GEOTECHNICAL INVESTIGATION
LOWE'S AND RETAIL
12600 S. BANGERTER HIGHWAY
RIVERTON, UTAH

Project No. 1506-7A

Prepared For

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May 10, 2005

WASATCH
ENVIRONMENTAL
Environmental Science and Engineering

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1506-7ARivertonGeo

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SUBJECT: Geotechnical Investigation
Lowe's and Retail
Lot 1: (Lowe's), Lots 2 and 4: (Retail), Lots 3 and 5: (ROW) and Detention Pond
12600 South Bangerter Highway
Riverton City, Utah

In accordance with your request, we have performed a geotechnical investigation for the subject site. The accompanying report presents the results of our field investigation and engineering analysis. The soil and foundation conditions are discussed and recommendations for the geotechnical engineering aspects of the site development are presented.

Our services consist of professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

If you have any questions concerning our findings, please call.

Sincerely,

WASATCH ENVIRONMENTAL, INC.

REGISTERED PROFESSIONAL ENGINEER
165613-2202
LESLIE H. PENNINGTON JR.
STATE OF UTAH

Les Pennington, P.E.
President

LP/ww

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(1) CLC Associates, Inc., Salt Lake City, UT
(1) Key Bank Real Estate Capital, Las Vegas, NV
(1) The Merrill Companies, Woodland Hills, CA
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(1) Freeman, Freeman & Smiley, Los Angeles, CA

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Figure 1 Site Plan

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GEOTECHNICAL INVESTIGATION
LOWE'S AND RETAIL
12600 S. BANGERTER HIGHWAY
RIVERTON, UTAH

1. INTRODUCTION

This report presents the results of our geotechnical investigation for the 25-acre Lowe's and Retail commercial development to be located at 12600 South Bangerter Highway in Riverton, Utah. The development includes a Lowe's Superwide on Lot 1, Retail Buildings A through F and a restaurant on Lots 2 and 4, and two perimeter roads designated as Lot 3 and Lot 5. The purpose of the geotechnical investigation was to evaluate the subsurface soil conditions at the site and to provide recommendations concerning the soil and foundation engineering aspects of the proposed development.

It is our understanding that the total building area for the Lowe's Superwide will be approximately 137,000 square feet. The maximum anticipated column and wall loads are 100 kips and 6 kips, respectively. Slab loading is anticipated to be 300 psf. The six retail stores and the restaurant will total approximately 65,400 square feet. Only minor cuts and fills are anticipated to attain finish site grades. Paved parking for a total of 596 stalls will be provided for the Lowe's and 420 stalls for the retail buildings and restaurant. The anticipated concrete and asphalt pavement design factors for both heavy and light duty traffic are 20 to 25 trucks per day and 2,500 vehicles per day, for a 15-year life. A 1.23-acre detention pond will be constructed in the northeast portion of the property.

2. SCOPE

The scope of work performed in this investigation included a site reconnaissance, subsurface exploration, engineering analysis of the field and laboratory data, and the preparation of this report. The data obtained and the analyses performed were for the purpose of providing design and construction criteria for site earthwork, building foundations, slab-on-grade construction, and pavements.

3. SITE CONDITIONS

3.1 Surface

The property has an elevation of approximately 4,625 feet above mean sea level. The property slopes gently to the east/northeast. The subject site is currently used for growing alfalfa and grain. Other than small concrete irrigation structures such as weirs and headgates, no structures are present on the subject site.

3.2 Subsurface

A subsurface investigation was performed on April 14, 15, 18, and 19, 2005. Twelve exploratory borings (LB1 through LB12) were drilled within the Lowe's building area, and six borings (LP1 through LP6) were drilled in the Lowe's parking area. Twelve borings (R1 through R12) were drilled in the Retail buildings area and three borings (RP1 through RP3) were drilled in the Retail parking area. Eight borings (ROW1 through ROW8) were drilled in the proposed perimeter streets, and two borings (DP1 and DP2) were drilled in the proposed detention pond area. The borings were drilled with a truck-mounted hollow-stem auger to depths ranging between 5 and 25 feet. Standard and modified penetration tests were conducted at the depths indicated on the boring logs provided in Appendix A. The approximate boring locations are shown on the Site Plan (Figure 1).

Lowe's Building

The soils encountered in the borings in the Lowe's building area (LB1 through LB12) consisted predominately of a layer of soft to stiff silty clay (CL) at the surface varying in thickness from six inches to 3-1/2 feet. The silty clay was underlain by coarser grained soils consisting primarily of medium dense to dense mixtures of silts (ML), sands (SM, SP), and gravels (GP) to the depth explored in the borings. The borings drilled on the northern and western portions

of the building (LB1, LB2, LB5, LB7, LB9, LB10, and LB12) encountered clayey silt (ML) and silty clay (CL) interlayered with the coarser sands and gravels. Drilling refusal was met on cobbles in borings LB3, LB8, and LB11, at depths of 8, 14-1/2, and 12 feet, respectively.

Lowe's Parking

The soils encountered in the borings in the Lowe's parking area (LP1 through LP6) consisted primarily of stiff silty clay (CL). Bulk samples were collected from borings LP2 and LP4. The silty clay collected from boring LP2 had a CBR value of 10, maximum density (Proctor) of 116.8 pcf at an optimum moisture content of 13.8 percent.

Retail Buildings and Restaurant

The soils encountered in the borings in the Retail buildings and Restaurant areas (R1 through R12) consisted predominately of a layer of firm to stiff sandy or silty clay (CL) at the surface varying in thickness from one foot to 13-1/2 feet. In most of the borings the silty clay was underlain by dense to very dense gravel (GP, GC). Exceptions were boring R3, R4, R5, and R8, on the eastern portion, which encountered interlayered deposits of medium dense silty and clayey sand (SM, SC), stiff to hard silty clay (CL), and dense gravel (GP). Drilling refusal was met in R6 at 6 feet and in R7 at 9 feet.

Retail Parking

The soils encountered in the borings in the Retail parking area (RP1, RP2, and RP3) consisted primarily of stiff silty clay (CL). Bulk samples were collected from all the borings. The silty clay collected from boring RP1 had a CBR value of 10 and a maximum density of 114.1 pcf at an optimum moisture content of 15.2 percent.

Right-of-Way

The soils encountered in the borings in the Right-of-Way (ROW1 through ROW8) consisted primarily of stiff silty clay (CL). Bulk samples were collected from ROW2, ROW3, ROW5, and ROW8. The silty clay collected from boring ROW5 had a CBR value of 39 and a maximum density of 125.6 pcf at an optimum moisture content of 10.2 percent. The silty clay collected from boring ROW8 had a CBR value of 15 and a maximum density of 117.7 pcf at an optimum moisture content of 12.8 percent.

Detention Pond

The soils encountered in the borings in the Detention Pond (DP1 and DP2) consisted primarily of firm to stiff silty clay (CL) and clayey silt (ML) underlain by medium dense sand (SP) and clayey gravel (GC) in boring DP1and interlayered clayey silt (ML), fine sand (SP), silty clay (CL), and silty gravel (GM) in DP2. Drilling refusal was met at 7 feet in DP1. These soil conditions are suitable for construction of the detention pond in accordance with Riverton City Standards and Specifications Manual including maximum 3:1 side slopes and maximum depth of 4 feet.

3.3 Groundwater

Free water was not encountered in any of the exploratory borings drilled on the site. Fluctuations in the local groundwater table may occur due to variations in surface topography, subsurface stratification, rainfall, and other factors which may not have been evident at the time of our field investigation.

3.4 Seismicity and Liquefaction

Based on a review of some available published information including the Earthquake Fault Map of a portion of Salt Lake County, there are no faults known to pass through the site. Faults generally considered to have the most potential for earthquake damage include the generally north-south trending Granger Fault and the Taylorsville Fault which are located approximately 20.3 and 21 miles (32.7 and 33.8 kilometers) north of the site. The Wasatch Fault Zone is located approximately 16 miles (25.7 kilometers) to the east.

The proposed commercial development is located within Seismic Zone 3 as defined on the Seismic Zone Map of the United States in the Uniform Building Code.

The development is located in an area mapped as having a "very low" potential for liquefaction.[1] The "very low" designation indicates an approximate probability of less than 5 percent that the critical ground acceleration needed to induce liquefaction would occur within a 100-year time frame. The lack of shallow groundwater and the medium dense to dense nature of site soils also indicate the site would not be subject to liquefaction during an earthquake.

Although research on earthquake prediction has greatly increased in recent years, geologists and seismologists have not yet reached the point where they can predict when and where an earthquake will occur. Nevertheless, on the basis of current technology, it is reasonable to assume that the proposed structures will be subject to the effects of at least one moderate earthquake during their design life. During such an earthquake, the danger from fault offset through the site is remote, but moderate to strong ground shaking is likely to occur.

Based on a study published in the February 1996 Journal of Geophysical Research, the probability of a magnitude seven or greater earthquake occurring within the next 100 years along the Salt Lake City segment of the Wasatch Fault may be as high as 57 percent.

Listed below is a summary of seismic site categorization procedure parameters according to section 1636 of the 1997 Uniform Building Code (UBC):

Seismic Zone 3	
Soil Profile Type	S_D
Seismic Source Type	B
Closest Distance to Known Seismic Source	25.7 Km
Near Source Factor N_a	1.0
Near Source Factor N_v	1.0

3.5 pH

The pH of soil collected from boring LB7 from one to three feet was 8.94 standard units. See concrete recommendations presented in Section 4.2.3 "Building Floor Slabs" and Section 4.2.4 "Exterior Slabs-On-Grade."

4. CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical engineering standpoint, it is our opinion that the site is suitable for construction of the proposed structures provided the conclusions and recommendations presented in this report are incorporated into the design and construction of the project.

Detailed earthwork and foundation recommendations are presented in the following paragraphs. The opinions, conclusions and recommendations presented in this report are contingent upon Wasatch Environmental, Inc., being retained to review the final plans and specifications as they are developed and to observe the site earthwork and installation of foundations.

4.1 Earthwork

4.1.1 Clearing and Stripping

The site should be cleared of all obstructions including any miscellaneous trash and debris that may be present at the time of construction. After clearing, the ground surface should be stripped of all surface vegetation. The stripping depths required to satisfactorily remove all

[1] Surface Fault Rupture and Liquefaction Potential Special Study Area (Map 1:48,000)., compiled by Craig, V. Nelson, Salt Lake County Public Works, 1989.

vegetation should be determined in the field by our representative at the time of construction. The cleared and stripped materials should be disposed of off-site.

4.1.2 Subgrade Preparation

After the site has been cleared and stripped, the exposed subgrade soils in those areas to receive fill and/or building improvements or pavements should be scarified to a depth of 8 inches, moisture conditioned, and compacted to the requirements of Item 4.1.4, "Compaction."

4.1.3 Materials for Fill

All existing on-site soils with an organic content of less than three percent by volume are suitable for use as fill. Imported fill material should be a non-expansive, granular soil with a plasticity index of 12 or less. In addition, both imported and existing on-site materials for use as fill should not contain rocks or lumps over 6 inches in greatest dimension and not more than 15 percent larger than 2-1/2 inches. Structural fill should be free of frozen materials, sod, or any other deleterious materials.

4.1.4 Compaction

All fill should be compacted to a minimum degree of compaction of 90 percent based upon ASTM Designation D-1557. Fill material should be spread and compacted in uniform horizontal lifts not exceeding 8 inches in uncompacted thickness. Before compaction begins, the fill should be brought to a water content that will permit proper compaction by either 1) aerating the fill if it is too wet, or 2) moistening the fill with water if it is too dry. Each lift should be thoroughly mixed before compaction to ensure a uniform distribution of moisture.

4.1.5 Trench Backfill

Pipeline trenches should be backfilled with compacted fill. Backfill materials should be placed in lift thicknesses appropriate to the type of compaction equipment utilized and compacted to a minimum degree of compaction of 90 percent by mechanical means. In pavement areas, that portion of the trench backfill within the pavement section should conform to the material and compaction requirements of the adjacent pavement section.

4.1.6 Surface Drainage

Positive surface gradients should be provided adjacent to the buildings; roof gutters and downspouts should be installed so as to direct water away from foundations and slabs toward suitable discharge facilities. Ponding of surface water should not be allowed, especially adjacent to buildings or on pavements.

4.1.7 Construction Observation

Variations in soil and geologic conditions are possible and may be encountered during construction. In order to permit correlation between the preliminary soil and geologic data and the actual conditions encountered during construction and so as to assure conformance with the plans and specifications as originally contemplated, it is essential that we be retained to perform on-site review during the course of construction.

All earthwork should be performed under the observation of our representative to assure proper site preparation, selection of satisfactory fill materials, as well as placement and compaction of the fills. Sufficient notification prior to earthwork operations is essential to make certain that the work will be properly observed.

4.2 Foundations

4.2.1 Footings

We recommend that the proposed buildings be supported on conventional, individual-spread and/or continuous footing foundations bearing on undisturbed natural soil and/or well-compacted structural fill. All exterior footings should be founded at least 30 inches below the lowest adjacent exterior grade. Interior footings should be founded a minimum of 18 inches below the lowest adjacent grade.

At the recommended depths, footings may be designed for allowable bearing pressures of 3,500 pounds per square foot (psf) for combined dead and live loads and 4,500 psf for all loads including wind or seismic. The footings should, however, have a minimum width of 12 inches. All continuous footings should contain top and bottom reinforcement to provide structural continuity and to permit spanning of local irregularities.

Settlements under building loads are expected to be within tolerable limits for the proposed structures. For footings designed in accordance with the recommendations presented in the preceding paragraphs we anticipate that post-construction differential settlements between adjacent columns and/or walls would not exceed ½ inch.

In order to assure that footings are founded on soils of sufficient load bearing capacity, it is essential that our representative inspect the footing excavations prior to the placement of reinforcing steel or concrete.

4.2.2 Lateral Loads

Lateral load resistance for footing foundations may be developed in friction between the foundation bottoms and the supporting subgrade. An allowable friction coefficient of 0.35 is considered applicable. An additional allowable passive resistance equal to an equivalent fluid weight of 350 pounds per cubic foot acting against the foundations may be used in design provided the footings are poured neat against the adjacent undisturbed native soils and/or compacted fill materials.

4.2.3 Building Floor Slabs

Concrete floor slabs should be supported on undisturbed natural soil or compacted structural fill. We recommend that Type II cement be used in building floor slabs. Slab reinforcing should be provided in accordance with the anticipated use of and loading on the slab. If it is desired to minimize hairline cracking of the slabs due to concrete shrinkage, control joints should be provided as well as providing wire mesh or fiber reinforcement in the slabs.

In areas where moisture-sensitive floor coverings are to be utilized and in other areas where floor dampness would be undesirable, we recommend that consideration be given to providing a 4-inch thickness of free draining rounded gravel to serve as a capillary barrier between the subgrade soil and the slab. In order to minimize vapor transmission, an impermeable membrane should be placed over the gravel. The membrane should be covered with 2 inches of sand to protect it during construction. The sand should be lightly moistened just prior to placing concrete.

4.2.4 Exterior Slabs-On-Grade

Exterior slabs-on-grade may be supported on undisturbed natural soil or compacted structural fill. We recommend that Type II cement be used in exterior slabs-on-grade. We recommend that consideration be given to providing a 4-inch thickness of free draining gravel beneath the slabs. The gravel will help minimize the damaging effects of frost action. We recommend that the slabs be provided with control joints and be reinforced with welded wire fabric or fiber reinforcement to minimize hairline cracking of the slabs due to concrete shrinkage.

4.3 Asphalt Concrete Pavements

Asphalt concrete, aggregate base, and preparation of the subgrade should conform to and be placed in accordance with the requirements of the State of Utah, Standard Specifications for Road and Bridge Construction, latest edition, except that the test method for compaction should be determined by ASTM D 1557 regardless of soil type. In addition, the upper 6 inches of subgrade soil should be compacted to a minimum degree of compaction of 95 percent. Copies of the UDOT specifications for untreated base course and hot mix asphalt are presented in Appendix C.

Bulk samples representative of the on-site soils were obtained and CBR tests performed to evaluate the pavement subgrade quality of the soils. The results of the test are attached and indicate a CBR value of 10. Based on the laboratory test results, design pavement loading requirements, and our experience with similar conditions, we have developed the recommended pavement sections presented in Table 1.

TABLE 1

RECOMMENDED ASPHALT CONCRETE PAVEMENT SECTIONS

Location	Asphalt Concrete (Inches)	Untreated Aggregate Base (Inches)	Total Thickness (Inches)
Light Duty Traffic Areas	3.0	8.0	11.0
Heavy Duty Traffic Areas (20-25 Trucks/day)	4.0	10.0	14.0

4.4 Concrete Pavements

We recommend that concrete pavements in truck loading areas, truck access lanes, and parking lot entrance and service lanes have a minimum thickness of 5.5 inches. Concrete pavements in automobile drives and parking areas should have a minimum thickness of 4 inches. The concrete should have a minimum 28-day compressive strength of 4,000 psi. The concrete pavements should be constructed on a 6-inch minimum thickness of compacted aggregate base. The aggregate base and upper 6 inches of underlying subgrade should be compacted to a minimum degree of compaction of 95 percent based on ASTM D 1557. The aggregate base should be open graded and conform to the following specification.

Sieve Analysis % Passing:

1-1/2 in	100
3/4 in	60-90
No. 4	35-60
No. 40	10-25
No. 200	0-7

4.5 Right-of-Way Pavements

The bulk sample from boring ROW5 had a CBR value of 39 and the bulk sample from boring ROW8 had a CBR value of 15. The CBR value of 39 from boring ROW5 seems anomalously high, we recommend that the CBR value of 15 from ROW8 be used for pavement section design in accordance with the Riverton City Standards and Specifications Manual and Traffic Classification.

APPENDIX A

FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using a Mobile B-61 continuous flight auger drill rig. Forty-three exploratory borings were drilled on April 14, 15, 18, and 19, 2005 at the approximate locations shown on the Site Plan, Figure 1. The soils encountered in the borings were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2487). Logs of the borings as well as a key for soil classification are included as part of this Appendix.

Representative samples were obtained from the exploratory borings at selected depths appropriate to the investigation. All samples were returned to our laboratory for evaluation and testing. Standard penetration resistance blow counts were obtained by driving a 2-inch O.D. split spoon sampler with a 140-pound hammer dropping through a 30-inch free fall. The sampler was driven a maximum of 18 inches and the number of blows recorded for each 6-inch interval. The blows per foot recorded on the boring logs represent the accumulated number of blows that were required to drive the last 12 inches or portion thereof. Boring log notation for the standard split spoon sampler, California sampler, as well as for grab and bulk samples taken from augur cuttings are indicated below.

Standard Split Spoon Sampler

California Sampler

"*" Grab Sample taken from auger cuttings

"BULK" Bulk Sample taken from auger cuttings

The boring logs show our interpretation of the subsurface conditions on the date and at the locations indicated, and it is not warranted that they are representative of subsurface conditions at other locations and times.

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	—
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown	Stiff	CL	1–3	X	27	23.2	102.0	91	
Sandy SILT w/ gravel, moist	Light Brown	Med. Dense	ML	4	*					
Interbedded Silty CLAY, and Gravelly SAND, moist	Light Brown	Very Stiff Med. Dense	CL/ SW	5–11		20				
Silty, Sandy, GRAVEL, moist	Light Brown	Very Dense	GP	12–17	X	50'5"				
				18–23		46				
Total Depth 23 ½ Feet										

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BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LB1

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	—
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
DESCRIPTION AND CLASSIFICATION										
Silty CLAY, moist	Dark Brown	Firm	CL	1–2						
SAND w/ gravel, moist	Light Brown	Dense	SP	3–4		43	5.5		9.9	
Silty SAND, moist	Reddish Brown	Med. Dense	SM	5–8						
SAND w/ gravel, moist	Light Brown	Very Dense	SW	9–14		50				
Silty CLAY, moist	Reddish Brown	Med. Dense	CL	15–18	*					
Sandy SILT, moist	Brown	Stiff	ML	19–21		22				
Total Depth 21 ½ Feet										

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BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07

BORING NO.: LB2

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8" OD
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
Silty CLAY, moist	Dark Brown	Firm	CL							
Silty SAND, moist	Gray	Dense	SM	1						
				2		56	7.8	117.3	13.4	
GRAVEL w / Sand and cobbles, moist	Reddish Brown	Very Dense	GP	3						
				4						
				5						
				6						
				7	*					
				8						
Refusal @ 8' (On Cobbles)										
Total Depth 8 feet										

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BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07

BORING NO.: LB3

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown	Firm	CL	1						
SAND w / gravel, moist	Brown	Very Dense	SP	2						
				3		46/9"				
				4						
				5						
				6						
				7						
				8						
SILT w / fine sand lenses, Iron staining, moist	Reddish Brown	Very Stiff	ML	9		66				
SAND w / gravel, moist	Brown	Very Dense	SP	10						
				11						
GRAVEL w / sand, moist	Light Brown	Very Dense	GP	12						
				13						
				14						
				15						
				16		50/5"				
				17						
				18						
				19						
				20		50/5"				
				21						
Total Depth 21 feet										

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BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LB4

S:\1506-07 Lowes Riverton LOGS.GDB

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
DESCRIPTION AND CLASSIFICATION										
Silty CLAY, moist	Gray	Soft	CL	1						
Poorly graded SAND w / gravel	Brown	Med. Density	SP	2 3 4 5 6 7		33				
Clayey SILT, moist	Brown	Stiff	ML	8 9 10 11 12 13 14 15		18 7	27.6	81.8		
Silty SAND w / gravel, moist	Brown	Med. Dense	SM	16 17 18 19 20 21 22		20/1"				
Silty CLAY, moist	Light Brown	Very Stiff	ML	23 24 25		19				
Total Depth 25 feet										

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BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LB5

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
6" Silty CLAY, moist	Lt. Gray	Soft	CL							
SAND w / Gravel, moist	Gray	Very Dense	GP	1						
				2	X	50/5"				
				3						
				4						
				5		74				
				6						
				7	X	48				
Interbedded SILT and sand layers	Reddish Brown	Stiff	ML	8						
				9						
Clayey SILT, moist	Reddish Brown	Stiff	ML	10						
				11						
				12						
				13		16	18.8		84.0	
				14						
Silty CLAY, moist	Reddish Brown	Med. Dense	CL	15						
				16						
				17						
				18						
				19	X	34/2"				
Clayey GRAVEL w / sand, moist	Brown	V. Dense	GC	20						
Total Depth 20 Feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LB6

DATE DRILLED: April 14, 2005

LOGGED BY: VJ

REFERENCE ELEVATION: ---

DRILL RIG: Mobile B61

BORING DIAMETER: 8"

DEPTH TO GROUNDWATER: Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY w / sand and gravel, moist	Brown	Stiff	CL	1–2						
Poorley Graded SAND w / gravel	Light Brown	Very Dense	SP	3–7		71				
Fine to Med. SAND, moist w / gravel layers 3" thick	Light Brown	Dense	SP	8–9						
Silty CLAY moist, Fe Stained	Light Gray	Very Stiff	CL	10–14		28	16.1	109.0	21.0	
Interbedded CLAY and Clayey SILT, moist	Light Brown	Stiff	CL/ML	15–19		12				
Sandy GRAVEL, moist, minor interbedded silt	Light Brown	Dense	GM	20–24		38				
Total Depth 24 ½ Feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A

BORING NO.: LB7

S:\1506-07 Lowes Riverton LOGS.GPJ

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown	Firm	CL	1	X	19				
Gravelly SILT w / sand, moist	Light Brown	Med. Dense	ML	2	*					
				3						
				4						
GRAVEL, moist	Brown	Very Dense	GP	5	*					
				6						
SAND w / gravel, moist	Light Brown	Very Dense	SP	7		50/6"				
				8						
				9						
				10						
GRAVEL w / sand, moist	Light Brown	Very Dense	GP	11						
				12						
				13						
				14						
Refusal at 14 ½ feet Total depth 14 ½ feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A

BORING NO.: LB8

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Light Brown	Soft	CL	1		8				
Poorly Graded SAND w / gravel, moist	Brown	Dense	GP	2 3 4 5		65				
SILT, moist	Light Brown	Med. Dense	ML	6 7 8 9						
Fine SAND, moist	Light Brown	Med. Brown	SP	10 11 12		21				
Silty CLAY, w / interbedded lenses of fine sand, moist	Brown	Firm	CL	13 14 15 16 17						
GRAVEL w / Silty Sand, moist	Light Brown	Dense	GP	18 19		50/5"				
Sand w / GRAVEL, moist	Light Brown	Very Dense	GP	20 21 22						
Clayey SILT, moist	Light Brown	Firm	ML	23 24		10				
Total depth 25 feet				25						

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LB9

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	—
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown	Firm	CL	1						
GRAVEL w / sand, moist	Light Brown	Very Dense	SP	2	BULK					
Poorly Graded SAND w / gravel, moist w / interbedded fine sand	Light Brown	Very Dense	SP	3		63				
				4						
				5						
				6						
				7		50/5"				
				8						
				9						
				10						
Silty CLAY, moist	Reddish Brown	Stiff	CL	11						
				12						
				13						
				14						
Clayey GRAVEL, moist	Reddish Brown	Hard	GC	15						
				16						
				17						
GRAVEL w / sand, moist	Reddish Brown	Very Dense	GP	18						
				19		50/6"				
				20						
Total Depth 20 feet										

DESCRIPTION AND CLASSIFICATION

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A

BORING NO.: LB10

DATE DRILLED:	April 14, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown	Firm	CL	1						
Silty, Clayey, GRAVEL, moist	Dark Brown	Dense	GC	2						
				3		45				
Poorly Graded GRAVEL, moist	Light Brown	Very Dense	GP	4			10.4	122.9	24.9	
				5						
				6						
				7						
				8						
				9						
GRAVEL w / sand, moist	Light Brown	Very Dense	GP	10						
				11		77				
				12						
Refusal at 12 feet Total Depth 12 feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LB11

DATE DRILLED:	April 15, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	—
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown Light Brown	Stiff	CL	1–3		34	24.1		90.3	
Sandy GRAVEL, moist, Fe Stained	Reddish Brown	Very Dense	GP	4–10		50/6"				
Silty CLAY, Moist	Light Brown	Very Stiff	CC	11–20	*	19				
Total Depth 20 feet					*					

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A

BORING NO.: LB12

DATE DRILLED:	April 18, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
Silty CLAY, moist	Brown	Stiff	CL	1 2 3 4 5						
Total Depth 5 feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LP1

DATE DRILLED:	April 18, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	—
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Top soil, silty CLAY, moist	Dark Brown	Stiff	CL	1	BULK					
Silty CLAY, moist	Brown	Stiff	CL	2						
				3						
Silty, Sandy CLAY, moist	Light Brown	Stiff	CL	4						
				5						
Total Depth 5 feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LP2

DATE DRILLED:	April 18, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
Silty CLAY, moist	Dark Brown	Stiff	CL	1						
				2						
Silty SAND, moist	Light Brown	Med. Dense	SM	3						
				4		15				
				5						
Total depth 5 feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LP3

DATE DRILLED:	April 18, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
Silty CLAY, moist	Dark Brown	Stiff	CL	1 2	BULK					
Silty CLAY w / gravel, moist	Dark Brown	Stiff	CL	3 4 5						
Total depth 5 feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A

BORING NO.: LP4

DATE DRILLED:	April 18, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown	Stiff	CL	1 2 3 4						
Silty SAND, moist	L. Brown	Med.Dense	SM	5						
Total depth 5 feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LP5

DATE DRILLED:	April 18, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY w / gravel, moist	D. Brown	Stiff	CL							
GRAVEL w / silt and sand	Light Brown	Very Dense	GP GM	1 2 3 4 5						
Total depth 5 feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: LP6

S.\1506-07 Lowes Riverton LOGS.CDR

DATE DRILLED:	April 19, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	—
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
Silty CLAY, moist	Dark Brown	Stiff	CL	1–14		19				
						32				
GRAVEL w / sand, moist	Light Brown	Very Dense	GP			50/5"				
Total depth 14 ½ feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: R1

DATE DRILLED:	April 19, 2005
LOGGED BY:	VJ
REFERENCE ELEVATION:	---
DRILL RIG:	Mobile B61
BORING DIAMETER:	8"
DEPTH TO GROUNDWATER:	Not Encountered

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	BLOWS/FOOT	WATER CONTENT (%)	DRY DENSITY (pcf)	PASSING 200 SIEVE (%)	OTHER
Silty CLAY, moist	Dark Brown	Stiff	CL	1						
				2		10	17.6		64.5	
				3						
				4						
				5						
				6						
				7						
				8						
				9		49				
				10						
				11						
				12						
				13						
GRAVEL w / sand, moist	Light Brown	Very Dense	GP	14		50/5"				
Total Depth 14 ½ feet										

WASATCH ENVIRONMENTAL

Environmental Science and Engineering

BORING LOG

Riverton Lowe's
12600 South Street and Bangerter Highway
Riverton, UT

PROJECT NO.: 1506-07A | BORING NO.: R2