to coarse sand, gravel up to 1/2" diameter
	15			S-1	13			CL	15': CLAY, dark brown, very moist, medium stiff to stiff, some silt, trace fine sand
	20			S-2	17			CL	20': Silty CLAY, dark brown, very moist, stiff, some fine sand
	25								Total Depth 20 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	30								

SAMPLE TYPES:

S SPLIT SPOON
R RING SAMPLE
B BULK SAMPLE
T TUBE SAMPLE
G GRAB SAMPLE
SH SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-8

Date 3-31-04 **Sheet** 1 of 1

Project Young Homes Moreno Valley **Project No.** 021164-001

Drilling Co. Redman Drilling **Type of Rig** Hollow Stem Auger

Hole Diameter 8 inches **Drive Weight** 140 pounds Automatic Hammer **Drop** 30"

Elevation Top of Hole ' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION Logged By RSB Sampled By RSB
	0								**ALLUVIUM (Qal)**
				R-1	13	115.7	2.6	SM	2': Silty SAND, yellow brown, slightly moist, loose, fine sand, trace gravel up to 1/8" diameter
	5			R-2	13	114.4	1.6	SW	5': Gravelly SAND, well graded, yellow brown, slightly moist, loose, fine to coarse sand, gravel up to 1/4" diameter, trace fines
				R-3	11			SP	7': SAND, poorly graded, yellow brown, slightly moist to moist, loose, fine to medium sand, trace gravel up to 1/8" diameter, trace fines
	10			R-4	18			SM	10': Silty SAND, dark yellow brown, very moist, medium dense, fine sand, trace gravel up to 1/8" diameter
	15			R-5	20			SW CL	15': TOP: Gravelly SAND, yellow brown, very moist, medium dense, fine to coarse sand, gravel up to 1/8" diameter BOTTOM: Silty CLAY, dark brown, very moist to wet, stiff
	20			R-6	23			CL	20': CLAY, dark brown, very moist to wet, stiff, some fine sand, trace gravel up to 1/16" diameter
	25								Total Depth 20 feet No Groundwater encountered No Bedrock encountered Boring Backfilled with Native Soil
	30								

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

LEIGHTON AND ASSOCIATES, INC.

Geotechnical Test Pit Logs

Young Homes / Moreno Valley
Project No. 021164-001

Logged by: MM
Sampled by: MM

Test Pit TP-1

Date: April 2004 Location: See Geotechnical Map

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit	Test Results: Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.1	SM	Silty SAND, light gray brown, dry, dense, fine to medium grain sand, rootlets (tilled)	Afu				
1.1	2.6	SM	Silty SAND, dark brown, slightly moist, medium dense, fine to coarse grain sand, porous to 1% up to 1/8" in diameter, some rootlets	Qal	Bag-1	2.5'		10.1
2.6	5.1	SW	Sand with gravel, light brown, dry to slightly moist, loose, fine to coarse grain sand, gravel up to 1/4", no apparent porosity	Qal		5.1		2.2

Total Depth (ft): 5.1
No ground water encountered.
Test pit backfilled, wheel rolled at surface.

Test Pit TP-2

Date: April 2004 Location: See Geotechnical Map

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit	Test Results: Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.6	SM	Silty SAND, light gray, dry, dense, fine to medium sand, rootlets (tilled)	Afu				
1.6	3.3	SM	Silty SAND, dark olive brown, slightly moist, medium dense, fine to medium grain with some coarse grain sand, porous to < 1% up to 1/8" in diameter, some rootlets	Qal	Bag-1	2		4.5
3.3	4	SP	SAND, dark brown, slightly moist, very dense, medium to coarse grain sand	Qal				
4	5.1	SW	SAND with gravel and some silt, light brown, dry to slightly moist, loose, fine to coarse grain sand, gravel up to 1/4", porous to < 0.5% up to 1/16" in diameter	Qal		5.1		4.1

Total Depth (ft): 5.1
No ground water enceuntered.
Test pit backfilled, wheel rolled at surface.

Test Pit TP-3

Date: April 2004 Location: See Geotechnical Map

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit	Test Results: Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.3		Fill - weathered alluvium (tilled)	Afu				
1.3	3	SW	SAND with some gravel and thin layers of silt, light to dark brown, slightly moist, dense to medium dense, fine to coarse grain sand with fine gravel, porous to < 1% up to 1/8" in diameter	Qal	Bag-1	2.3		3.6
3	5	SP	SAND, light to dark brown, slightly moist, medium dense to loose, medium to coarse grain sand with some fine gravel, no apparent porosity	Qal		5		3.4

Total Depth (ft): 5.0
No ground water encountered.
Test pit backfilled, wheel rolled at surface.

Geotechnical Test Pit Logs

Young Homes / Moreno Valley
Project No. 021164-001

Logged by: MM
Sampled by: MM

Test Pit TP-4

Date: April 2004 Location: See Geotechnical Map

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit	Test Results: Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.6		Fill - weathered alluvium (tilled)	Afu				
1.6	6	SM	Silty SAND, light brown, slightly moist, medium dense, fine to coarse grain sand, porous to < 0.5% up to 1/16" in diameter	Qal	Bag-1	2.5		4.1
				Qal		6		5.8

Total Depth (ft): 6.0
No ground water encountered.
Test pit backfilled, wheel rolled at surface.

Test Pit TP-5

Date: April 2004 Location: See Geotechnical Map

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit	Test Results: Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.4		Fill - weathered alluvium (tilled)	Afu				
1.4	3.2	SM	Silty SAND, light brown, dry to slightly moist, dense to medium dense, fine to coarse grain sand, thin layers of dark silt, porous to < 0.5% up to 1/16" in diameter, rootlets	Qal	Bag-1	2.5		2.6
3.2	5.5	SW	SAND with gravel, light brown, slightly moist, medium dense to loose, fine to coarse grain sand, fine gravel, no apparent porosity	Qal		5.5		3.3

Total Depth (ft): 5.5
No ground water encountered.
Test pit backfilled, wheel rolled at surface.

Test Pit TP-6

Date: April 2004 Location: See Geotechnical Map

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit	Test Results: Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.8		Fill - weathered alluvium (tilled)	Afu				
1.8	4.1	SM	Silty SAND, dark brown, slightly moist, medium dense, fine to coarse grain sand, porous to < 1% up to 1/8" in diameter, some rootlets	Qal	Bag-1	2.5		6.1
4.1	5.2	SW	SAND with gravel, light brown, dry to slightly moist, loose, fine to coarse grain sand, no apparent porosity	Qal		5.2		3.6

Total Depth (ft): 5.2
No ground water encountered.
Test pit backfilled, wheel rolled at surface.

Geotechnical Test Pit Logs

Young Homes / Moreno Valley
Prolect No. 021164-001

Logged by: MM
Sampled by: MM

Test Pit TP-7

Date: April 2004 Location: See Geotechnical Map

Depth		Soil	Description	Geologic	Test Results			
Top (ft)	Bottom (ft)	symbol (USCS)		Unit	Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.5		Fill - weathered alluvium (tilled)	Afu				
1.5	3.3	SM	Silty SAND, dark brown, dry to slightly moist, medium dense, fine to coarse grain sand, porous to <0.5% up to 1/16" in diameter	Qal	Bag-1	3		2.9
3.3	5	SW	Gravelly SAND, light brown, dry to slightly moist, loose, fine to coarse grain sand and fine gravel, no apparent porosity	Qal		5		3.3

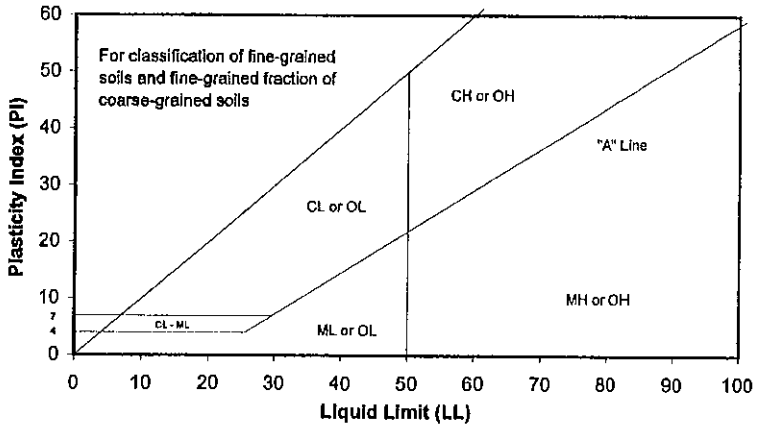
Total Depth (ft): 5.0
No ground water encountered.
Test pit backfilled, wheel rolled at surface.

Test Pit TP-8

Date: April 2004 Location: See Geotechnical Map

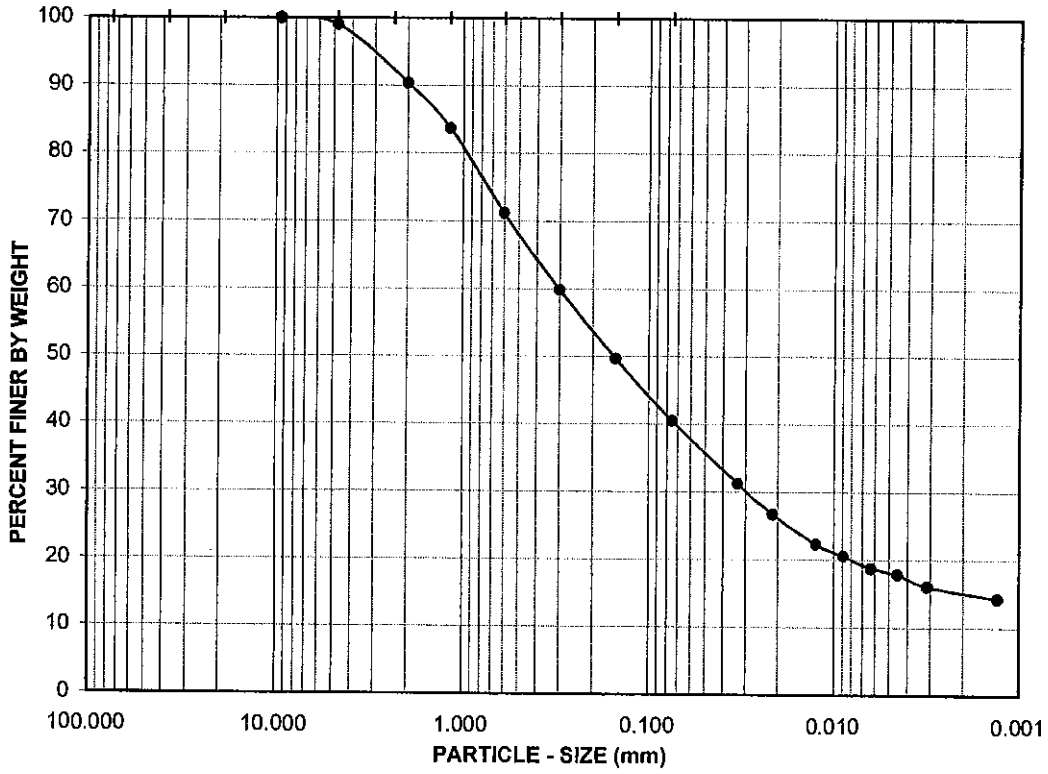
Depth		Soil	Description	Geologic	Test Results			
Top (ft)	Bottom (ft)	symbol (USCS)		Unit	Sample number	Depth ft	Density (dry)pfc	Moisture %
0	1.5		Fill - weathered alluvium (tilled)	Afu				
1.5	4.5	SM	Silty SAND with some gravel, light to dark brown, dry to slightly moist, medium dense, fine to coarse grain sand and fine gravel, porous to < 1% up to 1/16" in diameter, some rootlets	Qal	Bag-1	2.3		3.9
4.5	5.2	SW	SAND with some gravel, light brown, dry to slightly moist, medium dense to loose, fine to coarse grain sand and fine gravel, no apparent porosity	Qal		5.2		3.5

Total Depth (ft): 5.2
No ground water encountered.
Test pit backfilled, wheel rolled at surface.



GRAVEL		SAND			FINES	
COARSE	FINE	CRSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING 3.0" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200 U.S. STANDARD SIEVE NUMBER HYDROMETER



Boring No.:	Sample No.:	Depth (ft.) :	Soil Type	GR:SA:FI	LL,PL,PI
TP-1	Bag-1	2.5	SC-SM	1:58:41	NA,,

Soil Description: Brown silty, clayey sand (SC-SM)

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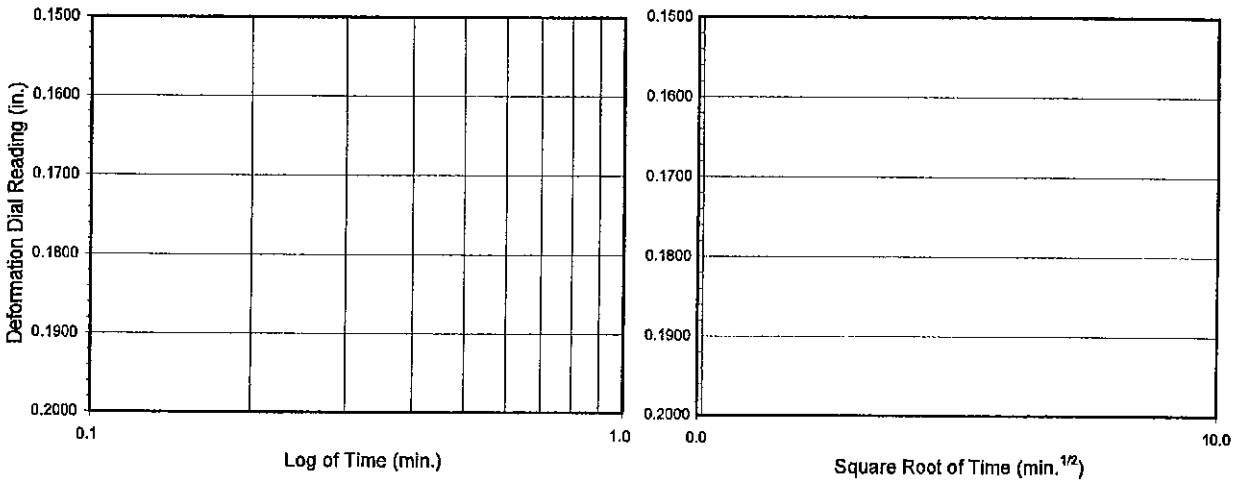
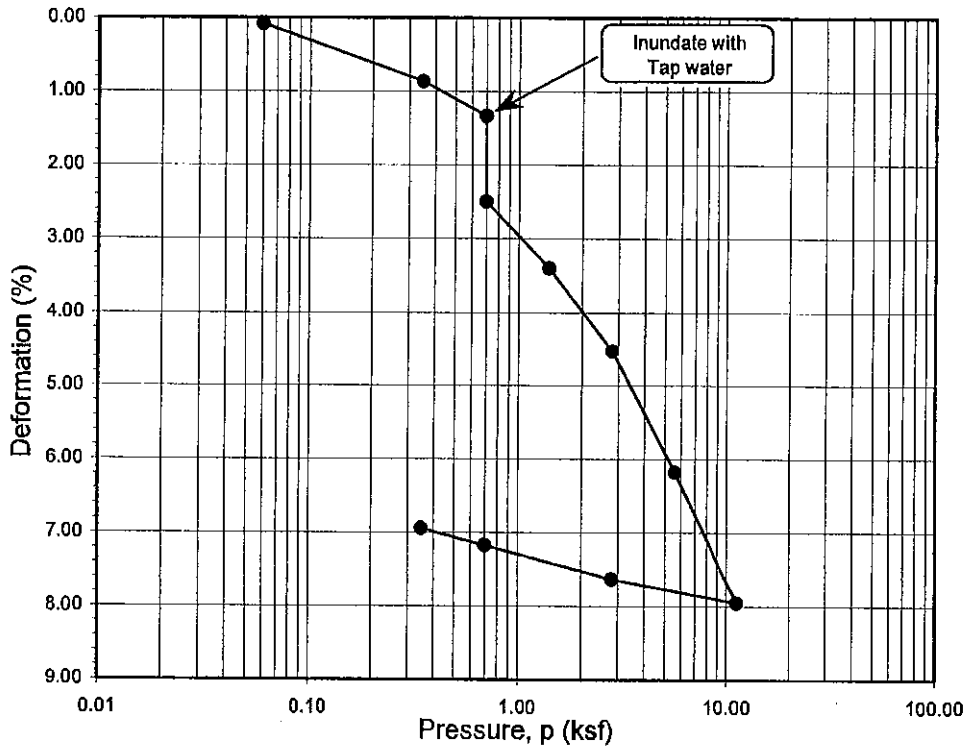
ATTERBERG LIMITS, PARTICLE - SIZE CURVE
ASTM D 4318, D 422

Project No.: 021164-001
Young Homes / MV

05-04

No Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-3	**R-2**	**5**	**2.4**	**14.3**	**112.7**	**120.6**	**0.495**	**0.391**	**13**	**97**

Soil Identification: Brown silty sand (SM)

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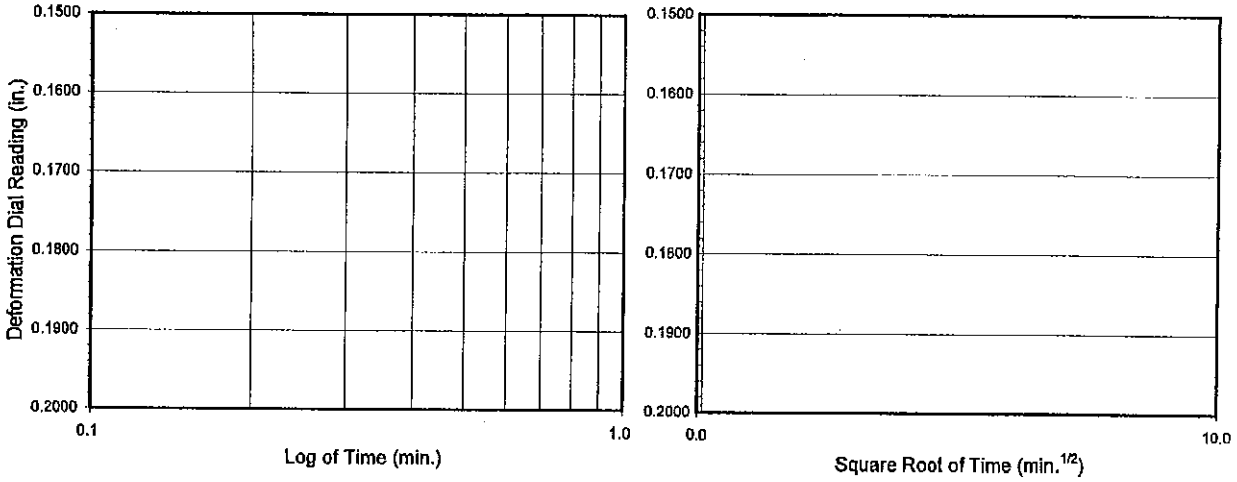
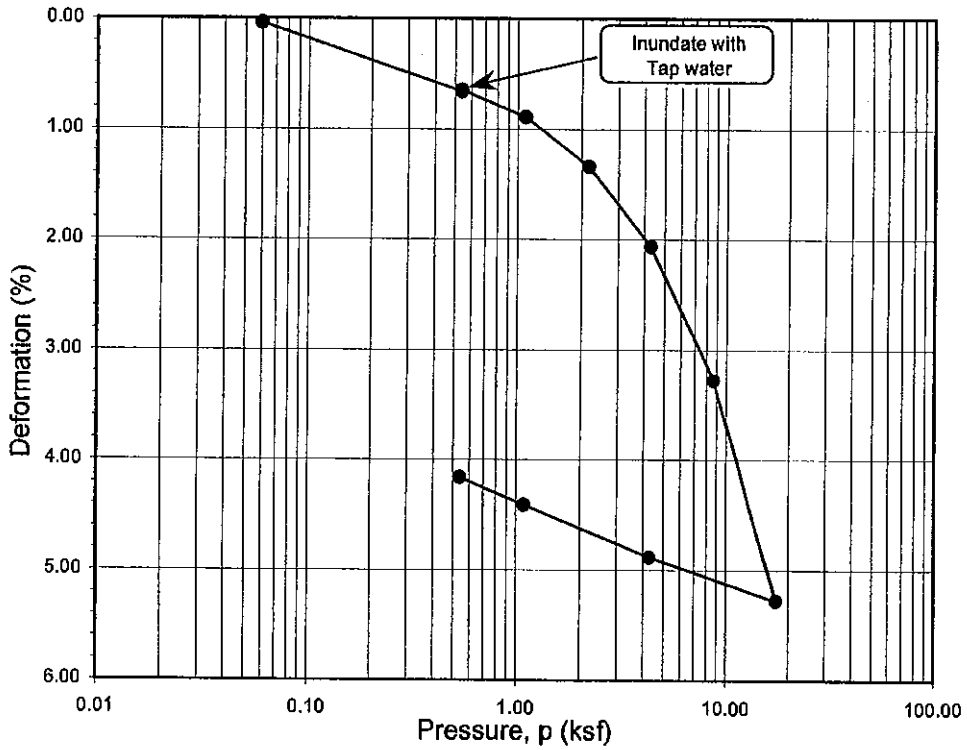
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
(ASTM D 2435)

Project No.: 021164-001

Young Homes / MV

No Time Readings





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
B-1	**R-2**	**5**	**8.9**	**12.6**	**118.2**	**122.5**	**0.426**	**0.366**	**57**	**90**

Soil Identification: Brown clayey sand (SC)

Teratest Labs, Inc.
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ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
(ASTM D 2435)

Project No.: 021164-001

Young Homes / MV

Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

Project Name:	Young Homes / MV	Tested By:	FT
Project No.:	021164-001	Checked By:	LF
Boring No.:	B-8	Sample Type:	Drive
Sample No.:	R-4	Depth (ft.)	10.0
Sample Description:	Brown silty sand (SM)		

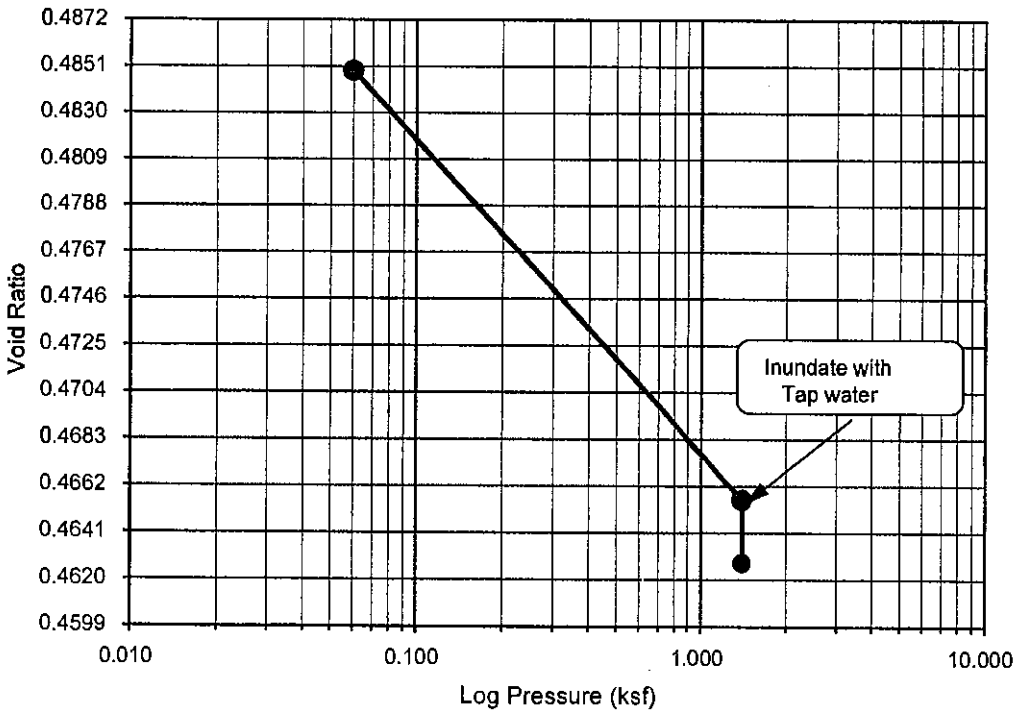
Initial Dry Density (pcf):	113.4
Initial Moisture (%):	5.80
Initial Length (in.):	1.0000
Initial Dial Reading:	0.2563
Diameter(in):	2.416

Final Dry Density (pcf):	113.7
Final Moisture (%) :	17.8
Initial Void ratio:	0.4859
Specific Gravity(assumed):	2.70
Initial Saturation (%)	32.2

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.2570	0.9993	0.00	-0.07	0.4849	-0.07
1.400	0.2700	0.9863	0.00	-1.37	0.4656	-1.37
H2O	0.2719	0.9844	0.00	-1.56	0.4628	-1.56

Percent Swell (+) / Settlement (-) After Inundation = -0.19

Void Ratio - Log Pressure Curve



Teratest Labs, Inc.
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One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

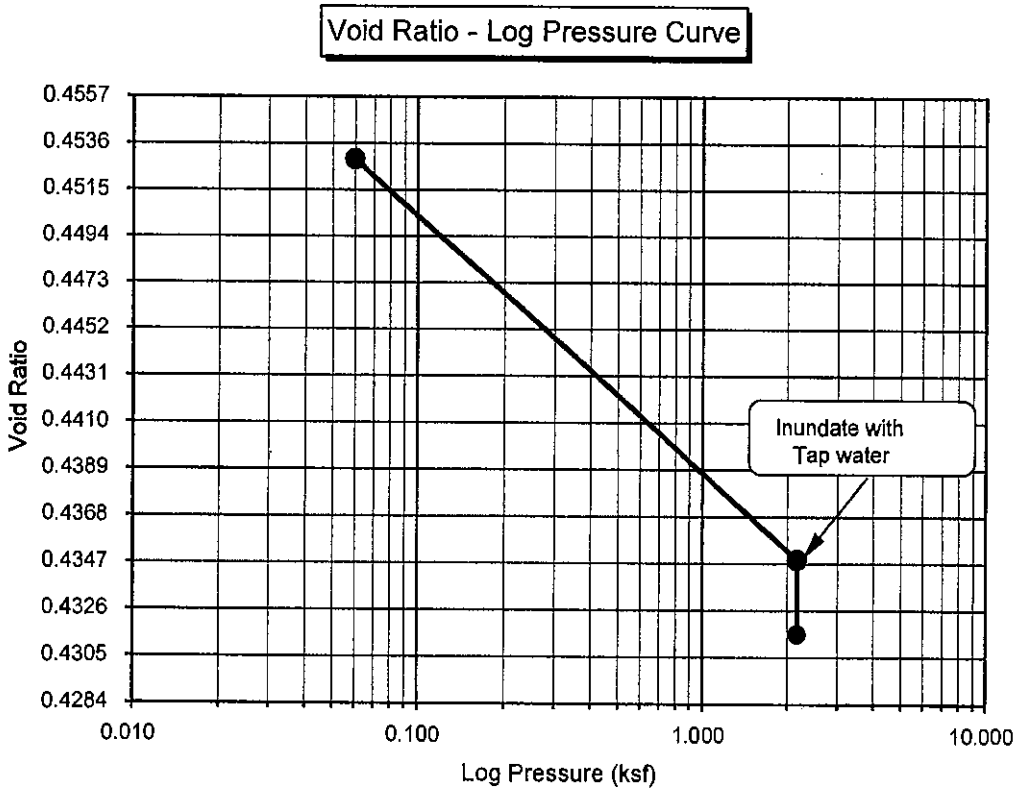
Project Name:	Young Homes / MV	Tested By:	FT
Project No.:	021164-001	Checked By:	LF
Boring No.:	B-6	Sample Type:	Drive
Sample No.:	R-5	Depth (ft.)	15.0
Sample Description:	Brown silty sand (SM)		

Initial Dry Density (pcf):	116.0
Initial Moisture (%):	6.69
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1000
Diameter(in):	2.416

Final Dry Density (pcf):	117.4
Final Moisture (%) :	16.3
Initial Void ratio:	0.4533
Specific Gravity(assumed):	2.70
Initial Saturation (%)	39.8

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.1003	0.9997	0.00	-0.03	0.4529	-0.03
2.170	0.1127	0.9873	0.00	-1.27	0.4349	-1.27
H2O	0.1150	0.9850	0.00	-1.50	0.4315	-1.50

Percent Swell (+) / Settlement (-) After Inundation = -0.23



Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

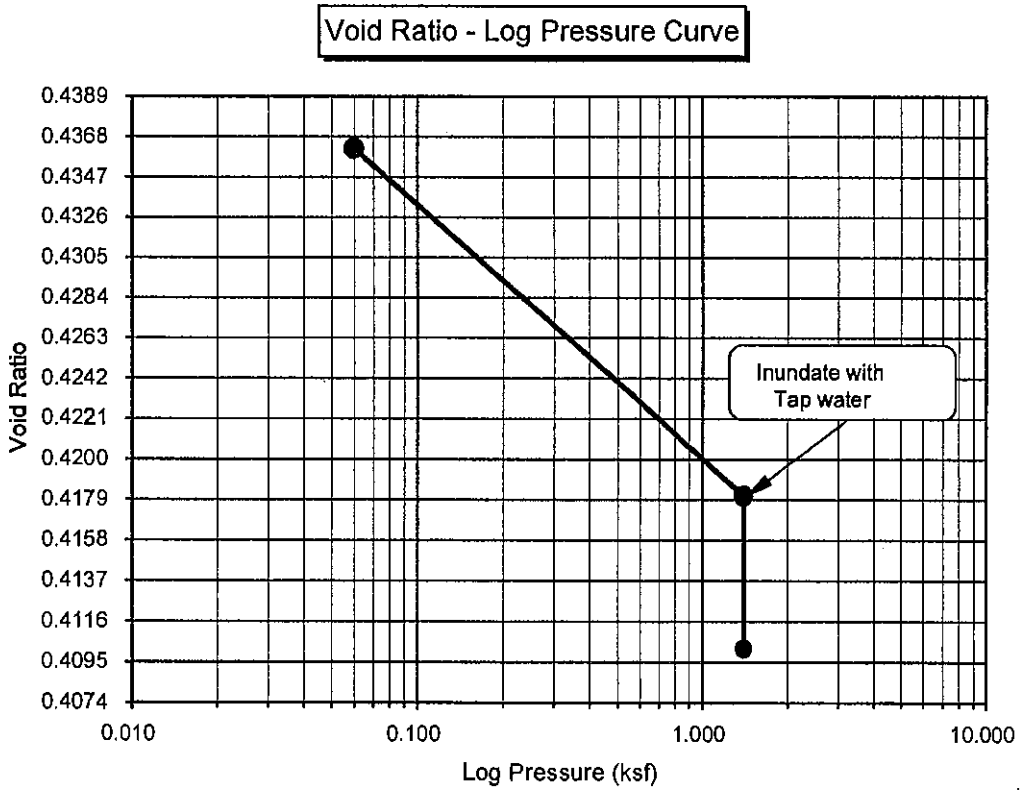
Project Name:	Young Homes / MV	Tested By:	FT
Project No.:	021164-001	Checked By:	LF
Boring No.:	B-5	Sample Type:	Drive
Sample No.:	R-3	Depth (ft.)	10.0
Sample Description:	Brown silty sand (SM)		

Initial Dry Density (pcf):	117.4
Initial Moisture (%):	1.92
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1000
Diameter(in):	2.416

Final Dry Density (pcf):	118.6
Final Moisture (%) :	14.6
Initial Void ratio:	0.4363
Specific Gravity(assumed):	2.70
Initial Saturation (%)	11.9

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.1001	0.9999	0.00	-0.01	0.4362	-0.01
1.400	0.1127	0.9873	0.00	-1.27	0.4181	-1.27
H2O	0.1182	0.9818	0.00	-1.82	0.4102	-1.82

Percent Swell (+) / Settlement (-) After Inundation = -0.56



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A LEIGHTON GROUP COMPANY

One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

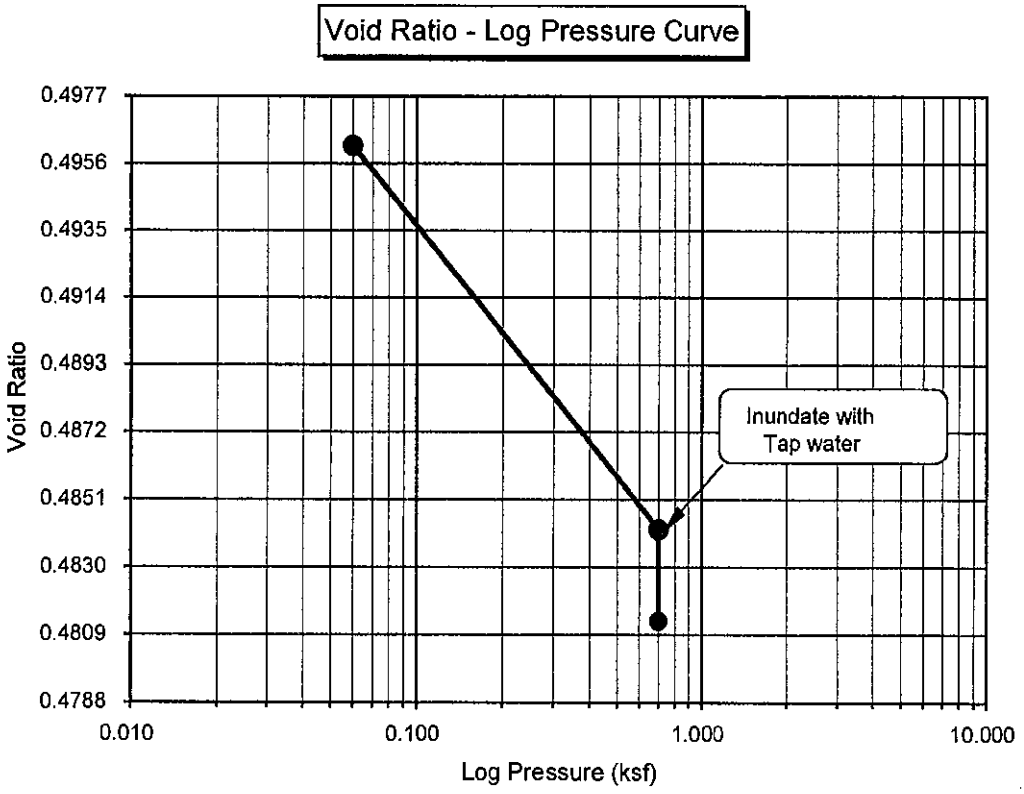
Project Name:	Young Homes / MV	Tested By:	FT
Project No.:	021164-001	Checked By:	LF
Boring No.:	B-5	Sample Type:	Drive
Sample No.:	R-2	Depth (ft.)	5.0
Sample Description:	Brown silty sand (SM)		

Initial Dry Density (pcf):	112.6
Initial Moisture (%):	4.73
Initial Length (in.):	1.0000
Initial Dial Reading:	0.2300
Diameter(in):	2.416

Final Dry Density (pcf):	112.5
Final Moisture (%) :	17.2
Initial Void ratio:	0.4967
Specific Gravity(assumed):	2.70
Initial Saturation (%)	25.7

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.2304	0.9996	0.00	-0.04	0.4961	-0.04
0.700	0.2384	0.9916	0.00	-0.84	0.4842	-0.84
H2O	0.2403	0.9897	0.00	-1.03	0.4813	-1.03

Percent Swell (+) / Settlement (-) After Inundation = -0.19



Teratest Labs, Inc.
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One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

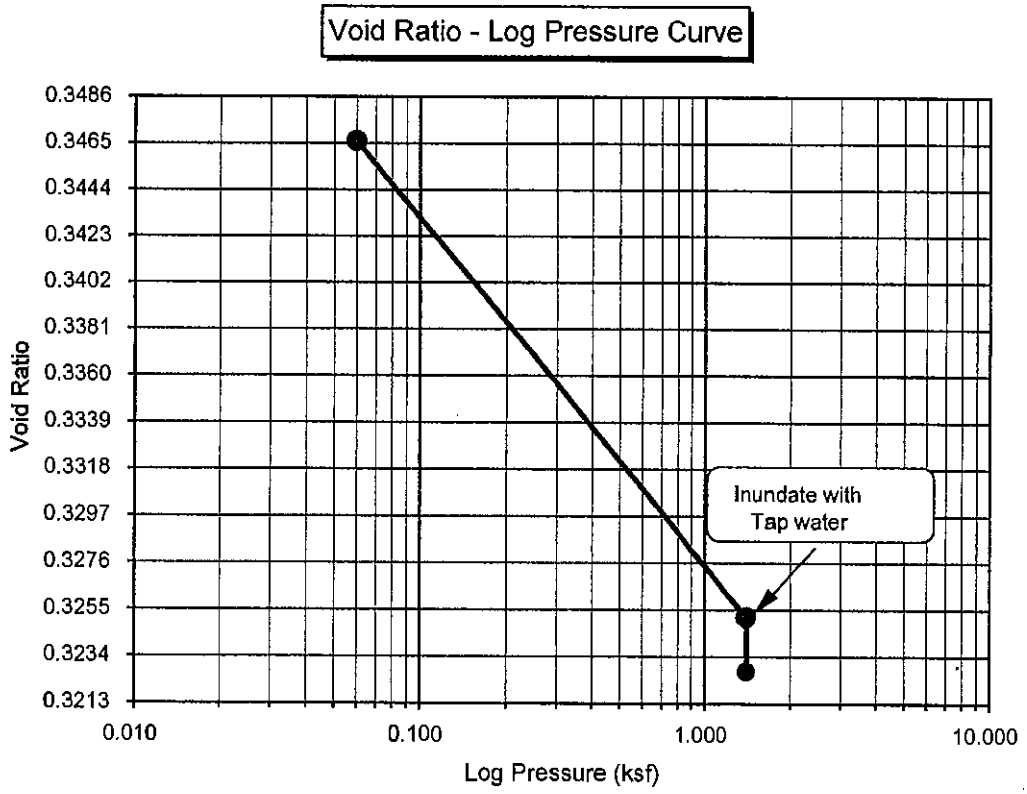
Project Name:	Young Homes / MV	Tested By:	FT
Project No.:	021164-001	Checked By:	LF
Boring No.:	B-4	Sample Type:	Drive
Sample No.:	R-5	Depth (ft.)	15.0
Sample Description:	Brown clayey sand (SC)		

Initial Dry Density (pcf):	125.0
Initial Moisture (%):	7.31
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1590
Diameter(in):	2.416

Final Dry Density (pcf):	126.3
Final Moisture (%) :	10.8
Initial Void ratio:	0.3481
Specific Gravity(assumed):	2.70
Initial Saturation (%)	56.7

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.1601	0.9989	0.00	-0.11	0.3466	-0.11
1.400	0.1760	0.9830	0.00	-1.70	0.3252	-1.70
H2O	0.1778	0.9812	0.00	-1.88	0.3227	-1.88

Percent Swell (+) / Settlement (-) After Inundation = -0.18



Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

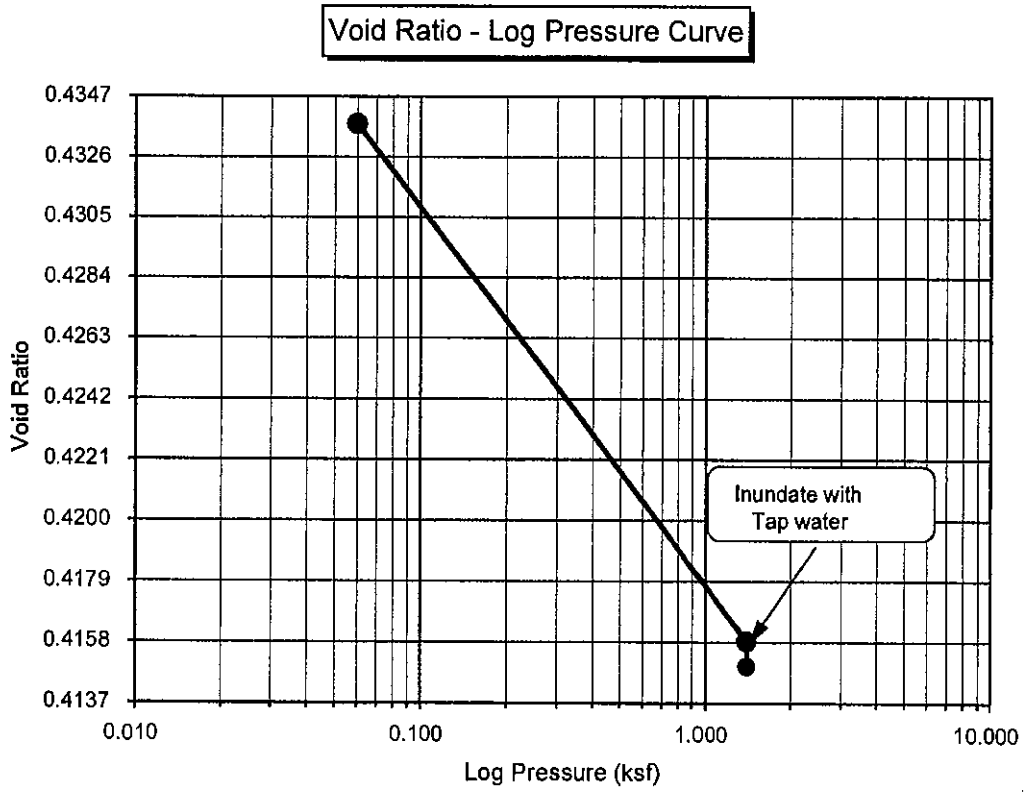
Project Name:	Young Homes / MV	Tested By:	FT, ESS
Project No.:	021164-001	Checked By:	LF
Boring No.:	B-3	Sample Type:	Drive
Sample No.:	R-3	Depth (ft.)	10.0
Sample Description:	Brown sandy lean clay s(CL)		

Initial Dry Density (pcf):	117.6
Initial Moisture (%):	11.23
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1441
Diameter(in):	2.416

Final Dry Density (pcf):	118.8
Final Moisture (%) :	15.7
Initial Void ratio:	0.4338
Specific Gravity(assumed):	2.70
Initial Saturation (%)	69.9

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.1441	1.0000	0.00	0.00	0.4338	0.00
1.400	0.1566	0.9875	0.00	-1.25	0.4158	-1.25
H2O	0.1572	0.9869	0.00	-1.31	0.4150	-1.31

Percent Swell (+) / Settlement (-) After Inundation = -0.06



Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

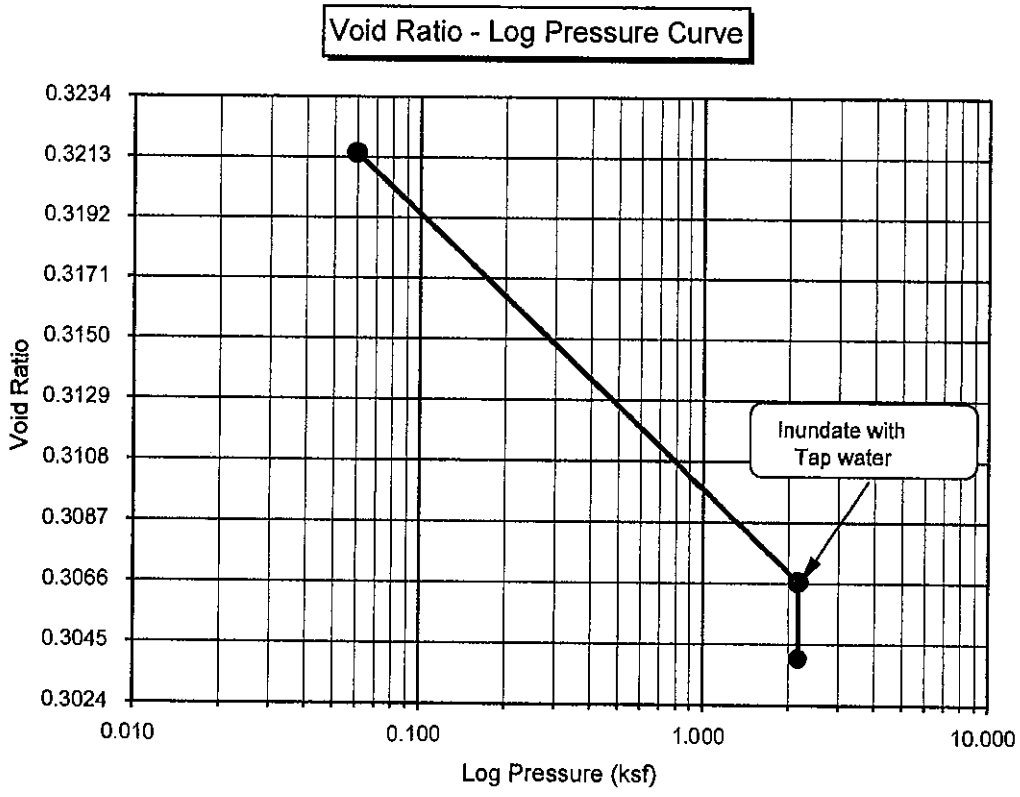
Project Name:	Young Homes / MV	Tested By:	FT, ESS
Project No.:	021164-001	Checked By:	LF
Boring No.:	B-2	Sample Type:	Drive
Sample No.:	R-6	Depth (ft.)	20.0
Sample Description:	Brown silty sand (SM)		

Initial Dry Density (pcf):	127.5
Initial Moisture (%):	5.38
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1000
Diameter(in):	2.416

Final Dry Density (pcf):	127.9
Final Moisture (%) :	11.3
Initial Void ratio:	0.3216
Specific Gravity(assumed):	2.70
Initial Saturation (%)	45.1

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.1001	0.9999	0.00	-0.01	0.3215	-0.01
2.170	0.1113	0.9887	0.00	-1.13	0.3067	-1.13
H2O	0.1133	0.9867	0.00	-1.33	0.3040	-1.33

Percent Swell (+) / Settlement (-) After Inundation = -0.20



Teratest Labs, Inc.
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One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546)

Project Name: Young Homes / MV
Project No.: 021164-001
Boring No.: B-2
Sample No.: R-2
Sample Description: Brown silty sand (SM)

Tested By: FT, ESS
Checked By: LF
Sample Type: Drive
Depth (ft.) 5.0

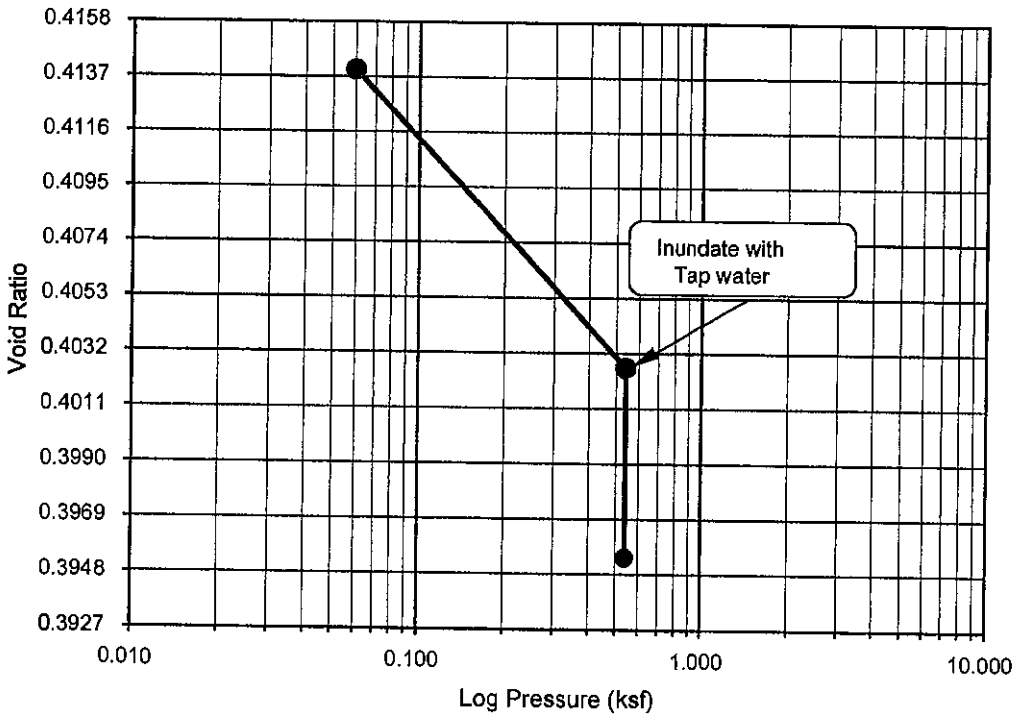
Initial Dry Density (pcf):	119.2
Initial Moisture (%):	3.19
Initial Length (in.):	1.0000
Initial Dial Reading:	0.1093
Diameter(in):	2.416

Final Dry Density (pcf):	119.0
Final Moisture (%) :	13.5
Initial Void ratio:	0.4147
Specific Gravity(assumed):	2.70
Initial Saturation (%)	20.8

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.060	0.1098	0.9995	0.00	-0.05	0.4140	-0.05
0.540	0.1178	0.9915	0.00	-0.85	0.4027	-0.85
H2O	0.1229	0.9864	0.00	-1.36	0.3954	-1.36

Percent Swell (+) / Settlement (-) After Inundation = -0.51

Void Ratio - Log Pressure Curve



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

Project Name:	Young Homes / MV	Tested By :	GB
Project No.:	021164-001	Input By :	LF
Boring No.:	TP-3	Depth (ft.)	2-3
Sample No. :	Bag-1		
Soil Identification:	Olive brown poorly graded sand (SP)		

Preparation Method: [ ] Moist [X] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03323 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3753.6	3855.7	3946.2	3901.9		
Weight of Mold (g)	1771.0	1771.0	1771.0	1771.0		
Net Weight of Soil (g)	1982.6	2084.7	2175.2	2130.9		
Wet Weight of Soil + Cont. (g)	411.70	355.40	374.30	399.80		
Dry Weight of Soil + Cont. (g)	404.20	341.80	353.40	369.80		
Weight of Container (g)	51.80	51.20	52.10	49.30		
Moisture Content (%)	2.13	4.68	6.94	9.36		
Wet Density (pcf)	131.5	138.3	144.3	141.4		
Dry Density (pcf)	128.8	132.1	134.9	129.3		

Maximum Dry Density (pcf) 135.0 **Optimum Moisture Content (%)** 7.0

PROCEDURE USED

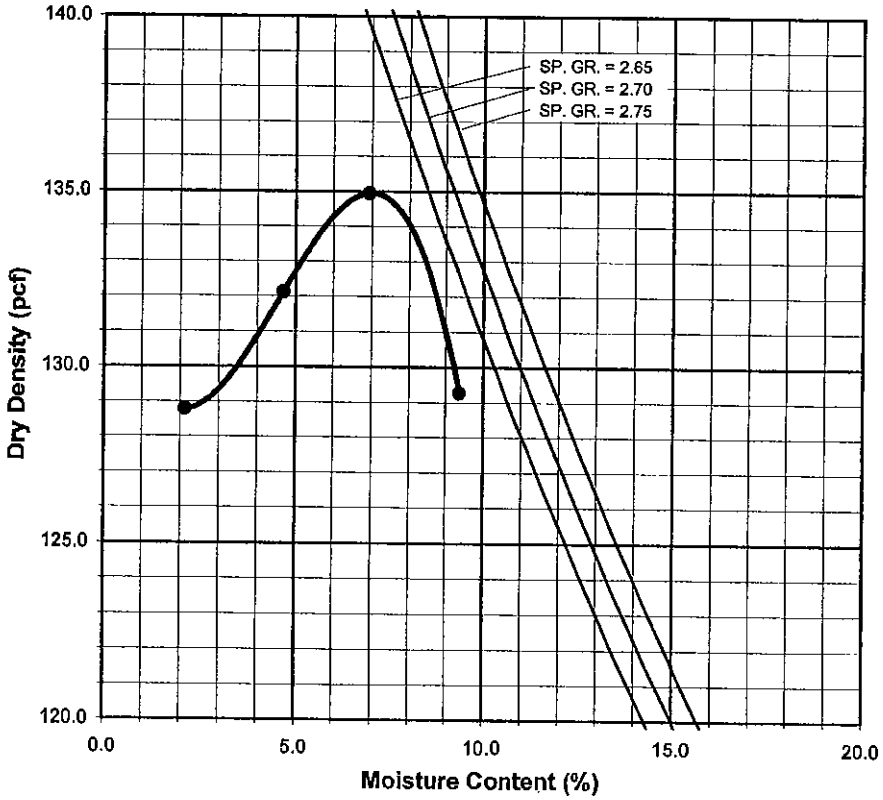
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
GR:SA:FI

Atterberg Limits:
LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

Project Name:	Young Homes / MV	Tested By :	GB
Project No.:	021164-001	Input By :	LF
Boring No.:	TP-6	Depth (ft.)	2-5
Sample No. :	Bag-1		
Soil Identification:	Dark reddish brown silty clay (CL-ML)		

Preparation Method: [ ] Moist [X] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03323 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3683.6	3842.9	3913.2	3810.1		
Weight of Mold (g)	1771.0	1771.0	1771.0	1771.0		
Net Weight of Soil (g)	1912.6	2071.9	2142.2	2039.1		
Wet Weight of Soil + Cont. (g)	369.90	347.80	312.20	329.70		
Dry Weight of Soil + Cont. (g)	354.20	326.10	287.80	298.20		
Weight of Container (g)	52.00	51.00	52.50	54.00		
Moisture Content (%)	5.20	7.89	10.37	12.90		
Wet Density (pcf)	126.9	137.5	142.1	135.3		
Dry Density (pcf)	120.6	127.4	128.8	119.8		

Maximum Dry Density (pcf) 129.0 **Optimum Moisture Content (%)** 9.5

PROCEDURE USED

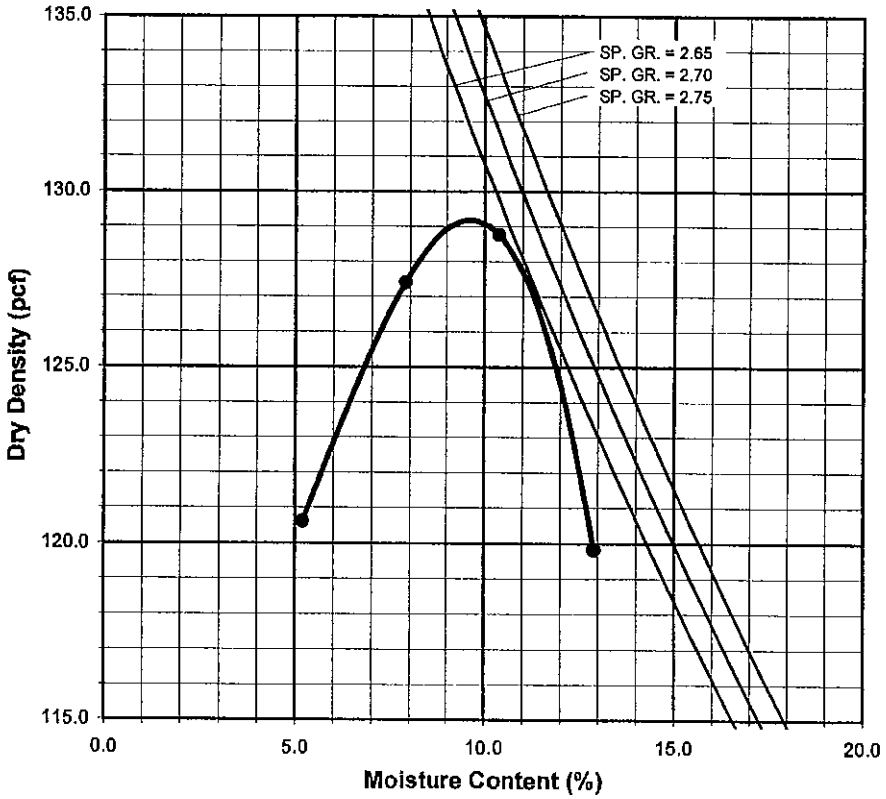
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
GR:SA:FI

Atterberg Limits:
LL,PL,PI



Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Young Homes / MV	Tested By:	GB
Project No. :	021164-001	Checked By:	LF
Boring No.:	TP-1	Depth (ft.)	2-5
Sample No. :	Bag-1		
Soil Identification:	Dark yellowish brown clayey sand (SC)		

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(In.)	1.0000	1.0043
Wt. Comp. Soil + Mold	(g)	636.10	443.00
Wt. of Mold	(g)	210.80	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	848.50	653.80
Dry Wt. of Soil + Cont.	(g)	787.90	605.70
Wt. of Container	(g)	0.00	210.80
Moisture Content	(%)	7.69	12.18
Wet Density	(pcf)	128.3	133.1
Dry Density	(pcf)	119.1	118.6
Void Ratio		0.415	0.421
Total Porosity		0.293	0.296
Pore Volume	(cc)	60.7	61.6
Degree of Saturation (%) [S_{meas}]		**50.0**	78.1

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
04/21/04	16:02	1.0	0	0.0710
04/21/04	16:12	1.0	10	0.0703
Add Distilled Water to the Specimen				
04/21/04	17:07	1.0	55	0.0742
04/22/04	6:45	1.0	873	0.0753
04/22/04	10:10	1.0	1078	0.0753

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	5.0
Expansion Index (EI)$_{60}$ = EI_{meas} - (50 -S_{meas})x((65+EI_{meas}) / (220-S_{meas}))	**5**

Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name: Young Homes / MV
Project No. : 021164-001
Boring No.: TP-5
Sample No. : Bag-1
Soil Identification: Dark yellowish brown poorly graded sand (SP)

Tested By: GB
Checked By: LF
Depth (ft.) 2-5

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(In.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0004
Wt. Comp. Soil + Mold	(g)	629.40	449.10
Wt. of Mold	(g)	190.80	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	854.10	639.90
Dry Wt. of Soil + Cont.	(g)	794.50	598.80
Wt. of Container	(g)	0.00	190.80
Moisture Content	(%)	7.50	10.07
Wet Density	(pcf)	132.3	135.4
Dry Density	(pcf)	123.1	123.0
Void Ratio		0.370	0.370
Total Porosity		0.270	0.270
Pore Volume	(cc)	55.9	56.0
Degree of Saturation (%) [S_{meas}]		**54.8**	73.4

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
04/21/04	16:29	1.0	0	0.0508
04/21/04	16:39	1.0	10	0.0507
Add Distilled Water to the Specimen				
04/21/04	17:06	1.0	27	0.0509
04/22/04	6:47	1.0	848	0.0512
04/22/04	10:02	1.0	1043	0.0512

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	0.5
Expansion Index ($EI)_{60}$ = EI_{meas} - (50 -S_{meas})x((65+EI_{meas}) / (220-S_{meas}))	**2**

Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Young Homes / MV	Tested By:	GB
Project No. :	021164-001	Checked By:	LF
Boring No.:	TP-8	Depth (ft.)	2-3
Sample No. :	Bag-1		
Soil Identification:	Dark yellowish brown silty sand (SM)		

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0000
Wt. Comp. Soil + Mold	(g)	620.80	440.00
Wt. of Mold	(g)	201.80	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	862.40	641.80
Dry Wt. of Soil + Cont.	(g)	804.50	592.70
Wt. of Container	(g)	0.00	201.80
Moisture Content	(%)	7.20	12.56
Wet Density	(pcf)	126.4	132.7
Dry Density	(pcf)	117.9	117.9
Void Ratio		0.430	0.430
Total Porosity		0.301	0.301
Pore Volume	(cc)	62.2	62.2
Degree of Saturation (%) [S_{meas}]		**45.2**	78.9

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
04/21/04	16:55	1.0	0	0.1090
04/21/04	17:05	1.0	10	0.1087
Add Distilled Water to the Specimen				
04/21/04	17:10	1.0	5	0.1087
04/22/04	6:44	1.0	819	0.1090
04/22/04	10:15	1.0	1030	0.1090

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	0.3
Expansion Index (EI)$_{50}$ = EI_{meas} - (50 -S_{meas})x((65+EI_{meas}) / (220-S_{meas}))	**0**

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

R-VALUE TEST RESULTS

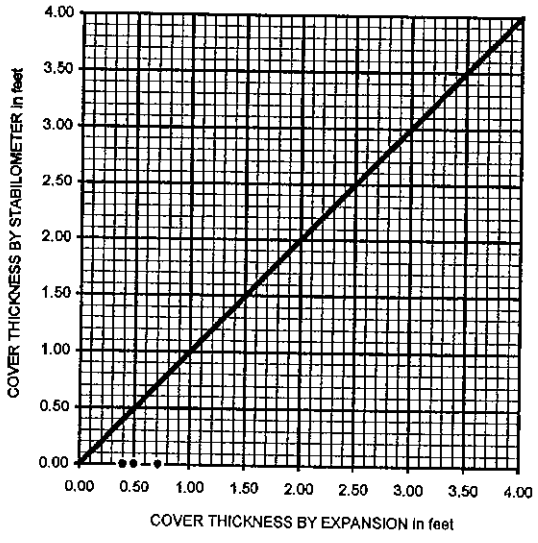
PROJECT NAME: Young Homes / MV
SAMPLE NUMBER: Bag 1
SAMPLE DESCRIPTION: Si. Sa.

PROJECT NUMBER: 021164-001
SAMPLE LOCATION: TP-8 2-3'
TECHNICIAN: SCF

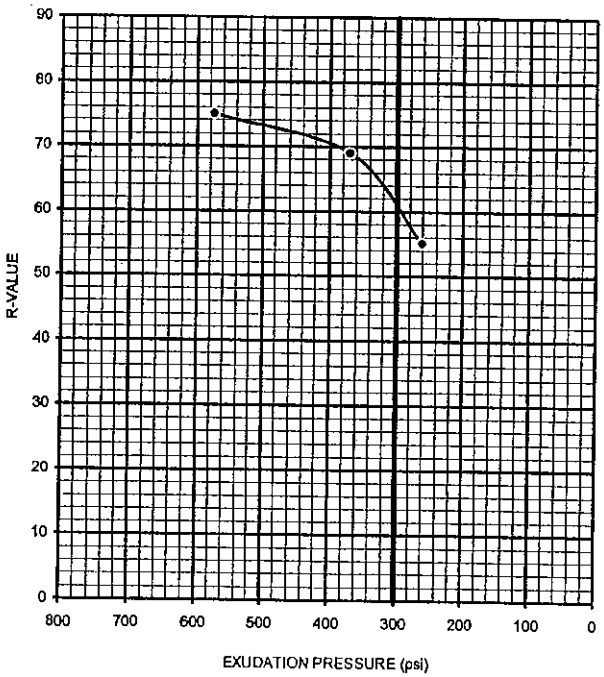
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	9.5	9.9	10.3
HEIGHT OF SAMPLE, Inches	2.44	2.57	2.53
DRY DENSITY, pcf	126.6	125.6	127.4
COMPACTOR AIR PRESSURE, psf	200	150	100
EXUDATION PRESSURE, psf	574	369	261
EXPANSION, Inches x 10exp-4	0	0	0
STABILITY Ph 2,000 lbs (160 psi)	25	30	43
TURNS DISPLACEMENT	4.58	4.98	5.56
R-VALUE UNCORRECTED	75	69	55
R-VALUE CORRECTED	75	69	55

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.40	0.50	0.72
EXPANSION PRESSURE THICKNESS, ft.	0.00	0.00	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION: 100
R-VALUE BY EXUDATION: 61
EQUILIBRIUM R-VALUE: 61

Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Young Homes / MV
Project No. : 021164-001

Tested By : VJ
Data Input By: LF

Boring No.	TP-1	TP-8		
Sample No.	Bag-1	Bag-1		
Sample Depth (ft)	2-5	2-3		
Soil Identification:	SC	SM		
Wet Weight of Soil + Container (g)	222.36	193.02		
Dry Weight of Soil + Container (g)	215.40	187.60		
Weight of Container (g)	74.75	38.66		
Moisture Content (%)	4.95	3.64		
Weight of Soaked Soil (g)	100.24	100.39		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	14	15		
Crucible No.	19	20		
Furnace Temperature (°C)	830	830		
Time In / Time Out	7:45 / 8:30	7:45 / 8:30		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	20.9062	21.2107		
Wt. of Crucible (g)	20.9043	21.2096		
Wt. of Residue (g) (A)	0.0019	0.0011		
PPM of Sulfate (A) x 41150	78.18	45.27		
PPM of Sulfate, Dry Weight Basis	**82**	**47**		

CHLORIDE CONTENT, DOT California Test 422

ml of Chloride Soln. For Titration (B)	30	30		
ml of AgNO3 Soln. Used in Titration (C)	0.6	0.6		
PPM of Chloride (C -0.2) * 100 * 30 / B	40	40		
PPM of Chloride, Dry Wt. Basis	**42**	**42**		

pH TEST, DOT California Test 532/643

pH Value	**7.02**	**7.07**		
Temperature °C	20.7	20.6		

Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

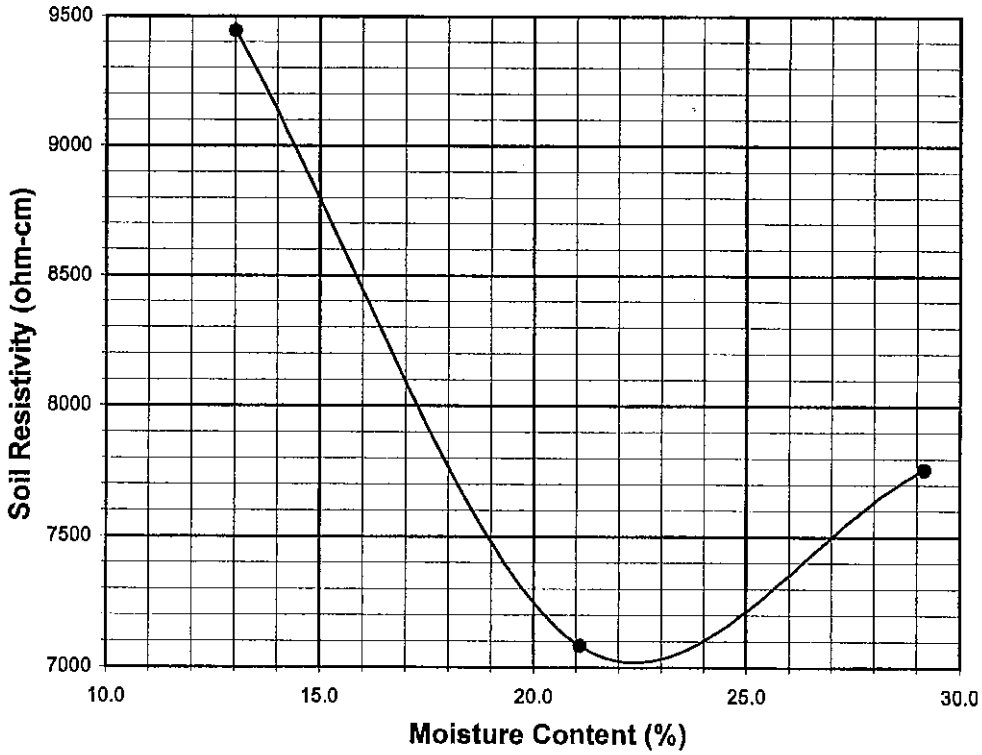
Project Name: Young Homes / MV
Project No. : 021164-001
Boring No.: TP-1
Sample No. : Bag-1
Soil Identification: SC

Tested By : VJ
Data Input By: LF
Depth (ft.) : 2-5

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	100	13.02	1400	9444
2	200	21.09	1050	7083
3	300	29.17	1150	7758
4				
5				

Moisture Content (%) (MCi)	4.95
Wet Wt. of Soil + Cont. (g)	222.36
Dry Wt. of Soil + Cont. (g)	215.40
Wt. of Container (g)	74.75
Container No.	
Initial Soil Wt. (g) (Wt)	1300.00
Box Constant	6.746
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
7020	**22.3**	**82**	**42**	**7.02**	**20.7**



Teratest Labs, Inc.
A LEIGHTON GROUP COMPANY

SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

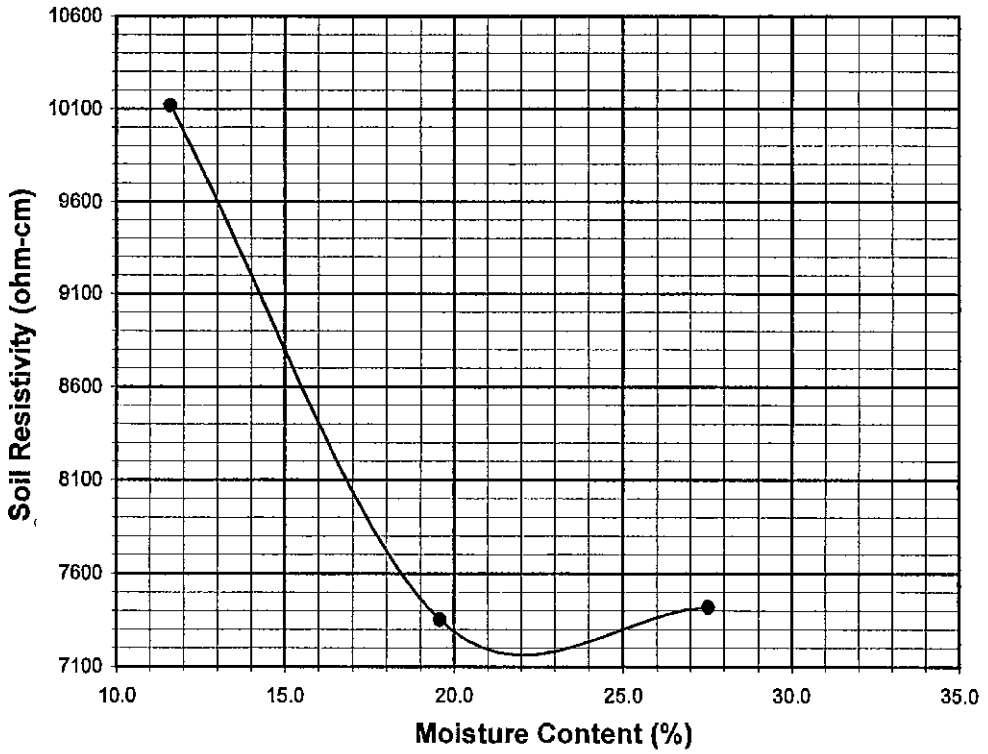
Project Name: Young Homes / MV
Project No. : 021164-001
Boring No.: TP-8
Sample No. : Bag-1
Soil Identification: SM

Tested By : VJ
Data Input By: LF
Depth (ft.) : 2-3

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	100	11.61	1500	10119
2	200	19.58	1090	7353
3	300	27.56	1100	7421
4				
5				

Moisture Content (%) (MCi)	3.64
Wet Wt. of Soil + Cont. (g)	193.02
Dry Wt. of Soil + Cont. (g)	187.60
Wt. of Container (g)	38.66
Container No.	
Initial Soil Wt. (g) (Wt)	1300.00
Box Constant	6.746
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
7170	**22.0**	**47**	**42**	**7.07**	**20.6**



APPENDIX E

LEIGHTON AND ASSOCIATES, INC.

GENERAL EARTHWORK AND GRADING SPECIFICATIONS FOR ROUGH GRADING

Table of Contents

1.0 General

1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record: Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The

Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing: Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing: Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation: In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching: Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas: All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General: Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import: If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers: Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning: Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557-91).

4.3 Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557-91). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes: In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557-91.

4.5 Compaction Testing: Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing: Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations: The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Safety: The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill: All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.3 Lift Thickness: Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

7.4 Observation and Testing: The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.