GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED NORTHEAST RETIREMENT COMMUNITY
MASTERSON STREET & HIGHWAY 178
BAKERSFIELD, CALIFORNIA

PROJECT NO. 022-07153
NOVEMBER 6, 2007

Prepared for:

MR. ANDREW PLANT
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Prepared by:

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SITE DEVELOPMENT ENGINEERS

DAVID R. JAROSZ II
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Expires June 30, 2008
GEOTECHNICAL

Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

November 6, 2007

KA Project No. 022-07153

Mr. Andrew Plant
Spring Hill Development, LLC.
7946 Ivanhoe Avenue, Suite 214
La Jolla, California 92037

RE: Geotechnical Engineering Investigation
Proposed Northeast Retirement Community
Masterson Street & Highway 178
Bakersfield, California

Dear Mr. Plant:

In accordance with your request, we have completed a Geotechnical Engineering Investigation for the above-referenced site. The results of our investigation are presented in the attached report.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (661) 837-9200.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

David R. Jarosz, II
Managing Engineer
RCE No. 60185/RGE No. 2698

REGISTERED PROFESSIONAL ENGINEER
DAVID R. JAROSZ II
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GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED NORTHEAST RETIREMENT COMMUNITY
MASTERSON STREET & HIGHWAY 178
BAKERSFIELD, CALIFORNIA

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed Northeast Retirement Community, to be located in Bakersfield, California. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, Engineered Fill, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior flatwork, retaining walls, soil cement reactivity, and pavement design.

A site plan showing the approximate boring locations is presented following the text of this report. A description of the field investigation, boring logs, and the boring log legend are presented in Appendix A. Appendix A contains a description of the laboratory-testing phase of this study, along with the laboratory test results. Appendices B and C contain guides to earthwork and pavement specifications. When conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

PURPOSE AND SCOPE

This investigation was conducted to evaluate the soil and groundwater conditions at the site, to make geotechnical engineering recommendations for use in design of specific construction elements, and to provide criteria for site preparation and Engineered Fill construction.

Our scope of services was outlined in our proposal dated September 26, 2007 (KA Proposal No. P181-07-R1) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- A field investigation consisting of drilling 6 borings to depths ranging from approximately 10 to 20 feet for evaluation of the subsurface conditions at the project site.
- Performing laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.

- Evaluation of the data obtained from the investigation and an engineering analysis to provide recommendations for use in the project design and preparation of construction specifications.

- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

PROPOSED CONSTRUCTION

We understand that design of the proposed development is currently underway; structural load information and other final details pertaining to the structures are unavailable. On a preliminary basis, it is understood the proposed development will include the construction of a retirement community. It is anticipated that the buildings will be two-story, wood-framed structures utilizing concrete slab-on-grade construction. Footing loads are anticipated to be light to moderate. On-site roadways and landscaping are also planned to be included in the development.

In the event, these structural or grading details are inconsistent with the final design criteria, the Soils Engineer should be notified so that we may update this writing as applicable.

SITE LOCATION AND SITE DESCRIPTION

The site is irregular in shape and encompasses approximately 17 acres. The site is located approximately 1000 feet north of the Highway 178 and Masterson Street intersection, on the east side of Masterson Street in Bakersfield, California. The site is predominately surrounded by vacant/range land.

Presently, the site is vacant land. The site is predominately covered by a sparse to moderate grass/weed growth and the surface soils have a loose consistency. A sewer line and manhole is located along the northern border. Overhead electric and gas lines are located in the easement along the western boundary. The site is relatively level to very gently sloping from east to west.

GEOLOGIC SETTING

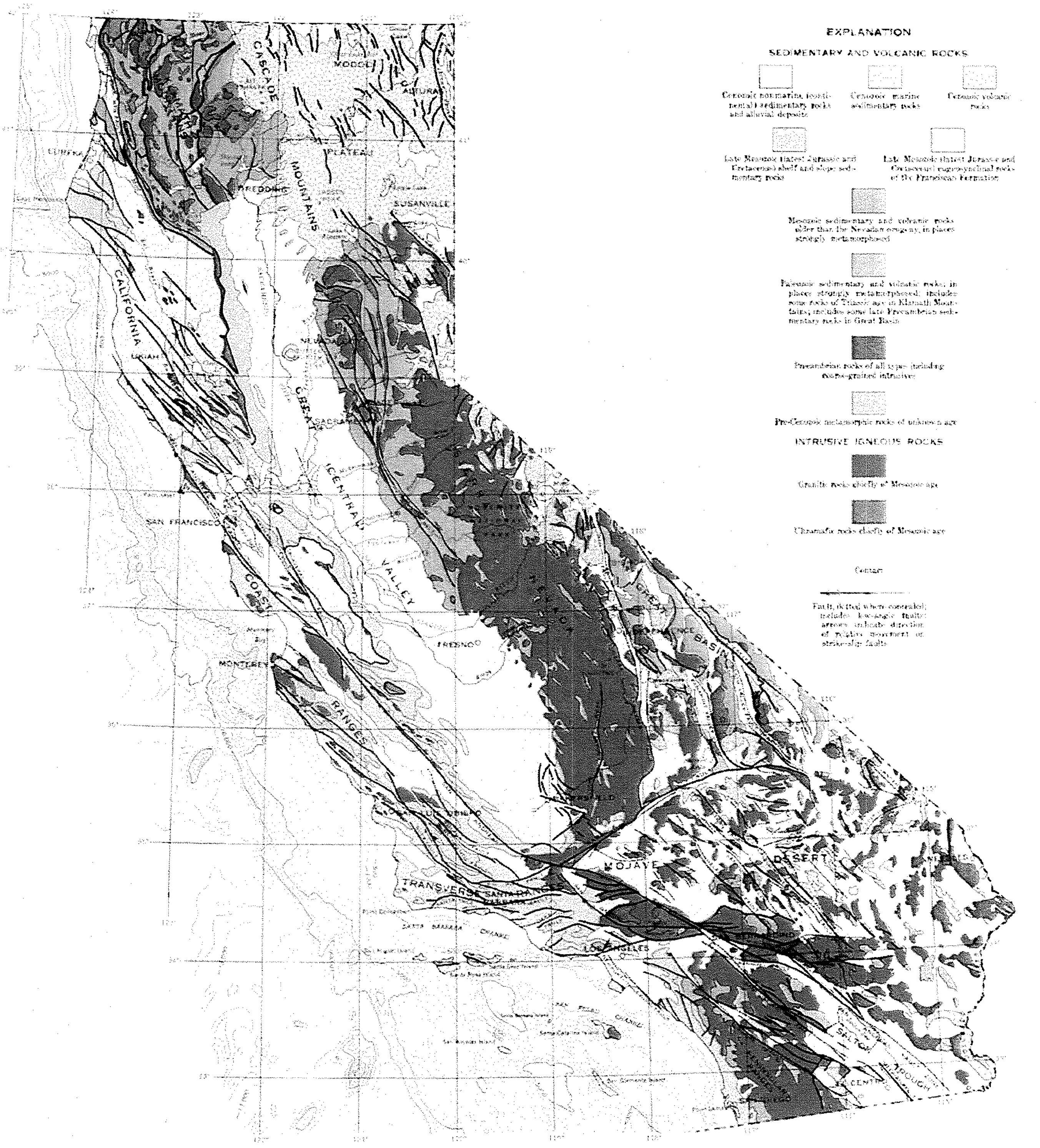
Geologically, the property is situated on the eastern flank, near the south end of the Great Valley Geomorphic Province. This province is a large northwesterly trending geosyncline or structural trough between the Coast Range Mountains and the Sierra Nevada. Erosion from both of these mountain systems has resulted in the deposition of immense thickness of sediments in the Valley floor. Heavily-laden streams from the Sierra Nevada have built very prominent alluvial fans along the margins of the San Joaquin Valley. This has resulted in a rather flat topography in the vicinity of the project site. The site is composed of alluvial deposits which are mostly cohesionless sands and silts.

The south end of the San Joaquin Valley is surrounded on all sides, excluding the north, by active fault systems (San Andreas, White Wolf-Breckenridge-Kern Canyon, and Garlock Faults). Numerous smaller faults exist within the valley floor.

CALIFORNIA GEOLOGICAL SURVEY
JAMES F. DAVIS, STATE GEOLOGIST

STATE OF CALIFORNIA - GRAY DAVIS, GOVERNOR
THE RESOURCES AGENCY - MARY D. NICHOLS, SECRETARY
CALIFORNIA DEPARTMENT OF CONSERVATION - DARRYL YOUNG, DIRECTOR

SIMPLIFIED GEOLOGIC MAP OF CALIFORNIA



GEOLOGIC MAP OF CALIFORNIA

CALIFORNIA GEOLOGICAL SURVEY
CALIFORNIA CONSERVATION

There is on-going seismic activity in the Kern County area, with the most noticeable earthquake being the July 21, 1952 Kern County Earthquake. The initial shock was 7.7 magnitude shake with the epicenter near Wheeler Ridge, about 22 miles from Bakersfield. Vertical displacements of as much as 3 feet occurred at the fault line. Estimated average value of the maximum bedrock accelerations from the 1952 event are about 0.25 gravity at the project site.

The closest known faults to the property are subsurface faults located at the Fruitvale Oil Field. These faults cut the older sediments and, although numerous, are not thought to be active in the last 2 million years.

No evidence was observed that indicated surface faulting has occurred across the property during the Holocene time. Faults not yet identified, however, may exist. The site is not located within an Earthquake Fault Zone (special studies zone). The site is located with a Seismic Zone 4.

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling 6 borings to depths ranging from approximately 10 to 20 feet below existing site grade, using a truck-mounted drill rig. In addition, 3 bulk subgrade soil samples were obtained from the project site for laboratory R-value testing. The approximate boring and bulk sample locations are shown on the site plan. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsoils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory-testing program was formulated with emphasis on the evaluation of natural moisture, density, gradation, shear strength, consolidation potential, expansion potential, atterberg limits, R-value, and moisture-density relationships of the materials encountered. In addition, chemical tests were performed to evaluate the corrosivity of the soils to buried concrete and metal. Details of the laboratory test program and results of the laboratory tests are summarized in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the surface soils consisted of approximately 12 to 18 inches of very loose silty sand with clay, clayey sand, or clayey sand/sandy clay. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated.

Below the loose surface soils, approximately 2 to 3 feet of medium dense silty sand with clay, clayey sand, clayey sand/sandy clay, or very stiff sandy clay were encountered. Field and laboratory tests suggest that these soils are moderately strong and slightly to highly compressible. The clayey soils have a moderate to high shrink/swell potential under variations in moisture content. Penetration resistance ranged from 21 to 38 blows per foot. Dry densities ranged from 88 to 118 pcf. A representative soil sample consolidated approximately 7 percent under a 2 ksf load when saturated. A representative soil sample had an angle of internal friction of 22 degrees. Representative samples of the clayey soils had Uniform Building Code Expansion Indices ranging from 75 to 139.

Below 3 to 4½ feet, alternating layers of medium dense to dense clayey sand, silty sand, sand, and very stiff to hard sandy clay were encountered. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance ranged from 18 blows per foot to greater than 50 blows per 6 inches. Dry densities ranged from 105 to 135 pcf. A representative soil sample consolidated approximately 1½ percent under a 2 ksf load when saturated. These soils had similar strength characteristics as the upper soils and extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the logs of borings in Appendix A.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was not encountered.

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

Administrative Summary

In brief, the subject site and soil conditions, with the exception of the moisture-sensitive upper soils and expansive nature of the clayey soils, appear to be conducive to the development of the project. Of primary importance in the development of this site is the removal of moisture sensitive upper native soils. These soils are moderately to highly compressible and/or collapsible under saturated conditions. Structures within the general vicinity have experienced excessive post-construction settlement when the foundation soils become near-saturated. Accordingly, mitigation measures are recommended to reduce the potential of excessive soil settlement. It is recommended that following stripping operations, the upper 4 feet of native soils within the proposed building and exterior flatwork areas be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, it is recommended that proposed structural elements within the proposed building areas be supported by a minimum of 2 feet of Engineered Fill. Over-excavation should extend to a minimum of 5 feet beyond proposed footing lines. Prior to fill placement, the exposed subgrade soils should be scarified to a depth of 6 inches, moisture-conditioned to a minimum of 2 percent above optimum moisture-content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

It is anticipated that the structural elements within the paved areas may settle if the subgrade soils become saturated. The settlement of the paved areas is related to the subsurface soil conditions. It is recommended that at a minimum, the upper 24 inches of subgrade soils within the proposed pavement areas be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, utilities placed within the paved areas should incorporate flexible connectors.

The upper native soils encountered from the project site generally consisted of silty sand with clay, clayey sand, clayey sand/sandy clay, and sandy clay. The clayey soils appeared to have a moderate to high shrink/swell potential under variations in moisture-content. The estimated swell pressures of the clayey soils may cause movement effecting slabs and possible stucco or similar brittle exterior finishes. To minimize potential soil movement, it is recommended the upper 30 inches of soil within building and exterior flatwork areas consist of non-expansive Engineered Fill. The fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive clayey soils below, which may result in swelling. The replacement soil and/or the upper 30 inches of Imported Fill soils should meet the specifications as described under the subheading Engineered Fill. The replacement soils should extend 5 feet beyond the perimeter of the building. The non-expansive replacement soil should be compacted to at least 90 percent relative compaction based on ASTM Test Method D1557. The exposed native soils in the excavation should not be allowed to dry out and should be kept continuously moist prior to backfilling. In addition, it is recommended that slab-on-grade continuous footings and slabs be nominally reinforced to minimize cracking and vertical off-set.

As an alternative to the use of non-expansive soils, the upper 30 inches of soil supporting the slab areas can consist of lime-treated clayey soils. The lime-treated soils should be recompacted to a minimum of 90 percent of maximum density. Preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. The clayey soils should be at or near optimum moisture during the mixing operations.

The site was previously utilized as agricultural land. In addition, several residential developments are located in the project site vicinity. Associated with these developments may be buried structures such as utility lines and irrigation lines that extend into the project site. Any buried structures or loosely backfilled excavations encountered during construction should be properly removed and/or relocated. The resulting excavations should be backfilled with Engineered Fill. It is suspected that demolition activities of the existing structures will disturb the upper soils. After demolition activities, it is recommended that these disturbed soils be removed and/or recompacted. This compaction effort should stabilize the upper soils and locate any unsuitable or pliant areas not found during our field investigation.

Sandy soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy soils.

After completion of the recommended site preparation, the site should be suitable for shallow footings bearing on a minimum of 24 inches of Engineered Fill. The proposed structure footings may be designed utilizing an allowable bearing pressure of 2,500 psf for dead-plus-live loads. Footings should have a minimum embedment of 12 inches.

Groundwater Influence on Structures/Construction

Based on our findings and historical records, it is not anticipated that groundwater will rise within the zone of structural influence or affect the construction of foundations and pavements for the project. However, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Site Preparation

General site clearing should include removal of: vegetation; existing utilities; structures including foundations; basement walls and floors; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for use as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Structures within the general vicinity have experienced excessive post-construction settlement when the foundation soils become near-saturated. Accordingly, mitigation measures are recommended to reduce the potential of excessive soil settlement. It is recommended that following stripping operations, the upper 4 feet of native soils within the proposed building and exterior flatwork areas be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted. In addition, it is recommended that proposed structural elements within the proposed building areas be supported by a minimum of 2 feet of Engineered Fill. Over-excavation should extend to a minimum of 5 feet beyond proposed footing lines. Prior to backfilling, the exposed subgrade soils should be scarified to a depth of 6 inches, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

It is anticipated that the structural elements within the paved areas will settle if the subgrade soils become saturated. The settlement of the paved areas is related to the subsurface soil conditions. It is recommended that at a minimum, the upper 24 inches of subgrade soils within the proposed pavement areas be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, utilities placed within the paved areas should incorporate flexible connectors.

In areas where slab-on-grade construction will be utilized, it is recommended that the upper 30 inches of soils within the proposed structure and exterior flatwork areas consist of non-expansive Engineered Fill or lime treated Engineered Fill. The intent is to support slab-on-grade and exterior flatwork areas with 30 inches of non-expansive or lime-treated fill. The fill placement serves 2 functions: 1) it provides a uniform amount of soil which will more evenly distribute the soil pressures and 2) it reduces moisture content fluctuation in the clayey material beneath the building area. The non-expansive fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive clayey soil below, which may result in soil swelling. Imported Fill should be approved by the Soils Engineer prior to placement. The fill should be placed as specified as Engineered Fill.

Any buried structures or loosely backfilled excavations encountered during construction should be properly removed and/or relocated and the resulting excavations backfilled. Excavations, depressions, or soft and pliant areas extending below planned finished subgrade levels should be cleaned to firm, undisturbed soil and backfilled with Engineered Fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. Any other buried structures should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

The upper soils, during wet winter months, become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

Engineered Fill

The organic-free, on-site, upper native soils are predominately silty sand with clay, clayey sand, clayey sand/sandy clay, sandy clay, silty sand, and sand. The clayey soils will not be suitable for reuse as non-expansive Engineered Fill. The clayey soils will be suitable for reuse for fill placement within the upper 30 inches of building and exterior flatwork areas, provided they are lime-treated. The preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. The clayey soils should be at or near optimum moisture-conditions during mixing operations. Additional testing is recommended to determine the appropriate application rate of lime prior to placement. These clayey soils will be suitable for reuse as General Engineered Fill, within pavement areas and below 30 inches from finished pad grade in slab-on-grade areas, provided they are cleansed of excessive organics, debris and moisture-conditioned to at least 2 percent above optimum moisture. The silty sand and sand soils that do not contain clay will be suitable for reuse as non-expansive Engineered Fill provided they are cleansed of excessive organics and debris.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since he has complete control of the project site at that time.

Imported non-expansive Fill should consist of a well-graded, slightly cohesive, fine silty sand or sandy silt, with relatively impervious characteristics when compacted. This material should be approved by the Soils Engineer prior to use and should typically possess the following characteristics:

Percent Passing No. 200 Sieve	20 to 50
Plasticity Index	10 maximum
UBC Standard 29-2 Expansion Index	15 maximum

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned as necessary, and compacted to achieve at least 90 percent of maximum density based on ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required density or if soil conditions are not stable.

Drainage and Landscaping

The ground surface should slope away from building pad and pavement areas toward appropriate drop inlets or other surface drainage devices. It is recommended that adjacent exterior grades be sloped a minimum of 2 percent for a minimum distance of 5 feet away from structures. Subgrade soils in pavement areas should be sloped a minimum of 1 percent and drainage gradients maintained to carry all surface water to collection facilities and off-site. These grades should be maintained for the life of the project.

Slots or weep holes should be placed in drop inlets or other surface drainage devices in pavement areas to allow free drainage of adjoining base course materials. Cutoff walls should be installed at pavement edges adjacent to vehicular traffic areas; these walls should extend to a minimum depth of 12 inches below pavement subgrades to limit the amount of seepage water that can infiltrate the pavements. Where cutoff walls are undesirable subgrade drains can be constructed to transport excess water away from planters to drainage interceptors. If cutoff walls can be successfully used at the site, construction of subgrade drains is considered unnecessary.

Utility Trench Backfill

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards by a Contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the Contractor. Traffic and vibration adjacent to trench walls should be minimized; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

Sandy soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy soils.

Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. The utility trench backfill placed in pavement areas should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. Pipe bedding should be in accordance with pipe manufacturer's recommendations.

The Contractor is responsible for removing all water-sensitive soils from the trench regardless of the backfill location and compaction requirements. The Contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

Foundations

After completion of the recommended site preparation, the site should be suitable for shallow footings support. The proposed structures may be supported on a shallow foundation system bearing on a minimum of 24 inches of Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	1,875 psf
Dead-Plus-Live Load	2,500 psf
Total Load, including wind or seismic loads	3,325 psf

The footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Footings should have a minimum width of 12 inches, regardless of load.

The footing excavations should not be allowed to dry out at any time prior to pouring concrete. It is recommended that all footings be reinforced by at least one No. 4 reinforcing bar in both top and bottom.

The total soil movement is not expected to exceed 1 inch. Differential soil movement should be less than 1 inch. Most of the movement is expected to occur during construction as the loads are applied. However, additional post-construction movement may occur if the foundation soils are flooded or saturated.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.3 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an equivalent fluid passive pressure of 275 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A ⅓ increase in the above value may be used for short duration, wind, or seismic loads. The above earth pressures are unfactored and are, therefore, not inclusive of factors of safety.

Floor Slabs and Exterior Flatwork

Concrete slab-on-grade floors should be underlain by a water vapor retarder. The water vapor retarder should be installed in accordance with ASTM Specification E 1643-98. According to ASTM Guidelines, the water vapor retarder should consist of a vapor retarder sheeting underlain by a minimum of 3 inches of compacted, clean, gravel of ¾-inch maximum size. To aid in concrete curing an optional 2 to 4 inches of granular fill may be placed on top of the vapor retarder. The granular fill should consist of damp clean sand with at least 10 to 30 percent of the sand passing the 100 sieve. The sand should be free of clay, silt, or organic material. Rock dust which is manufactured sand from rock crushing operations is typically suitable for the granular fill. This granular fill material should be compacted.

The floor slab should be reinforced at a minimum with #3 reinforcement bars at 18 inches on-center each way within the floor slabs middle-third. Thicker floor slabs with increased concrete strength and reinforcement should be designed wherever heavy concentrated loads, heavy equipment, or machinery is anticipated.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. Exterior finish grades should be sloped a minimum of 1 to 1½ percent away from all interior slab areas to preclude ponding of water adjacent to the structures. All fills required to bring the building pads to grade should be Engineered Fills.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To minimize moisture vapor intrusion, it is recommended that a vapor retarder be installed in accordance with ASTM guidelines. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to minimize the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure is recommended to reduce the accumulation of interior moisture.

Lateral Earth Pressures and Retaining Walls

Walls retaining horizontal backfill and capable of deflecting a minimum of 0.1 percent of its height at the top may be designed using an equivalent fluid active pressure of 50 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 70 pounds per square foot per foot per depth. Expansive soils should not be used for backfill against walls. The wedge of non-expansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 2:1 (horizontal to vertical) or flatter. The stated lateral earth pressures do not include the effects of hydrostatic water pressures generated by infiltrating surface water that may accumulate behind the retaining walls; or loads imposed by construction equipment, foundations, or roadways. The above earth pressures are unfactored and are, therefore, not inclusive of factors of safety.

During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers," vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have a minimum width of 12 inches wide and should extend upward to within 12 inches of the top of the wall. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic concrete or other suitable backfill to minimize surface drainage into the wall drain system. The aggregate should conform to Class II permeable materials graded in accordance with Section 68-1.025 of the CalTrans Standard Specifications (May 2006). Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel provided they are installed in accordance with the manufacturer's recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.

Drainage pipes should be placed with perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The pipes should be placed no higher than 6 inches above the heel of the wall, in the centerline of the drainage blanket and should have a minimum diameter of four inches. Collector pipes may be either slotted or perforated. Slots should be no wider than ¼-inch in diameter, while perforations should be no more than $^1/_8$-inch in diameter. If retaining walls are less than 6 feet in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 4-inch diameter holes (concrete walls) or unmortared head joints (masonry walls) and not be higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to Section 88-1.03 of the CalTrans Standard Specifications for "edge drains") should be affixed to the rear wall opening of each weep hole to retard soil piping.

R-Value Test Result and Pavement Design

Three R-Values were obtained from the project site at the locations shown on the attached site plan. The samples were tested in accordance with the State of California Materials Manual Test Designation 301. Results of the tests are as follows:

Sample	Depth	Description	R-Value at Equilibrium
1	12-24"	Clayey Sand (SC)	26
2	12-24"	Clayey Sand (SC)	36
3	12-24"	Clayey Sand (SC)	34

These test results are low to moderate and indicate poor to fair subgrade support characteristics under dynamic traffic loads. The following table shows the recommended pavement sections for various traffic indices.

Traffic Index	Asphaltic Concrete	Class II Aggregate Base*	Class III Aggregate Subbase	Compacted Subgrade**
4.0	2.0"	6.0"	--	24.0"
4.0	2.0"	4.5"	2.0"	24.0"
4.5	2.5"	6.0"	--	24.0"
4.5	2.5"	4.0"	2.0"	24.0"
5.0	2.5"	7.0"	--	24.0"
5.0	2.5"	5.0"	2.5"	24.0"
5.5	3.0"	7.0"	--	24.0"
5.5	3.0"	5.0"	2.5"	24.0"
6.0	3.0"	9.0"	--	24.0"
6.0	3.0"	6.5"	3.0"	24.0"
6.5	3.5"	9.5"	--	24.0"
6.5	3.5"	6.0"	4.0"	24.0"
7.0	4.0"	10.5"	--	24.0"
7.0	4.0"	6.5"	4.0"	24.0"
7.5	4.0"	11.5"	--	24.0"
7.5	4.0"	7.5"	4.5"	24.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 90% compaction based on ASTM Test Method D1557 or CAL 216*

If traffic indices are not available, an estimated (typical value) index of 4.5 may be used for light automobile traffic and an index of 7.0 may be used for light truck traffic.

The following recommendations are for light-duty and heavy-duty Portland Cement Concrete pavement sections.

PORTLAND CEMENT PAVEMENT
LIGHT DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
4.5	6.0"	4.0"	24.0"

HEAVY DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
7.0	7.0"	6.0"	24.0"

**** 95% compaction based on ASTM Test Method D1557 or CAL 216***
***** 90% compaction based on ASTM Test Method D1557 or CAL 216***
******Minimum compressive strength of 3000 psi***

Site Coefficient

The site coefficient, per Table 16-J, of the 2001 California Building Code (2001 CBC), is based upon the site soil conditions. It is our opinion that a site coefficient of soil type S_D 2001 CBC is appropriate for building design at this site.

For seismic design of the structures, in accordance with the seismic provisions of the 2001 CBC, we recommend the following parameters:

2001 California Building Code – Seismic Loads		
Seismic Item	**Value**	**UBC Reference**
Zone Factor	0.4	Table 16I
Source Type	A	Table 16U
Coefficient N_a	1.0	Table 16S
Coefficient N_v	1.0	Table 16T
Coefficient C_a	0.44	Table16Q
Coefficient C_v	0.64	Table 16R

The site class per Table 1613.5.2, of the 2007 California Building Code (2007 CBC) is based upon the site soil conditions. It is our opinion that Site Class D is most consistent with the subject site soil conditions.

For seismic design of the structures based on the seismic provisions of the 2007 CBC, to be adopted in January 2008, we recommend the following parameters:

2007 California Building Code – Seismic Loads		
Seismic Item	**Value**	**CBC Reference**
Site Class	D	Table 1613.5.2
S_s	1.117	Figure 1613.5 (3)
Site Coefficient F_a	1.032	Table 1613.5.3 (1)
S_{MS}	1.208	Section 1613.5.3
S_{DS}	0.805	Section 1613.5.4
S_1	0.409	Figure 1613.5 (4)
Site Coefficient F_v	1.591	Table 1613.5.3 (2)
S_{M1}	0.650	Section 1613.5.3
S_{D1}	0.433	Section 1613.5.4

Compacted Material Acceptance

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent on the stability of that material. The Soils Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with an in-situ moisture content significantly less than optimum moisture. This type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

Testing and Inspection

A representative of Krazan & Associates, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

LIMITATIONS

Soils Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using the most appropriate and most current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 2 years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Soils Engineer should be notified so that supplemental recommendations may be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The Soils Engineer should be notified of any changes so the recommendations may be reviewed and re-evaluated.

This report is a Geotechnical Engineering Investigation with the purpose of evaluating the soil conditions in terms of foundation design. The scope of our services did not include any Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (661) 837-9200.

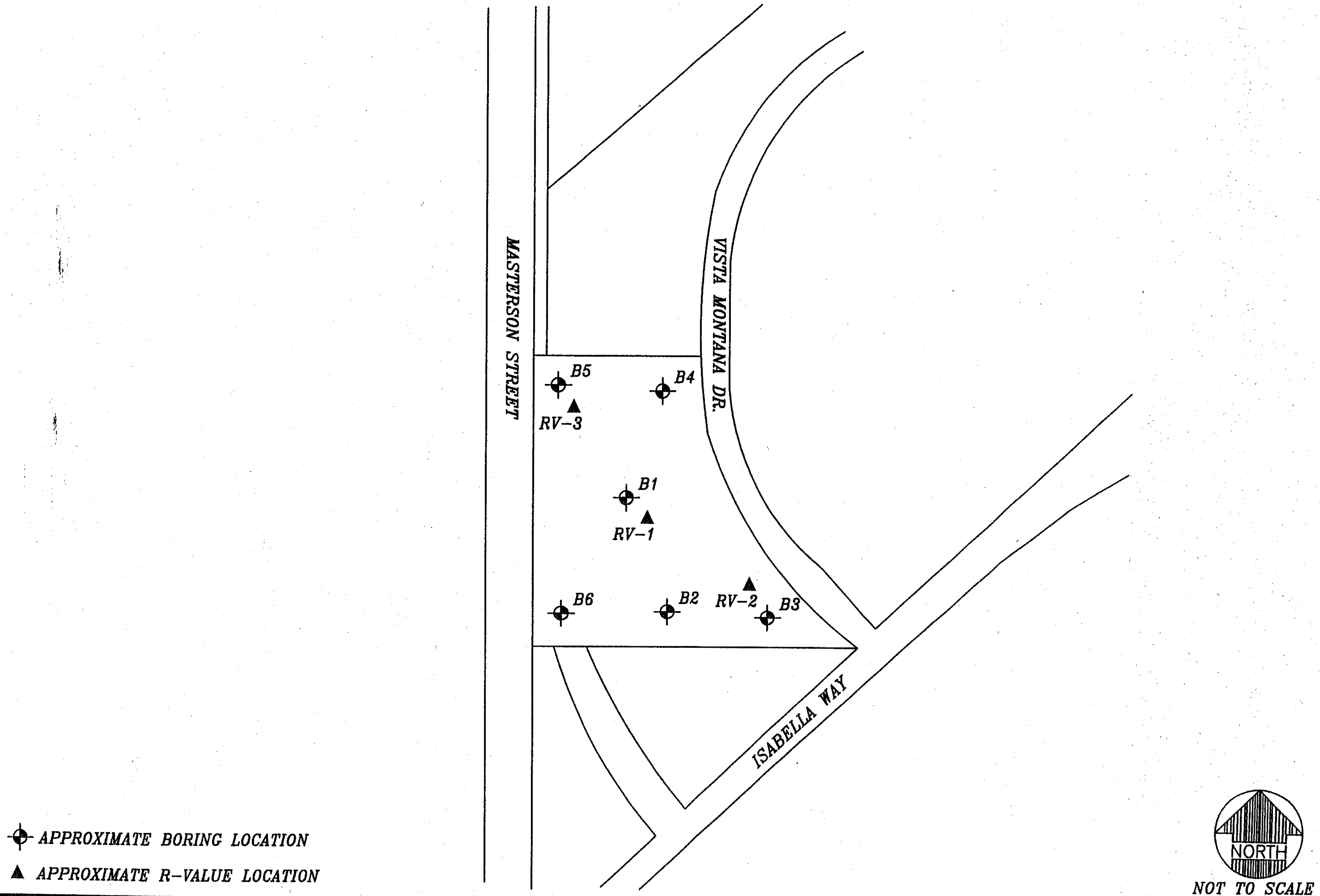
Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Leopoldo Fabian
Project Engineer

David R. Jarosz, II
Managing Engineer
RCE No. 60185/RGE No. 2698

REGISTERED PROFESSIONAL ENGINEER
DAVID R. JAROSZ, II
No. 2698
Expires June 30, 2008
GEOTECHNICAL
STATE OF CALIFORNIA

LF/DRJ:ch



PROPOSED NORTHEAST RETIEMENT COMMUNITY
MASTERSON STREET AND HIGHWAY 178

BAKERSFIELD, CA

Scale: AS SHOWN	Date: 11/07
Drawn by: MN	Approved by: DJ
Project No. 02207153	Figure No.

Krazan
SITE DEVELOPMENT ENGINEERS
Offices Serving the Western United States

Log of Borings
&
Laboratory Testing

Appendix A

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploratory program. Six 4½-inch exploratory borings were advanced. The boring locations are shown on the site plan.

The soils encountered were logged in the field during the exploration and, with supplementary laboratory test data, are described in accordance with the Unified Soil Classification System.

Modified standard penetration tests were performed at selected depths. This test represents the resistance to driving a 2½-inch diameter core barrel. The driving energy was provided by a hammer weighing 140 pounds falling 30 inches. Relatively undisturbed soil samples were obtained while performing this test. Bag samples of the disturbed soil were obtained from the auger cuttings. All samples were returned to our Fresno laboratory for evaluation.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the foundation soil underlying the site. Test results were used as criteria for determining the engineering suitability of the surface and subsurface materials encountered.

In-situ moisture content, dry density, consolidation, direct shear, and sieve analysis tests were completed for the undisturbed samples representative of the subsurface material. Expansion index and R-value tests were completed for select bag samples obtained from the auger cuttings. These tests, supplemented by visual observation, comprised the basis for our evaluation of the site material.

The logs of the exploratory borings and laboratory determinations are presented in this Appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)		
	Clean Gravels (Less than 5% fines)	
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
	Clean Sands (Less than 5% fines)	
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

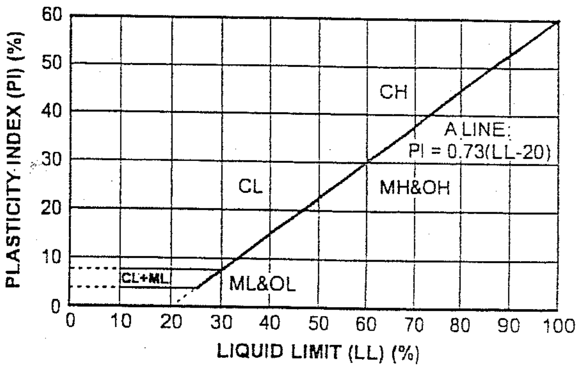
CONSISTENCY CLASSIFICATION

Description	Blows per Foot
Granular Soils	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
Cohesive Soils	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION

Grain Type	*Standard Sieve Size*	*Grain Size in Millimeters*
Boulders	Above 12 inches	Above 305
Cobbles	3 to 12 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.042
Fine-grained	No. 40 to No. 200	0.042 to 0.074
Silt and Clay	Below No. 200	Below 0.074

PLASTICITY CHART



Log of Drill Hole B1

Project: Northeast Retirement Community

Project No: 022-07153

Client: Spring Hill Development, LLC.

Figure No.: A-1

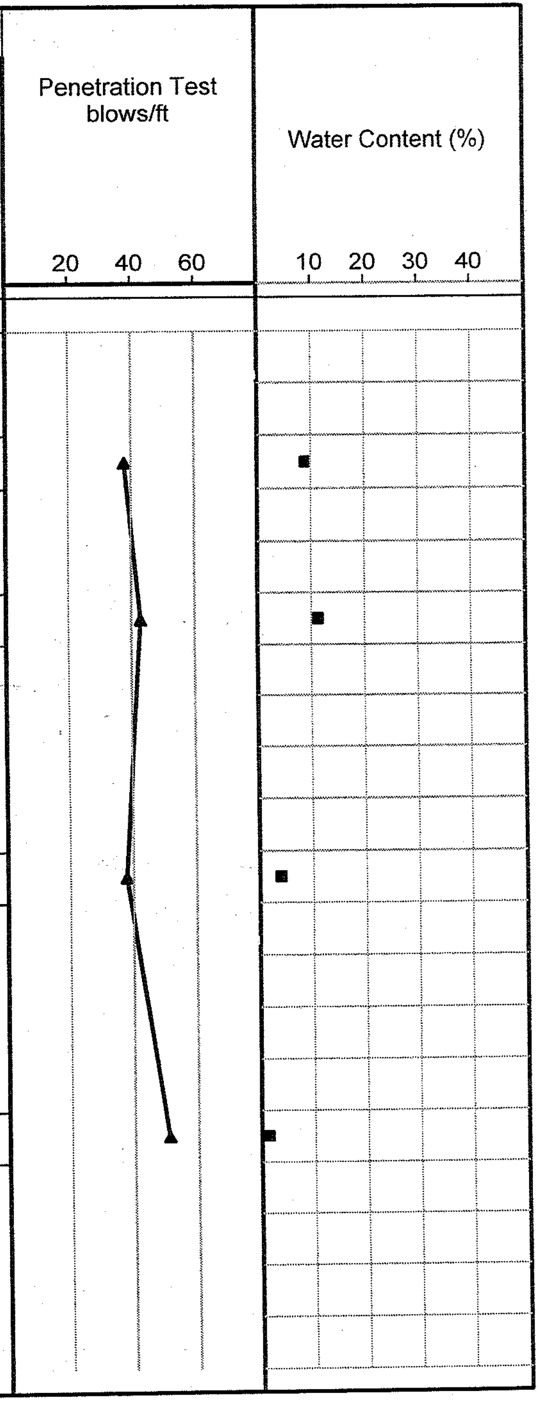
Location: Masterson Street and Highway 178, Bakersfield, California

Logged By: David Adams

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE	SAMPLE			
Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
Ground Surface				
CLAYEY SILTY SAND/SANDY CLAY (S Very loose, fine- to medium-grained with trace CLAY; reddish-brown, damp, drills easily				
CLAYEY SAND/SANDY CLAY (SC/CL) Medium dense, fine- to coarse-grained; reddish-brown, damp, drills firmly	117.7	9.1	■	38
CLAYEY SAND (SC) Dense, fine- to coarse-grained with trace GRAVEL; reddish-brown, damp, drills firmly	115.7	11.3	■	43
SANDY CLAY (CL) Hard, fine- to coarse-grained; reddish-brown, moist, drills firmly				
SILTY SAND (SM) Medium dense, fine- to medium-grained; brown, damp, drills easily	110.9	4.0	■	38
SAND (SP) Dense, fine- to coarse-grained; light brown, damp, drills firmly	113.9	1.4	■	51

Depth (ft): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20



Drill Method: Solid Flight

Drill Rig: CME 45

Driller: Brent Snyder

Krazan and Associates

Drill Date: 10-10-07

Hole Size: 4½ Inches

Elevation: 20 Feet

Sheet: 1 of 1

Log of Drill Hole B2

Project: Northeast Retirement Community
Project No: 022-07153

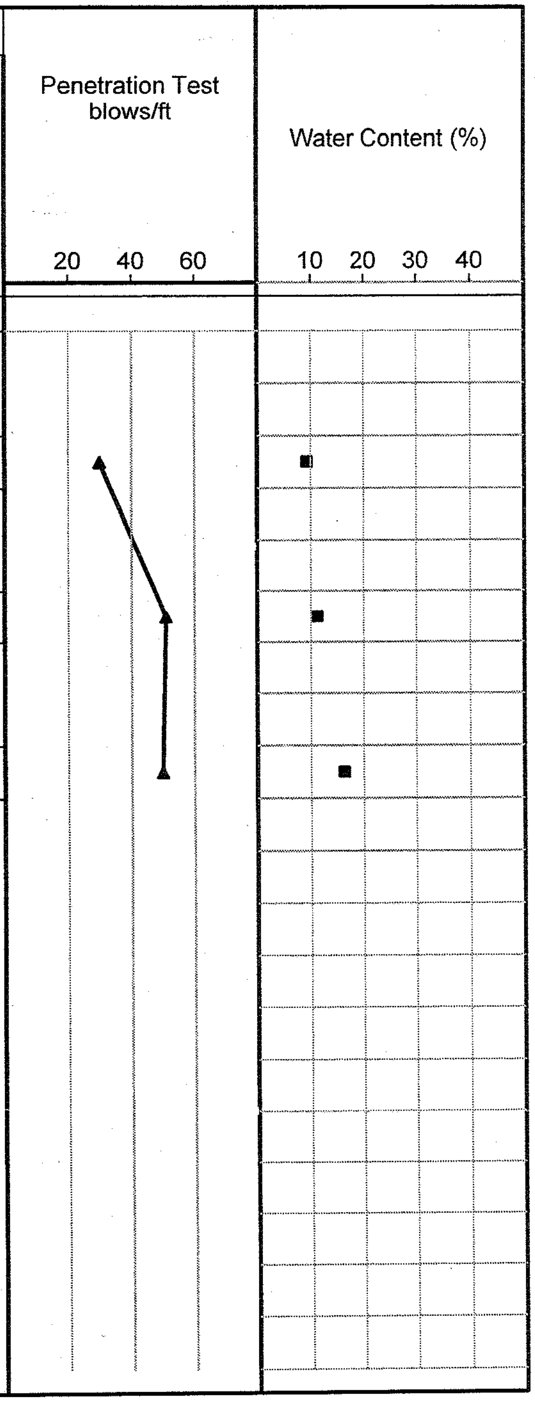
Client: Spring Hill Development, LLC.
Figure No.: A-2

Location: Masterson Street and Highway 178, Bakersfield, California
Logged By: David Adams

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE		SAMPLE			
Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
	Ground Surface				
▧	*CLAYEY SAND (SC)* Very loose, fine- to medium-grained; brown, damp, drills easily				
▨	*SANDY CLAY (CL)* Very stiff; fine- to coarse-grained; reddish-brown, damp, drills easily	89.8	9.3	■	30
▨	Hard below 5 feet	115.0	11.3	■	51
▨		110.7	16.3	■	50
▥	*SILTY SAND (SM)* Dense, fine- to medium-grained with trace CLAY; brown, damp, drills firmly				
	End of Borehole				

Depth (ft): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20



Drill Method: Solid Flight
Drill Date: 10-10-07

Drill Rig: CME 45
Krazan and Associates
Hole Size: 4½ Inches

Driller: Brent Snyder
Elevation: 15 Feet

Sheet: 1 of 1

Log of Drill Hole B3

Project: Northeast Retirement Community

Project No: 022-07153

Client: Spring Hill Development, LLC.

Figure No.: A-3

Location: Masterson Street and Highway 178, Bakersfield, California

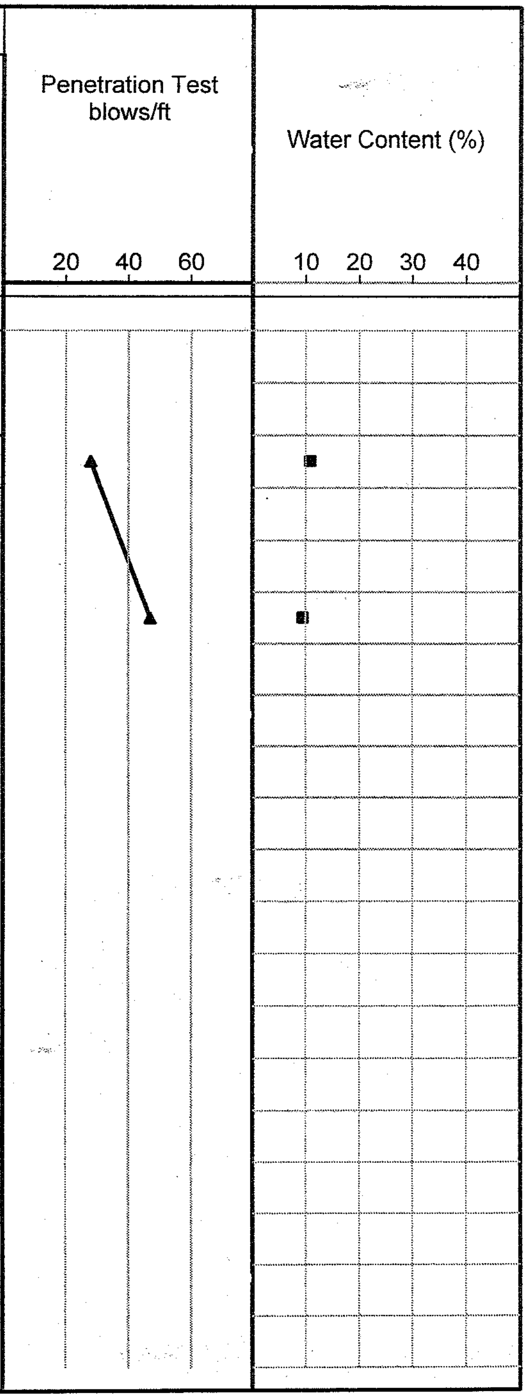
Logged By: David Adams

Depth to Water>

Initial: None

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
	▨	***CLAYEY SAND (SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily				
2	▨	***SANDY CLAY (CL)*** Very stiff; fine- to coarse-grained; reddish-brown, damp, drills easily	97.8	10.9	■	28
	▨	Hard and drills firmly below 5 feet	105.4	9.5	■	47
10		End of Borehole				



Drill Method: Solid Flight

Drill Date: 10-10-07

Drill Rig: CME 45

Krazan and Associates

Hole Size: 4½ Inches

Driller: Brent Snyder

Elevation: 10 Feet

Sheet: 1 of 1

Log of Drill Hole B4

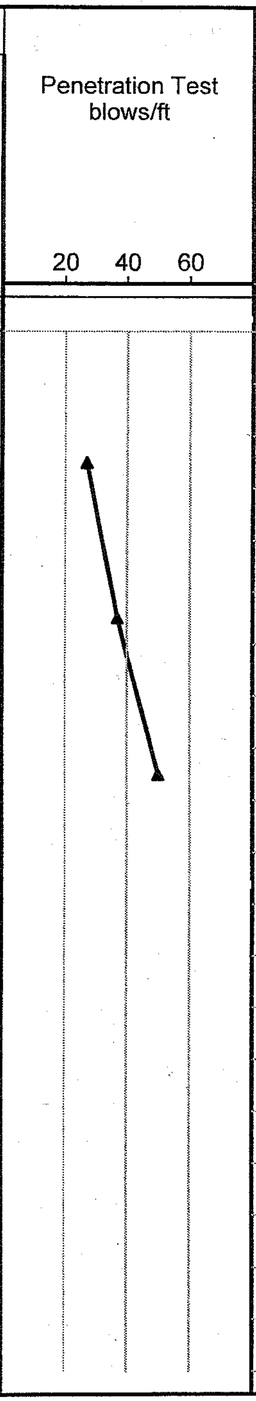
Project: Northeast Retirement Community
Project No: 022-07153

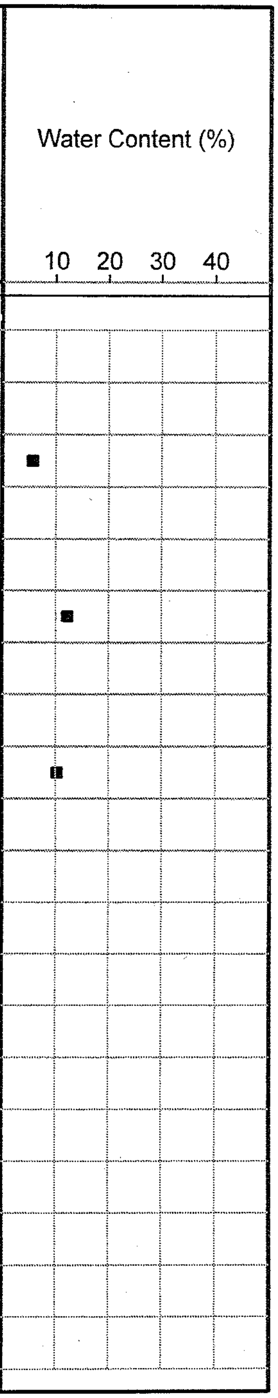
Client: Spring Hill Development, LLC.
Figure No.: A-4

Location: Masterson Street and Highway 178, Bakersfield, California
Logged By: David Adams

Depth to Water>
Initial: None
At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface ***CLAYEY SILTY SAND (SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily				
2		***SANDY CLAY (CL)*** Very stiff, fine- to medium-grained; brown, damp, drills easily	115.7	5.8	■	27
4		***SANDY CLAY (CL)*** Very stiff, fine- to coarse-grained; reddish-brown, damp, drills firmly				
6			119.3	12.3	■	37
8		Hard below 8 feet	116.2	10.3	■	50+
10						
12						
14		***SILTY SAND (SM)*** Medium dense, fine- to medium-grained with trace CLAY; brown, damp, drills firmly				
16		End of Borehole				
18						
20						





Drill Method: Solid Flight
Drill Date: 10-10-07

Drill Rig: CME 45
Hole Size: 4½ Inches

Krazan and Associates

Driller: Brent Snyder
Elevation: 15 Feet

Sheet: 1 of 1

Log of Drill Hole B5

Project: Northeast Retirement Community

Project No: 022-07153

Client: Spring Hill Development, LLC.

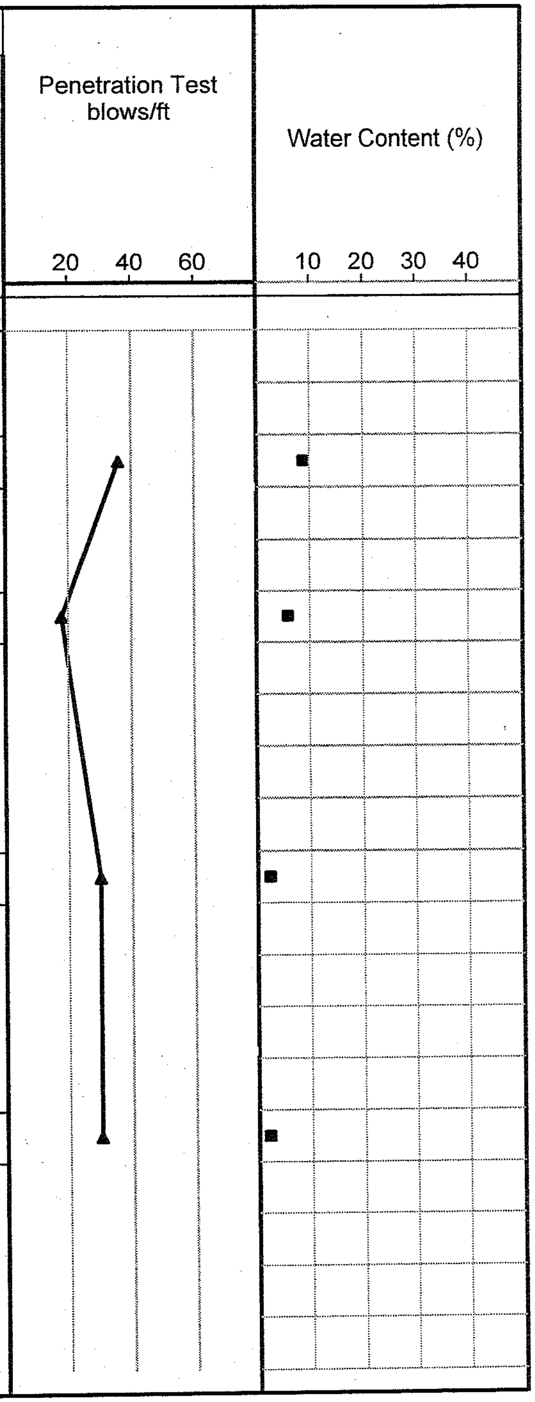
Figure No.: A-5

Location: Masterson Street and Highway 178, Bakersfield, California

Logged By: David Adams

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***CLAYEY SAND (SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily				
2	▨	***SANDY CLAY (CL)*** Very stiff, fine- to medium-grained; reddish-brown, damp, drills firmly	107.4	8.9	■	36
4	▨	***CLAYEY SAND (SC)*** Medium dense, fine- to coarse-grained with trace GRAVEL; reddish-brown, moist, drills easily	108.8	6.0	■	18
10	⁘	***SAND (SP)*** Medium dense, fine- to coarse-grained; light brown, damp, drills easily	122.2	2.4	■	30
14	⁘		135.0	2.1	■	30
20						



Drill Method: Solid Flight

Drill Rig: CME 45

Driller: Brent Snyder

Krazan and Associates

Drill Date: 10-10-07

Hole Size: 4½ Inches

Elevation: 20 Feet

Sheet: 1 of 1

Log of Drill Hole B6

Project: Northeast Retirement Community

Project No: 022-07153

Client: Spring Hill Development, LLC.

Figure No.: A-6

Location: Masterson Street and Highway 178, Bakersfield, California

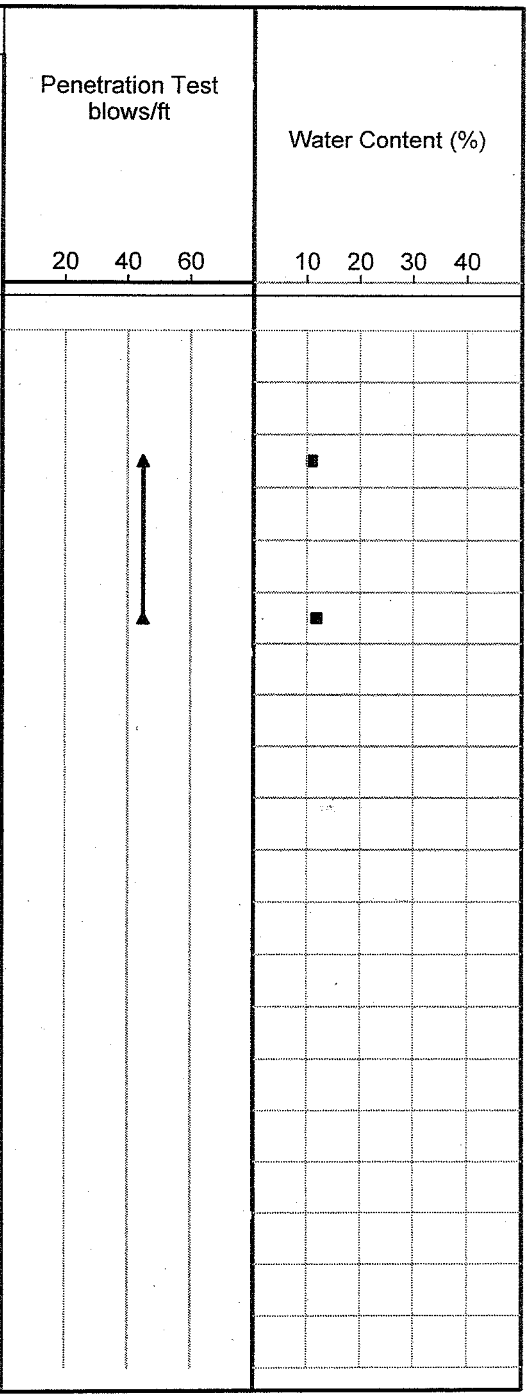
Logged By: David Adams

Depth to Water>

Initial: None

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0	▨	***CLAYEY SAND (SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily				
1	▨	***CLAYEY SAND/SANDY CLAY (SC/CL)*** Dense, fine- to medium-grained; reddish-brown, damp, drills easily				
2.5	▨		87.9	11.0	■	45
5.5	▨		106.1	11.9	■	45
10		End of Borehole				



Drill Method: Solid Flight

Drill Date: 10-10-07

Drill Rig: CME 45

Krazan and Associates

Hole Size: 4½ Inches

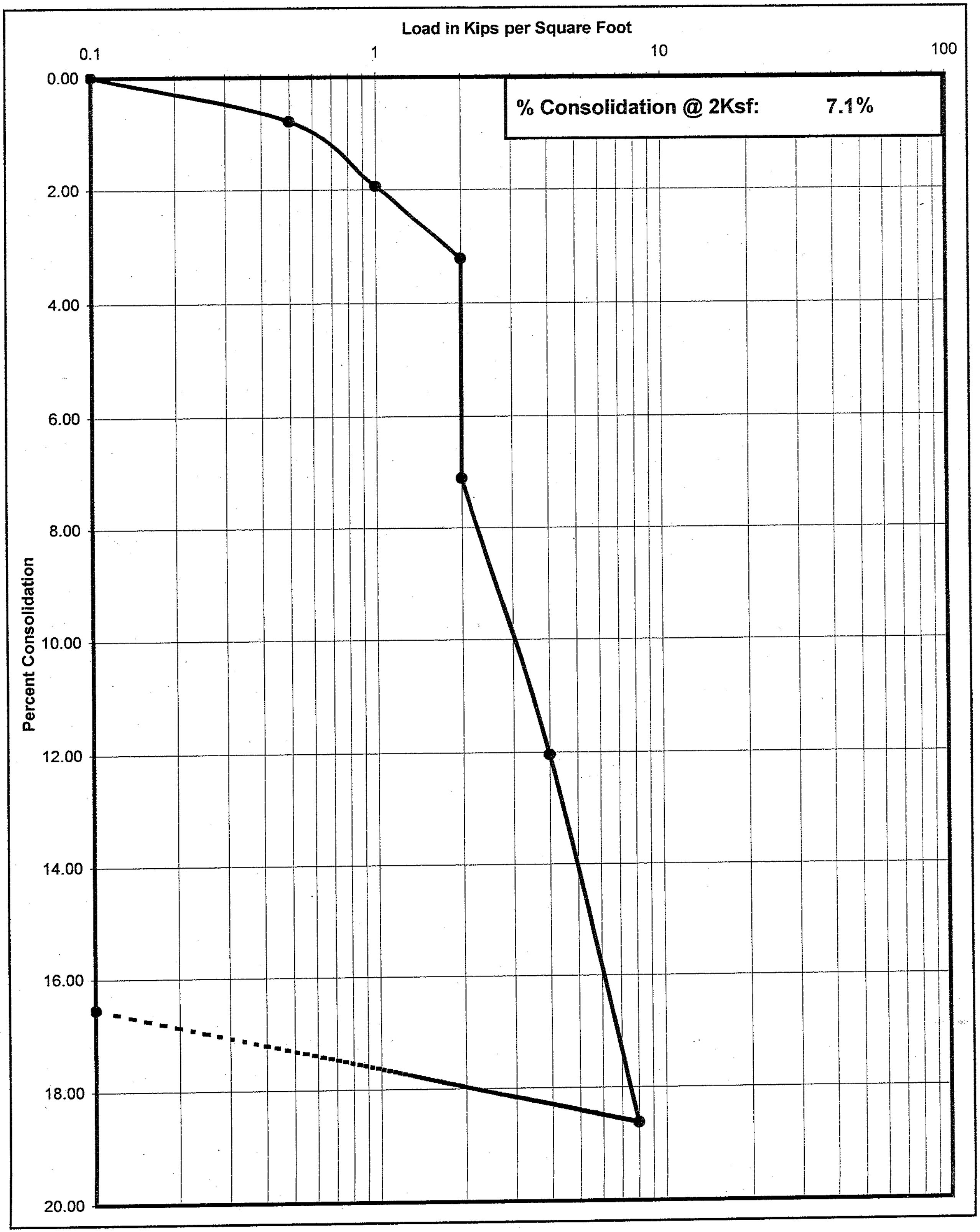
Driller: Brent Snyder

Elevation: 10 Feet

Sheet: 1 of 1

Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
2207153	B4 @ 2-3'	10/24/2007	SM w/ clay



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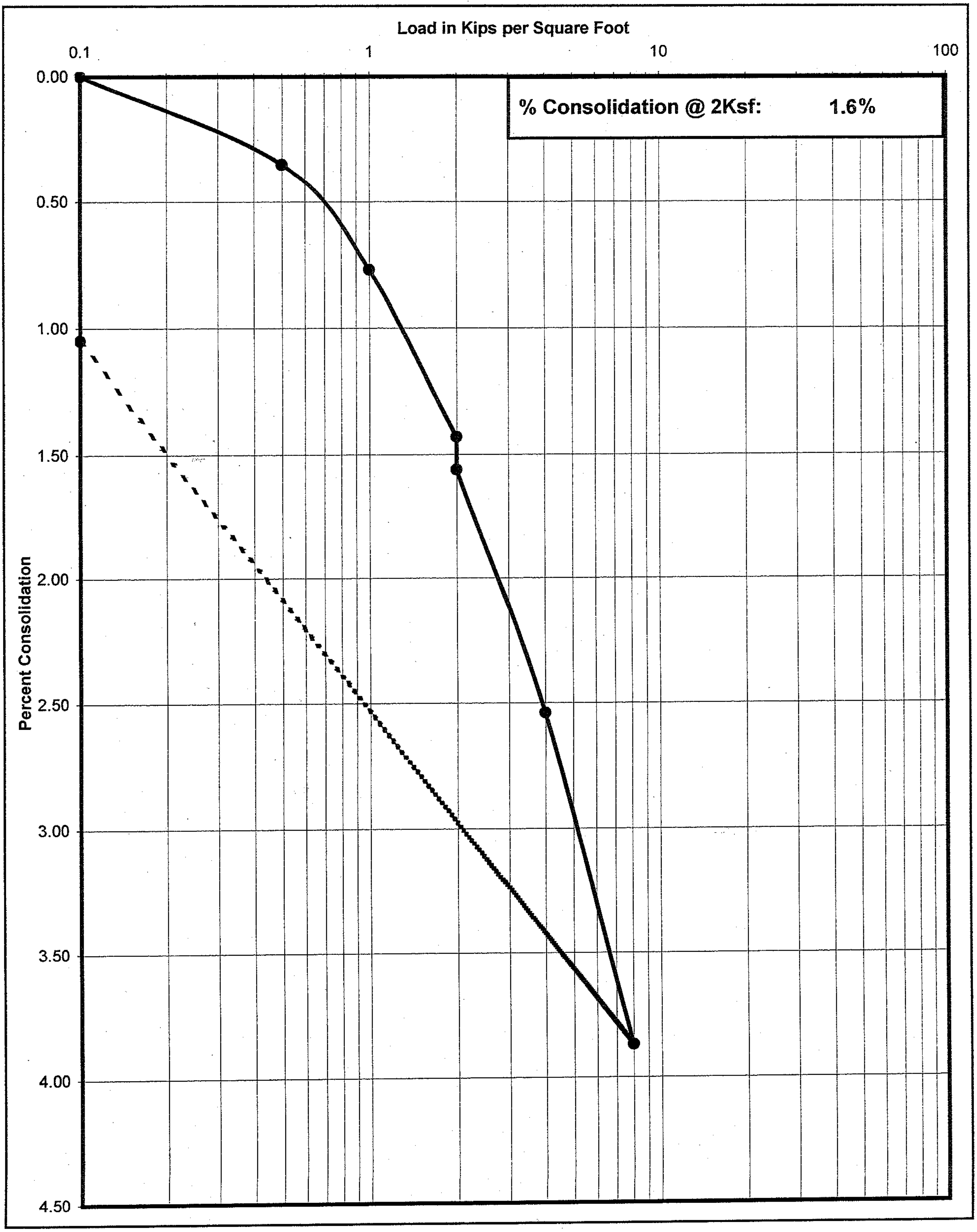
Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
2207153	B4 @ 5-6'	10/24/2007	CL



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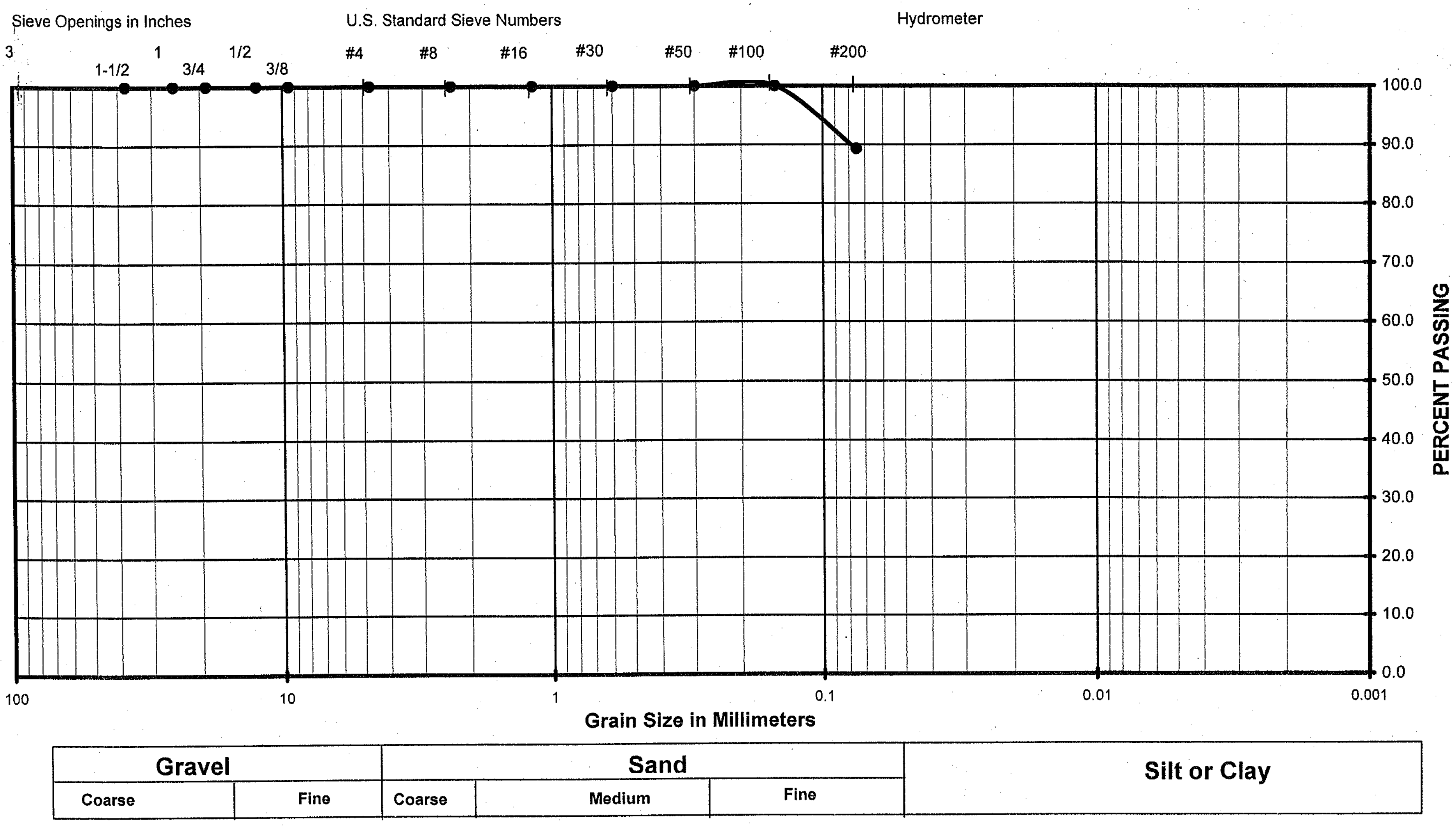
Grain Size Analysis



(Unified Soils Classification)

Project Name	Proposed Northeast Retirement Community
Project Number	2207153
Soil Classification	CL
Sample Number	B4 @ 2-3'

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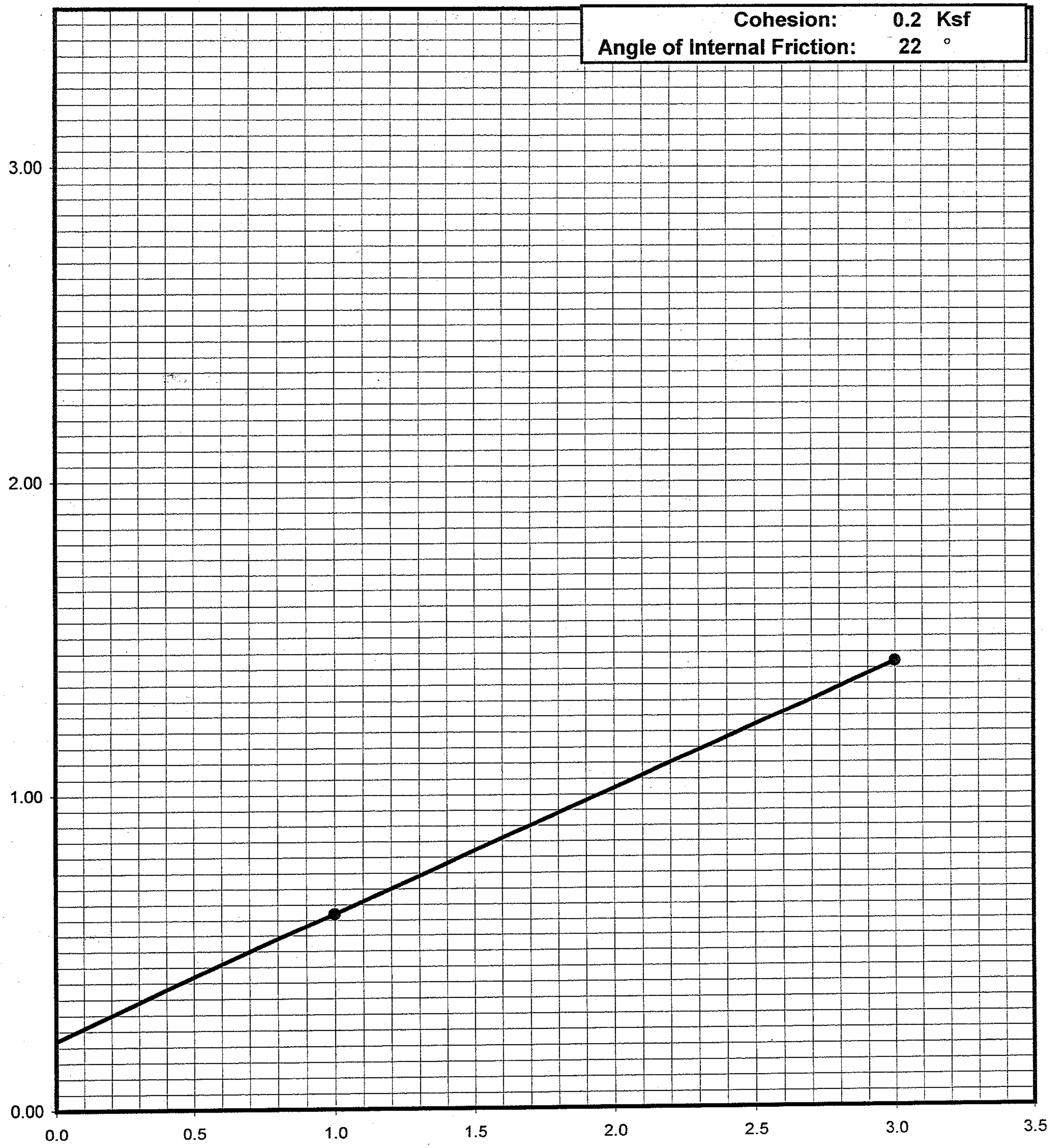
Shear Strength Diagram (Direct Shear)

ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
2207153	B2 @ 2-3'	CL	10/24/2007



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Expansion Index Test

ASTM D - 4829/ UBC Std. 18-2

Project Number : 2207153
Project Name : Proposed Northeast Retirement Community
Date : 10/24/2007
Sample location/ Depth : B1 @ 1-2'
Sample Number : RV#1
Soil Classification : SC-CL

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	577.1		
Weight of Mold, gms	185.2		
Weight of Soil, gms	391.9		
Wet Density, Lbs/cu.ft.	118.2		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	266.4		
Moisture Content, %	12.6		
Dry Density, Lbs/cu.ft.	105.0		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	56.3		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0701

Expansion Index $_{\text{measured}}$ = 70.1
Expansion Index $_{50}$ = 75.3

Expansion Index = 75

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829/ UBC Std. 18-2

Project Number	: 2207153
Project Name	: Proposed Northeast Retirement Community
Date	: 10/24/2007
Sample location/ Depth	: B2 @ 3-4'
Sample Number	: X1
Soil Classification	: CL

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	560.6		
Weight of Mold, gms	183.7		
Weight of Soil, gms	376.9		
Wet Density, Lbs/cu.ft.	113.7		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	265.3		
Moisture Content, %	13.1		
Dry Density, Lbs/cu.ft.	100.5		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	52.2		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.1366

Expansion Index $_{\text{measured}}$ = 136.6

Expansion Index $_{50}$ = 139.3

Expansion Index = 139

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829/ UBC Std. 18-2

Project Number	: 2207153
Project Name	: Proposed Northeast Retirement Community
Date	: 10/24/2007
Sample location/ Depth	: B6 @ 2-3'
Sample Number	: --
Soil Classification	: SC-CL

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	585.0		
Weight of Mold, gms	183.3		
Weight of Soil, gms	401.7		
Wet Density, Lbs/cu.ft.	121.1		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	266.9		
Moisture Content, %	12.4		
Dry Density, Lbs/cu.ft.	107.8		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	59.5		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.082

Expansion Index $_{\text{measured}}$ = 82

Expansion Index $_{50}$ = 90.7

Expansion Index = 91

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

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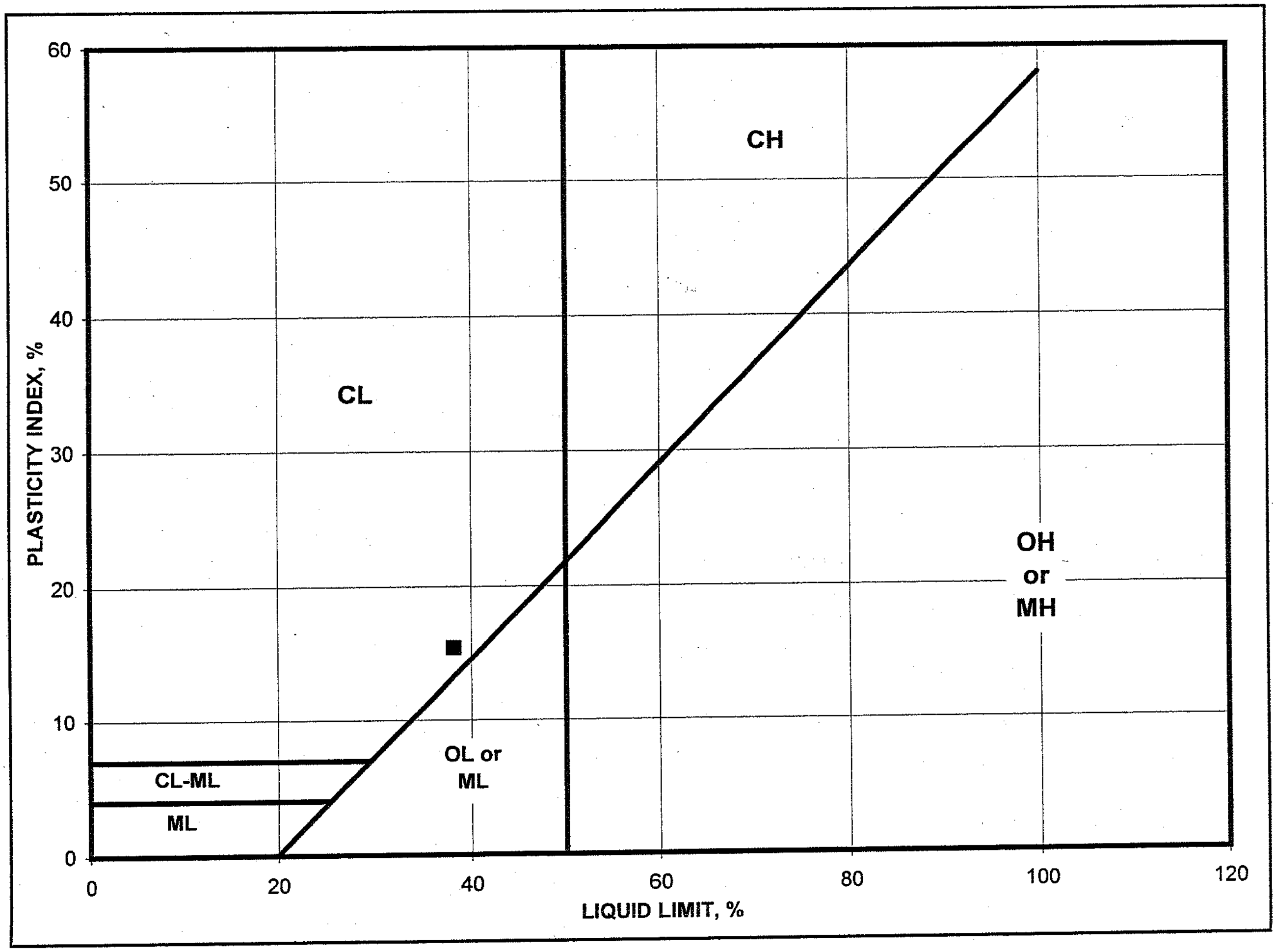
Atterberg Limits Determination
ASTM D - 4318

Project Number : 02207153
Project Name : Proposed Northeast Retirement Community
Date : 10/24/2007
Sample Number : --
Sample Location/Depth : B6 @ 2-3'

	Plastic Limit			Liquid Limit		
Run Number	1	2	3	1	2	3
Weight of Wet Soil & Tare	15.67			21.42	24.70	
Weight of Dry Soil & Tare	14.86			18.67	21.02	
Weight of water	0.81			2.75	3.68	
Weight of Tare	11.31			11.27	11.39	
Weight of Dry Soil	3.55			7.40	9.63	
Water Content	22.8			37.2	38.2	
Number of Blows				31	25	

Plastic Limit : 22.82 **Liquid Limit : 38.21**

Plasticity Index : 15.40
Classification of < #40 : CL
Unified Soil Classification : SC-CL



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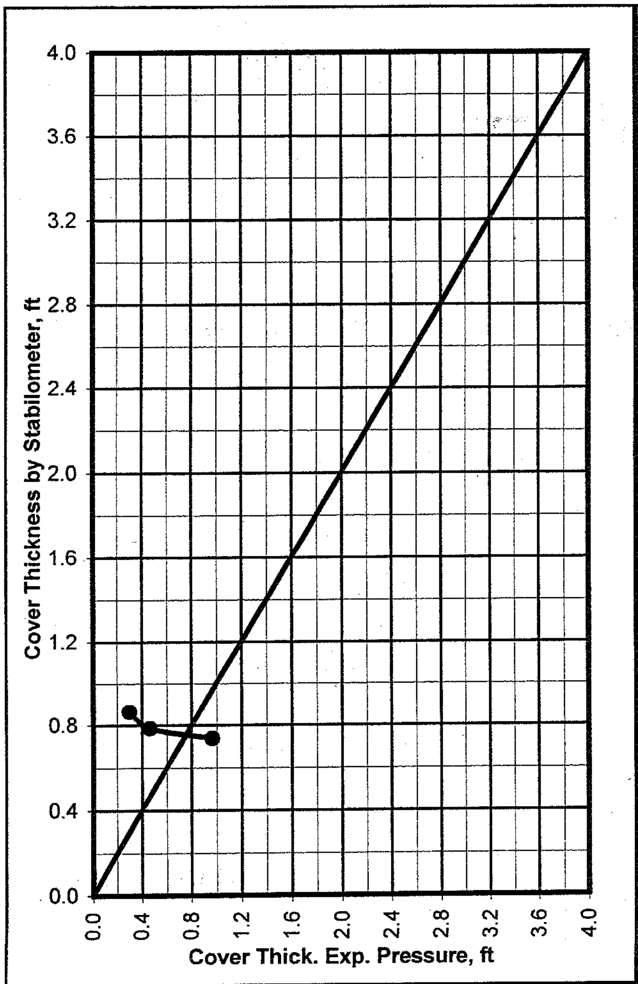
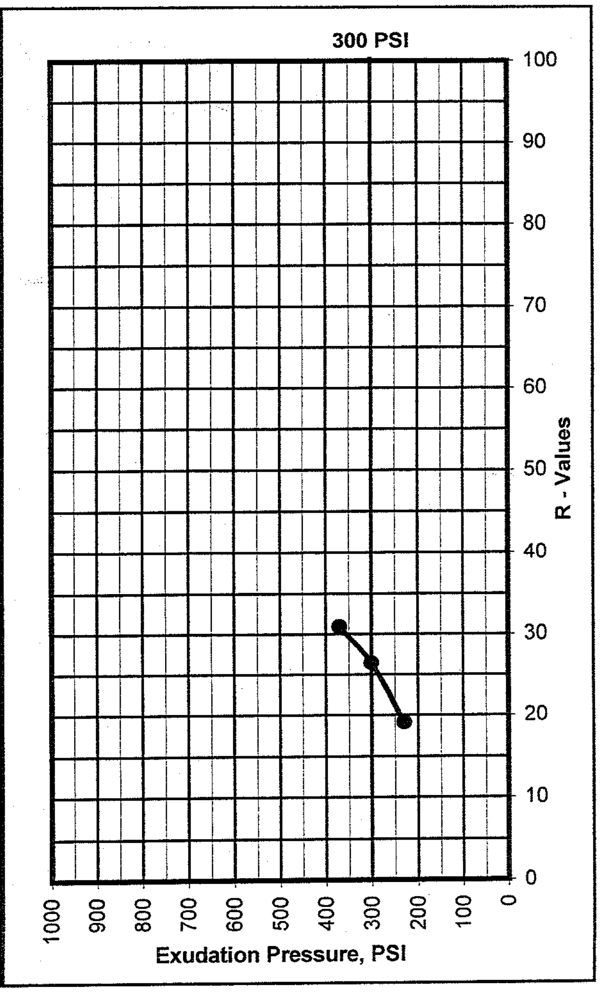
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	2207153
Project Name	:	Proposed Northeast Retirement Community
Date	:	10/16/2007
Sample Location/Curve Number	:	RV#1
Soil Classification	:	SC

TEST	A	B	C
Percent Moisture @ Compaction, %	18.2	20.0	21.1
Dry Density, lbm/cu.ft.	111.9	107.3	106.5
Exudation Pressure, psi	370	300	230
Expansion Pressure, (Dial Reading)	29	14	9
Expansion Pressure, psf	126	61	39
Resistance Value R	31	26	19

R Value at 300 PSI Exudation Pressure	**26**
R Value by Expansion Pressure (TI =): 5	**30**





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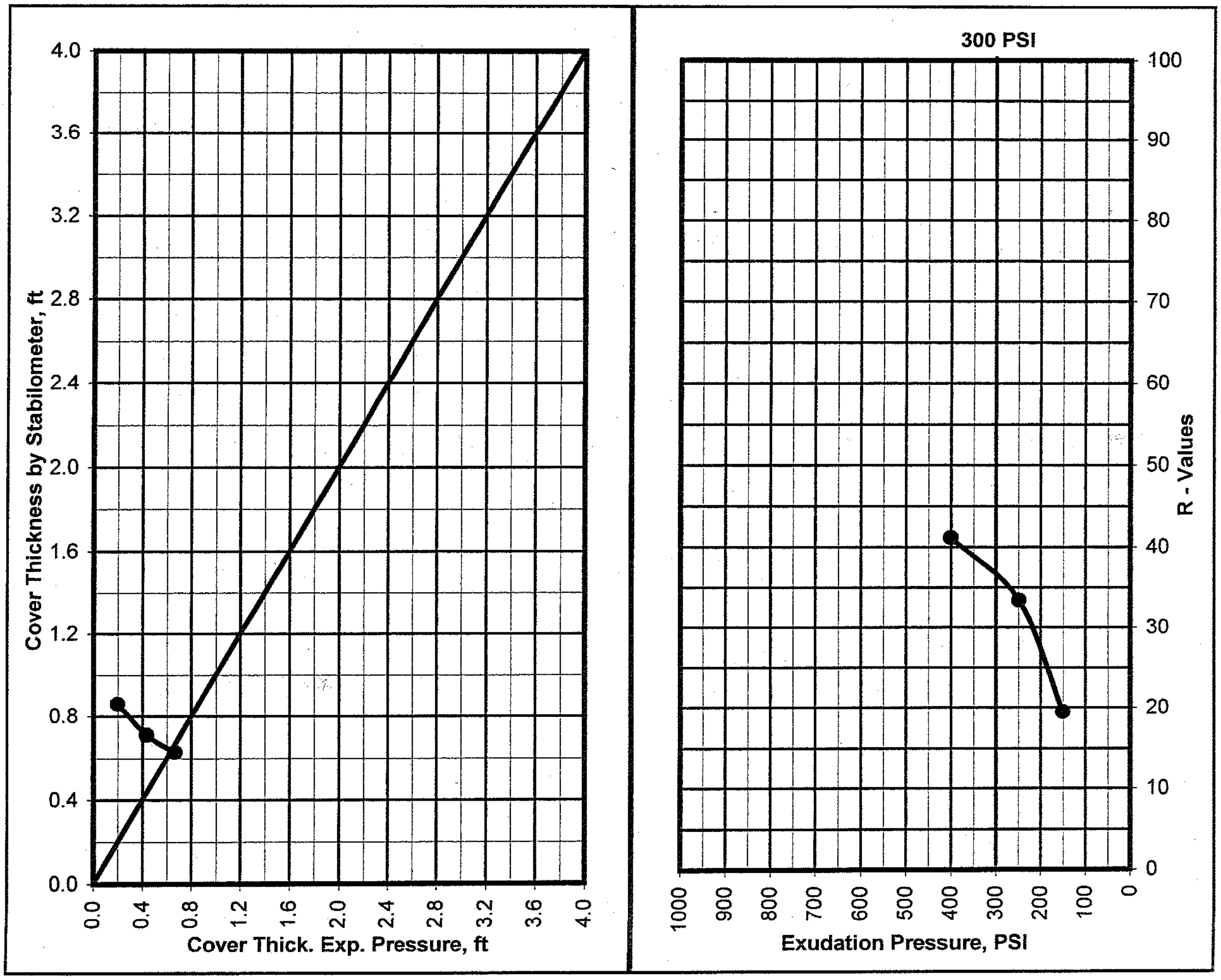
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	2207153
Project Name	:	Proposed Northeast Retirement Community
Date	:	10/16/2007
Sample Location/Curve Number	:	RV#2
Soil Classification	:	SC

TEST	A	B	C
Percent Moisture @ Compaction, %	16.1	17.2	18.2
Dry Density, lbm/cu.ft.	115.5	113.8	112.3
Exudation Pressure, psi	400	249	150
Expansion Pressure, (Dial Reading)	20	13	6
Expansion Pressure, psf	87	56	26
Resistance Value R	41	33	19

R Value at 300 PSI Exudation Pressure	**36**
R Value by Expansion Pressure (TI =): 5	**39**



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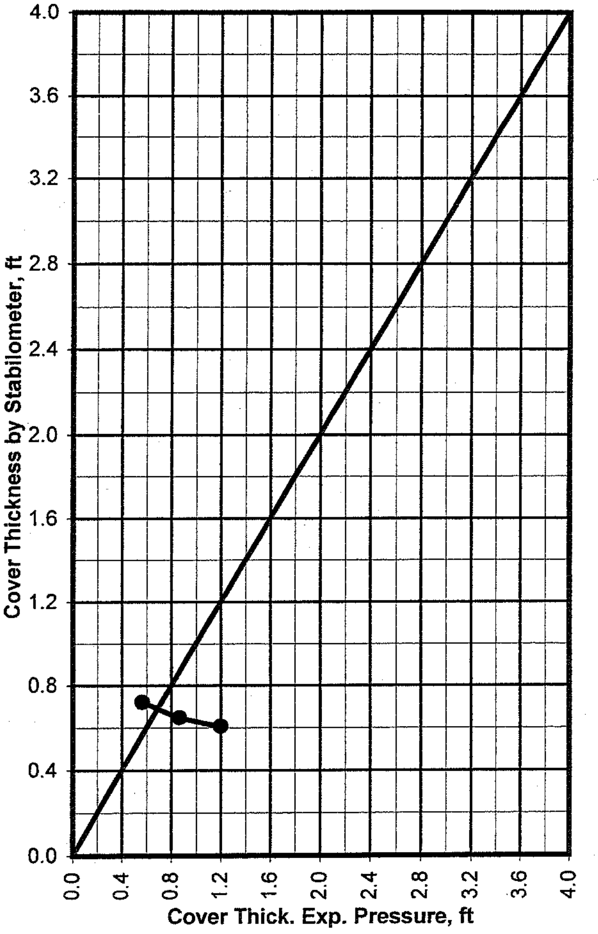
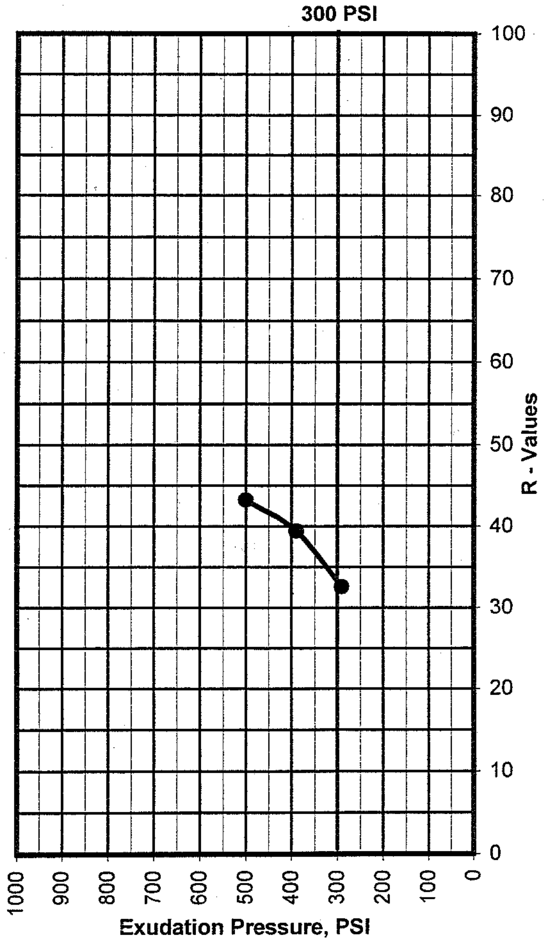
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	2207153
Project Name	:	Proposed Northeast Retirement Community
Date	:	10/16/2007
Sample Location/Curve Number	:	RV#3
Soil Classification	:	SC

TEST	A	B	C
Percent Moisture @ Compaction, %	17.2	16.7	16.2
Dry Density, lbm/cu.ft.	113.6	115.4	115.2
Exudation Pressure, psi	290	390	500
Expansion Pressure, (Dial Reading)	17	26	36
Expansion Pressure, psf	74	113	156
Resistance Value R	32	39	43

R Value at 300 PSI Exudation Pressure	**34**
R Value by Expansion Pressure (TI =): 5	**34**





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General Earthwork Specifications

Appendix B

APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including but not limited to the furnishing of all labor, tools, and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans, and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Inc., hereinafter known as the Soils Engineer and/or Testing Agency. Attainment of design grades when achieved shall be certified by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer or project Architect.

No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to a density not less than 90 percent relative compaction based on ASTM Test Method D1557 or CAL-216, as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be as determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the soil report.

The Contractor shall make his own interpretation of the data contained in said report, and the Contractor shall not be relieved of liability under the Contract documents for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing and the preparations of foundation materials for receiving fill.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter, and all other matter determined by the Soils Engineer to be deleterious or otherwise unsuitable. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent which would permit removal of all roots larger than 1 inch. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavations should not be permitted until all exposed surfaces have been inspected and the Soils Engineer is present for the proper control of backfill placement and compaction. Burning in areas which are to receive fill materials shall not be permitted.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill, building or slab loads shall be prepared as outlined above, excavated/scarified to a depth of 12 inches, moisture-conditioned as necessary, and compacted to 90 percent relative compaction.

Loose soil areas, areas of uncertified fill, and/or areas of disturbed soils shall be moisture-conditioned as necessary and recompacted to 90 percent relative compaction. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill materials shall be approved by the Soils Engineer prior to the placement of any of the fill material.

EXCAVATION: All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. However, compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer.

Both cut and fill areas shall be surface-compacted to the satisfaction of the Soils Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill are as specified.

Appendix C

General Paving Specifications

APPENDIX C

PAVEMENT SPECIFICATIONS

1. **DEFINITIONS** - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term "Standard Specifications": hereinafter referred to is the May 2006 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the applicable tests outlined in the Materials Manual.

2. **SCOPE OF WORK** - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically noted as "Work Not Included."

3. **PREPARATION OF THE SUBGRADE** - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 90 percent. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

4. **UNTREATED AGGREGATE BASE** - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class II material, 1½ inches maximum size. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent.

5. **AGGREGATE SUBBASE** - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class II material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

6. ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10. The mineral aggregate shall be Type B, ½ inch maximum size, medium grading and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning and mixing of the materials shall conform to Section 39.

The prime coat, spreading and compacting equipment and spreading and compacting mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50° F. The surfacing shall be rolled with a combination of steel wheel and pneumatic rollers, as described in Section 39-6. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

7. FOG SEAL COAT - The fog seal (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of Section 37.