Applied Geotechnical Engineering Consultants, Inc.

GEOTECHNICAL INVESTIGATION

PROPOSED BUCKLYN ROSE HEALTHCARE FACILITY

13757 SOUTH REDWOOD ROAD

RIVERTON, UTAH

PREPARED FOR:

BUCKLYN ROSE HEALTHCARE CENTERS, LLC
216 NORTH 1800 EAST
MAPLETON, UTAH 84664
ATTENTION: BOB BUCKLEY

PROJECT NO. 1100212

APRIL 16, 2010

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EXECUTIVE SUMMARY

1. Up to approximately 1 foot of topsoil was encountered in the upper portion of test pits excavated at the site. The natural soil encountered below the topsoil consists of poorly-graded sand with small to moderate amounts of silt and gravel. The sand extends the maximum depth investigated, approximately 12 feet.

2. No free water was encountered in the test pits at the time of our field study to the maximum depth investigated, approximately 12 feet. No free water was encountered in the slotted PVC pipe installed in Test Pit TP-1 to a depth of approximately 12 feet when checked 8 days after excavation.

3. The proposed structure may be supported on spread footings bearing on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil. Footings bearing on the undisturbed natural soil may be designed using an allowable net bearing pressure of 2,000 pounds per square foot. Footings bearing entirely on at least 2 feet of properly compacted structural fill extending down to the undisturbed natural soil may be designed using an allowable net bearing pressure of 3,500 pounds per square foot.

4. The site is located in an area mapped as having a "very low" potential for liquefaction. Based on the subsurface conditions encountered at the site to the depth investigated and our understanding of geologic conditions in the area, it is our professional opinion that liquefaction is not a concern for the site.

5. Geotechnical information relating to foundations, subgrade preparation, materials compaction and pavement is included in the report.

SCOPE

This report presents the results of a geotechnical investigation for the proposed Bucklyn Rose Healthcare Facility to be constructed at approximately 13757 South Redwood Road in Riverton, Utah. The report presents the subsurface conditions encountered, laboratory test results and recommendations for design and construction at the site. The study was conducted in general accordance with our proposal dated March 26, 2010.

Field exploration was conducted to obtain information on the subsurface conditions. Samples obtained from the field investigation were tested in the laboratory to determine physical and engineering characteristics of the on-site soil. Information obtained from the field and laboratory was used to define conditions at the site for our engineering analysis and to develop recommendations for the proposed foundations and pavement.

This report has been prepared to summarize the data obtained during the study and to present our conclusions and recommendations based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to construction are included in the report.

SITE CONDITIONS

There are no permanent structures or pavements on the site. A large concrete slab is located in the north central portion of the site. The slab is covered with lumber. An unpaved road extends from the northwest corner to the east central portion of the site. There is an unlined irrigation ditch that extends along the south side of the site.

Vegetation at the site consists primarily of trees, grass and weeds. Piles of debris were encountered across the site. The debris piles consist primarily of soil, trash, lumber and broken concrete.

The ground surface at the site is relatively flat with a gentle slope down to the southeast. The US Geological Survey Quadrangle map indicates the elevation for the site is approximately 4,450 above mean sea level.

There are is a single-story, Credit Union building with asphalt paved parking northwest of the project site. There are single-family residences with landscaping areas along the north and northeast sides of the site. An undeveloped residential subdivision with asphalt paved roads extends along the east side of the site. Undeveloped land similar to the project site extends along the west side of the site. Redwood Road, which is a wide asphalt paved road, is located further to the west. Bangerter Highway boarders the site to the south.

FIELD STUDY

The field study was conducted on April 7, 2010. Three test pits were excavated at the approximate locations indicated on Figure 1 using a rubber-tired backhoe. The test pits were logged and soil samples obtained by a representative from AGEC. Logs of the subsurface conditions encountered in the test pits are graphically shown on Figure 2.

The test pits were backfilled without significant compaction. The backfill in the test pits should be properly compacted where it will support the proposed structure, slabs or pavement.

SUBSURFACE CONDITIONS

Up to approximately 1 foot of topsoil was encountered in the upper portion of test pits excavated at the site. The natural soil encountered below the topsoil consists of poorly-graded sand with small to moderate amounts of silt and gravel. The sand extends the maximum depth investigated, approximately 12 feet.

A description of the various materials encountered in the test pits follows:

Topsoil - The topsoil consists of silty sand with small to moderate amounts of gravel. It is slightly moist to moist, dark brown and contains roots and organics.

Poorly-Graded Sand with Silt - The poorly-graded sand contains small to moderate amounts of silt and some gravel up to approximately 2 inches in size. The sand is medium dense, slightly moist to moist and brown.

Laboratory tests conducted on samples of the sand indicate that it has natural moisture contents ranging from 3 to 11 percent and a natural dry density 107 pounds per cubic foot (pcf). Results of a gradation test conducted on relatively small sample of the sand are presented on Figure 3.

Results of the laboratory tests are summarized on Table I and are included on the logs of exploratory test pits.

SUBSURFACE WATER

No free water was encountered in the test pits at the time of our field study to the maximum depth investigated, approximately 12 feet. No free water was encountered in the slotted PVC pipe installed in Test Pit TP-1 to a depth of approximately 12 feet when checked 8 days after excavation.

PROPOSED CONSTRUCTION

We understand that the proposed healthcare facility is planned to be a single-story, wood-frame, slab-on-grade structure. The proposed building is planned to be approximately

20,000 square feet in size. We have assumed building loads will consist of wall loads of up to 3 kips per lineal foot and column loads of up to 50 kips.

We anticipate paved parking areas will be constructed for the project. We have assumed traffic for pavement areas consisting predominantly of relatively light passenger vehicles with two delivery trucks per day and two garbage trucks per week.

If the proposed construction, building loads or traffic is significantly different from what is described above we should be notified to reevaluated the recommendations given.

RECOMMENDATIONS

Based on the subsurface conditions encountered, laboratory test results and our understanding of the proposed construction, the following recommendations are given:

A. Site Grading

Final site grading plans were not available at the time of our investigation. We anticipate that there will be less than 3 feet in elevation change at the site.

Topsoil, organics, unsuitable fill, debris and other deleterious materials should be removed from below proposed building and pavement areas.

1. Excavation

   Excavation at the site can be accomplished with typical excavation equipment. Care should be taken to minimize disturbance of the soils to remain below the proposed structure.

2. Materials

Listed below are materials recommended for imported structural fill.

Fill to Support	Recommendations
Footings	Non-expansive granular soil Passing No. 200 Sieve < 35% Liquid Limit < 30% Maximum size 4 inches
Floor Slab (Upper 4 inches)	Sand and/or Gravel Passing No. 200 Sieve < 5% Maximum size 2 inches
Slab Support	Non-expansive granular soil Passing No. 200 Sieve < 50% Liquid Limit < 30% Maximum size 6 inches

Materials placed as fill to support the proposed structure should consist of non-expansive granular soil. The on-site sand meeting the criteria above may used as fill below structures, as site grading fill, utility trench backfill and in pavement areas if the topsoil, organics and other deleterious material are removed or it may be used in landscape areas.

The on-site soil may require moisture conditioning (wetting or drying) prior to use as fill. Drying of the soil may not be practical during cold or wet times of the year.

3. Compaction

Compaction of materials placed at the site should equal or exceed the minimum densities as indicated below when compared to the maximum dry density as determined by ASTM D 1557.

Fill To Support	Compaction
Foundations	≥ 95%
Concrete Slabs and Pavement	≥ 90%
Landscaping	≥ 85%
Retaining Wall Backfill	85 - 90%

To facilitate the compaction process, fill should be compacted at a moisture content within 2 percent of the optimum moisture content.

Base course should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D 1557.

Fill and pavement materials placed for the project should be frequently tested during construction for compaction. Fill should be placed in thin enough lifts to allow for proper compaction.

4. Drainage

The ground surface surrounding the proposed structure should be sloped away from the building in all directions. Roof downspouts and drains should discharge beyond the limits of backfill.

The collection and diversion of drainage away from the pavement surface is important to the satisfactory performance of the pavement section. Proper drainage should be provided.

B. Foundations

1. Bearing Material

With the proposed construction and the subsurface conditions encountered, the structure may be supported on spread footings bearing on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil. Structural fill should extend out away from the edge of the footings at least a distance equal to the depth of fill beneath footings.

Unsuitable fill, topsoil, organics, debris and other deleterious materials should be removed from below proposed foundation areas.

2. Bearing Pressures

Footings bearing on the undisturbed natural soil may be designed using an allowable net bearing pressure of 2,000 pounds per square foot (psf). Footings bearing on at least 2 feet of properly compacted structural fill extending down to the undisturbed natural soil or on at least 2 feet of undisturbed natural gravel, may be designed using an allowable net bearing pressure of 3,500 psf.

Footings should have a minimum width of 1½ feet and a minimum depth of embedment of 1 foot.

3. Temporary Loading Conditions

The allowable bearing pressures indicated above may be increased by one-half for temporary loading conditions such as wind or seismic loads.

4. Settlement

Based on the subsurface conditions encountered and the assumed building loads, we estimate that total settlement for foundations designed and

constructed as described above will be on the order of ¾ inch or less. Differential settlement is estimated to be on the order of ½ inch or less.

5. Frost Depth

Exterior footings and footings beneath unheated areas should be placed at least 30 inches below grade for frost protection.

6. Foundation Base

The base of footing excavations should be cleared of loose or deleterious material prior to structural fill or concrete placement.

7. Construction Observation

A representative of the geotechnical engineer should observe footing excavations prior to structural fill or concrete placement.

C. Concrete Slab-on-Grade

1. Slab Support

Concrete slabs may be supported on the undisturbed natural soil or on compacted structural fill extending down to the natural undisturbed soil. Unsuitable fill, topsoil, organics, debris and other deleterious materials should be removed from below proposed floor slabs.

2. Underslab Sand and/or Gravel

A 4-inch layer of free draining sand and/or gravel (less than 5 percent passing the No. 200 sieve) should be placed below the concrete slabs for ease of construction and to promote even curing of the slab concrete. Some of the on-site sand and gravel may meet this criteria.

3. Vapor Barrier

A vapor barrier should be placed under the concrete floor if the floor will receive an impermeable floor covering. The barrier will reduce the amount of water vapor passing from below the slab to the floor covering.

D. Lateral Earth Pressures

1. Lateral Resistance for Footings

Lateral resistance for spread footings placed on the natural soil or on compacted structural fill is controlled by sliding resistance between the footing and the foundation soils. A friction value of 0.45 may be used in design for ultimate lateral resistance for footings.

2. Subgrade Walls and Retaining Structures

The following equivalent fluid weights are given for design of subgrade walls and retaining structures. The active condition is where the wall moves away from the soil. The passive condition is where the wall moves into the soil and the at-rest condition is where the wall does not move. The values listed below assume a horizontal surface adjacent the top and bottom of the wall.

Soil Type	Active	At-Rest	Passive
Clay & Silt	50 pcf	65 pcf	250 pcf
Sand & Gravel	40 pcf	55 pcf	300 pcf

3. Seismic Conditions

Under seismic conditions, the equivalent fluid weight should be increased by 29 pcf for active and at-rest conditions and decreased by 29 pcf for the passive condition. This assumes a short period spectral response acceleration of 1.23g for a 2 percent probability of exceedance in a 50-year period (IBC 2006 and 2009).

4. Safety Factors

The values recommended above assume mobilization of the soil to achieve soil strength. Conventional safety factors used for structural analysis for such items as overturning and sliding resistance should be used in design.

E. Seismicity, Faulting and Liquefaction

1. Seismicity

Listed below is a summary of the site parameters for the 2006 and 2009 International Building Code.

a.	Site Class	D
b.	Short Period Spectral Response Acceleration, S_S	1.23g
c.	One Second Period Spectral Response Acceleration, S_1	0.52g

2. Faulting

There are no mapped active faults extending through the project site. The closest mapped fault which is considered active is the Wasatch Fault located approximately 5.1 miles to the east of the site (Black and others, 2003).

3. Liquefaction

The site is located in an area mapped as having a "very low" potential for liquefaction (Salt Lake County, 2002). Based on the subsurface conditions encountered at the site to the depth investigated and our understanding of geologic conditions in the area, it is our professional opinion that liquefaction is not a concern for the site.

F. Water Soluble Sulfates

One sample of the natural soil was tested in the laboratory for water soluble sulfate content. Test results indicate there is less than 0.1 percent water soluble sulfate in

the samples tested. Based on the results of the test and published literature, the natural soil possesses a negligible sulfate attack potential on concrete. No special cement type is needed for concrete placed in contact with the natural soil. Other conditions may dictate the type of cement to be used in concrete for the project.

G. Pavement

Based on the subsoil conditions encountered, laboratory test results and the assumed traffic as indicated in the Proposed Construction section of the report, the following pavement support recommendations are given:

1. Subgrade Support

   We anticipate that the subgrade material will consist of silty sand. We have assumed a California Bearing Ratio (CBR) value of 5 percent which assumes a silty sand subgrade.

2. Pavement Thickness

   Based on the subsurface conditions encountered at the site, the anticipated traffic as described in the Proposed Construction section of this report, a design life of 20 years for flexible pavement and 30 years for rigid pavement and methods presented by the Utah Department of Transportation, the following pavement sections are calculated.

   A flexible pavement section consisting of 3 inches of asphaltic concrete overlying 6 inches of high quality base course may be used for the project.

   Alternatively, a rigid pavement section consisting of 5 inches of Portland cement concrete placed above a properly prepared subgrade may be considered.

3. Pavement Materials and Construction

a. Flexible Pavement (Asphaltic Concrete)

The pavement materials should meet the specifications for the applicable jurisdiction. Other materials may be considered for use in the pavement section. The use of other materials may result in the need for different pavement material thicknesses.

b. Rigid Pavement (Portland Cement Concrete)

The rigid pavement thickness assumes that the pavement will have aggregate interlock joints and that a concrete shoulder or curb will be provided.

The pavement materials should meet the specifications for the applicable jurisdiction. The pavement thickness indicated above assumes that the concrete will have a 28-day compressive strength of 4,000 pounds per square inch. Concrete should be air entrained with approximately 6 percent air. Maximum allowable slump will depend on the method of placement but should not exceed 4 inches.

4. Jointing

Joints for concrete pavement should be laid out in a square or rectangular pattern. Joint spacings should not exceed 30 times the thickness of the slab. The joint spacings indicated should accommodate the contraction of the concrete and under these conditions steel reinforcing will not be required. The joints should be approximately one-fourth of the slab thickness.

LIMITATIONS

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client for design purposes. The conclusions and recommendations included within the report are based on the information obtained from the test pits excavated at the approximate locations indicated on Figure 1 and the data obtained from laboratory testing. Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted. If the subsurface conditions or groundwater level is found to be significantly different from what is described above, we should be notified to reevaluate the recommendations given.

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REFERENCES

Black, B.D., Hecker, S., Hylland, M.D., Christenson, G.E., and McDonald, G.N., 2003; Quaternary fault and fold database and map of Utah; Utah Geological Survey Map 193DM.

International Building Code, 2006 and 2009; International Code Council, Inc., Falls Church, Virginia.

Salt Lake County, 2002; Surface Rupture and Liquefaction Potential Special Study Areas Map, Salt Lake County, Utah, adopted March 31, 1989, updated March 2002, Salt Lake County Public Works - Planning Division, 2001 South State Street, Salt Lake City, Utah.

USGS Aerial Photograph 2009

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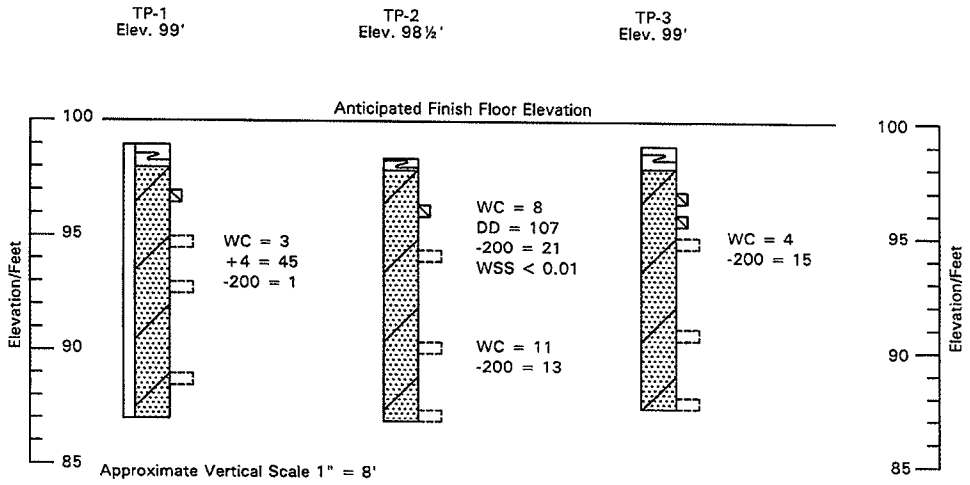
Approximate Scale
1 inch = 200 feet

1100212	AGES	***Locations of Test Pits***	***Figure 1***



LEGEND:

Topsoil; silty sand, small to moderate amounts of gravel, slightly moist to moist, dark brown, roots and organics.

Poorly Graded Sand with Silt (SP-SM); small to moderate amounts of silt, some gravel up to approximately 2 inches in size, medium dense, slightly moist to moist, brown.

Indicates relatively undisturbed hand drive sample taken.

Indicates disturbed sample taken.

Indicates slotted 1½ inch PVC pipe installed in the test pit to the depth shown.

NOTES:

1. Test pits were excavated on April 7, 2010 with a rubber-tired backhoe.
2. Locations of test pits were measured approximately by pacing from features shown on the site plan provided.
3. Elevations of test pits were measured by hand level and refer to the bench mark shown on Figure 1.
4. The test pit locations and elevations should be considered accurate only to the degree implied by the method used.
5. The lines between the materials shown on the test pit logs represent the approximate boundaries between material types and the transitions may be gradual.
6. No free water was encountered in the test pits at the time of excavation.
7. WC = Water Content (%);
   DD = Dry Density (pcf);
   +4 = Percent Retained on the No. 4 Sieve;
   -200 = Percent Passing No. 200 Sieve;
   WSS = Water Soluble Sulfates (%).

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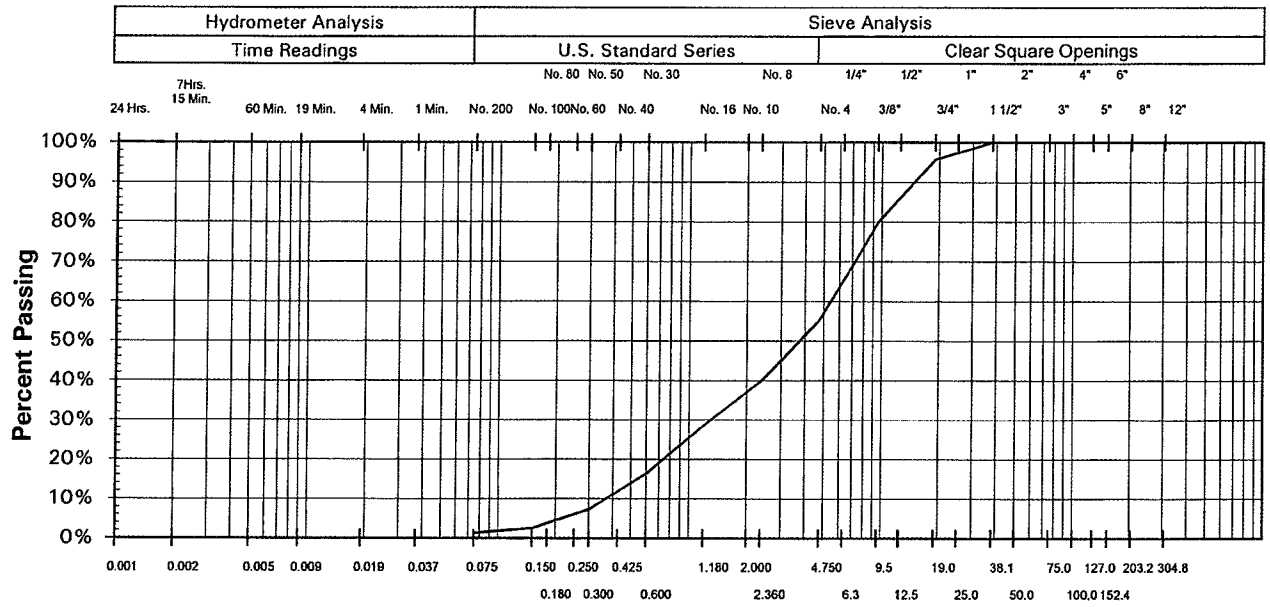
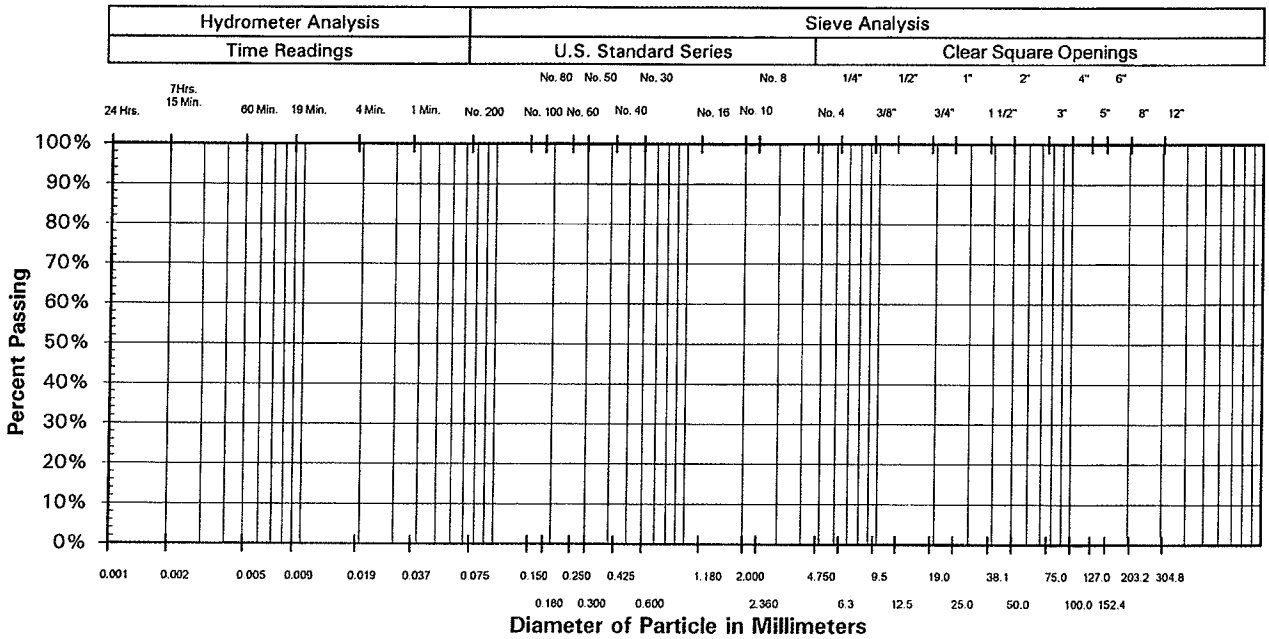


Clay to Silt	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

Gravel	45%	Liquid Limit	-
Sand	54%	Plasticity Index	-
Silt and Clay	1%	Sample Location	TP-1 @ 4 feet
Sample Description	Poorly Graded Sand with Gravel (SP)		



Clay to Silt	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

Gravel	-	Liquid Limit	-
Sand	-	Plasticity Index	-
Silt and Clay	-	Sample Location	
Sample Description			

Project No. 1100212 **GRADATION TEST RESULTS** Figure 3

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TABLE I

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER 1100212

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	WATER SOLUBLE SULFATE (%)	SAMPLE CLASSIFICATION
TEST PIT	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
TP-1	4	3		45	54	1					Poorly Graded Sand with Gravel (SP)
TP-2	2	8	107			21				<0.01	Silty Sand (SM)
	8	11				13					Silty Sand (SM)
TP-3	4	4				15					Silty Sand (SM)