REPORT

OF

SUBSURFACE INVESTIGATION

ON THE

PROPOSED TRAIL EXTENSION

AT

ROSWELL MILL PARK
LOT NO. 416
95 MILL VIEW AVE.
ROSWELL, GA 30075

FOR

MR. JEFF PRUITT
ROSWELL RECREATION & PARKS DEPARTMENT
38 HILL STREET, SUITE 100
ROSWELL, GEORGIA 30075

PROJECT NO.: 176001B

FEBRUARY 13, 2017

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EXECUTIVE SUMMARY

A Geotechnical Subsurface Investigation has been completed on the proposed trail extension at Roswell Mill Park located in Roswell, Fulton County, Georgia. The results of this investigation are briefly summarized below. The text of this report should be revised for a discussion of these items.

1. Fill and Residual soils were encountered in all seven soil test borings conducted at the site. Although no deleterious materials were encountered, the area between Boring B-3 and B-4 was not accessible during the drilling due to muddy conditions caused by heavy rainfall the night before.

2. Groundwater levels were encountered at the time of drilling in Boring B-3 at a depth of 12.0 feet below the existing ground surface elevation.

3. Auger refusals were encountered at depths of 11.0, 10.0, 6.0, and 4.0, in Borings B-4, B-5, B-6, and offset Boring B-6, respectively, below the existing ground surface elevations due to encountering rock and boulder contained in fill soils.

4. The proposed boardwalk trail extension structure can be supported by the designed helical piers deep foundation system driven to a minimum depth of 15.0 feet below the existing ground surface elevations. The design parameters of an allowable capacity of 12.5 kips per pile with an ultimate capacity of 12.5 tons per pile with a factor of safety of 2 should adequately be achievable at a minimum depth of 15.0 feet.

PURPOSE

The purpose of this investigation was to assess the general type and condition of the subsurface materials at the project site, and to provide generalized recommendations to guide the design and construction of the foundation for the proposed trail extension structure.

SCOPE

The scope of our services has included the following:

1. Conducting seven (7) Standard Penetration Soil Test Borings at locations indicated on the attached boring location plan to assess the general nature and condition of the subsurface soils.

2. A review of the soil samples obtained during our field testing program by the Geotechnical Engineer for further identification and classification.

3. Preparing this report to document the results of our field testing program, engineering analysis and foundation recommendations.

SITE DESCRIPTION

The site is located in Roswell Mill Park, which is in the close proximity of Vickory Creek to the south, Roswell Mill to the north, and the Old Mill covered bridge with a brick paved pavilion to the west. The site is located in Roswell, Fulton County, Georgia. Plans call for the construction of a boardwalk trail extension consisting of a wood deck structure.

PLANNED DEVELOPMENT

We understand the proposed construction will consist of a board walk trail extension consisting of a wood deck 12' wide by 250'long.

The loading conditions are not available on the structural drawings, but it is assumed that it will meet the IBC.

INVESTIGATIVE PROCEDURES

A total of seven (7) standard penetration soil test borings were performed. Borings B-1, B-2, and B-3 were drilled on the east end of the trail extension, and Borings B-4, B-5, and B-6 were drilled on the west end. No borings were drilled between Borings B-3 and B-4 because of the inaccessible landscape due to muddy conditions caused by a rainfall the night before. Please refer to the Boring Location Plan included in the Appendix for more information regarding the location of the borings.

The test borings were located in the field by representative DMD Engineering and Testing, Inc. In general, the locations of all test borings should be considered approximate.

Standard Penetration Testing, as provided for in ASTM D-1586, was performed at the selected intervals in the soil test borings. All of the soil samples obtained from the Split Spoon Sampler were examined by a Geotechnical Engineer and classified in general accordance with ASTM D-2488 (Visual-Manual Procedure for Description of the soils). Soil classification includes the use of the unified Soil Classification System described in ASTM D-2487 (classification of soils for Engineering Purposes).

Descriptions of the soils encountered in the test borings are provided in the Test Boring Records included in the Appendix. Groundwater conditions, standard penetration resistances and other pertinent information are also included.

REGIONAL GEOLOGY

The proposed site is located in the Northern Piedmont Geologic Province of Georgia. The residual soils in this area have been formed by the in-place weathering of the underlying crystalline rock. Residual soils near the ground surface, which have experienced advanced weathering, frequently consist of red brown clayey silt (ML) or silty clay (CL). The thickness of this surficial clayey zone may range up to roughly 6 feet. (For various reasons, such as erosion or local variation of mineralization, the upper clayey zone is not always present).

With increased depth, the soil becomes less weathered; coarser grained, and structural character of the underlying parent rock becomes more evident. These residual soils are typically classified as sandy micaceous silt (ML) or silty micaceous sand (SM). With a further increase in depth, the soils eventually become quite hard and have an increasing resemblance to the underlying parent rock. When these materials have a standard penetration resistance of 100 blows per foot or greater, they are referred to as partially weathered rock. The transition from soil to partially weathered rock is usually a gradual one, and may occur at a wide range of depths. Lenses or layers of partially weathered rock are not unusual in the soil profile.

Alluvial deposits (Alluvium) having been transported by moving water are found in the vicinity of rivers. Rain falling on land areas runs overland, eroding and transporting soil and rock particles as it goes, and eventually enters a creek or river. All soils carried and deposited by flowing water are called alluvial deposits. Alluvial deposits are often comprised of various soil types because different types of soil tend to mix as they are carried downstream. They do, however, tend to be layered, since settling rates are proportional to particle size.

Partially weathered rock represents the zone of transition between the soil and the indurated igneous or metamorphic rocks from which the soils are derived. The thicknesses of the zone of partially weathered rock and the depth to the rock surface have been found to vary considerable over relatively short distances. The depth to the rock surface may frequently range from the ground surface to 80 feet or more. The thickness of the partially weathered rock, which overlies the rock surface, may vary from only a few inches to as much as 40 feet or more.

Fill Soils are those placed by man. The general consistency and quality of fill soils is a function of the quality controls employed during placement. Fill materials can vary widely depending on these controls.

SUBSURFACE CONDITIONS

A total of seven (7) mechanically augured soil test borings were extended to depths ranging from 5.0 to 15.0 feet below the existing ground surface elevations at the site. All of the borings encountered fill and residual soils. Fill soils were silty sand with their consistencies ranging from very loose to medium dense. Residual soils encountered had consistencies ranging from very loose to very dense. Partially weathered rock (PWR) was encountered in Borings B-1, B-2, and B-3 at a depth of 15.0 feet below the existing ground surface elevations. Boring B-1, B-4, B-5, B-6, and B-6 Offset encountered boulder, and Borings B-4 and B-5 encountered rock fragments.

Borings B-4, B-5, B-6, and Offset Boring B-6 encountered auger refusals due to encountering rock and boulders contained in fill soils at depths of 11.0, 10.0, 6.0 and 4.0 feet below the existing ground surface elevations, respectively.

Fill soils containing rock fragments and boulder were encountered to depths ranging from 8.0 feet to 11.0 feet.

Groundwater levels were encountered at the time of drilling in Boring B-3 at a depth of 12.0 feet below the existing ground surface elevation.

Groundwater levels should be anticipated to fluctuate with yearly and seasonal variations, during periods of very low or high precipitation, or due to changes in site drainage.

The preceding is a generalized description of subsurface conditions. For a more detailed description of subsurface soils, please refer to the Test Boring Records included in the Appendix.

DISCUSSION AND RECOMMENDATIONS

The trail extension can be supported by a deep foundation system namely helical piers, timber piles, auger cast in place piles and driven H steel piles. The following report sections discuss our recommendations for foundation construction.

The following recommendations are based on our understanding of the proposed construction, the data obtained in our soil test borings, a site reconnaissance, and our experience with soils and subsurface conditions similar to those encountered at this site.

We recommend that DMD Engineering and Testing, Inc., as the Geotechnical Engineer of Record, be consulted during construction to conduct Geotechnical Controls for the Owner.

It is recommended that we be provided the opportunity for general review of final design and specifications in order to verify that foundation recommendations have been properly interpreted and implemented in the design and specifications.

FOUNDATION DESIGN

The findings of the exploration indicate that the proposed trail extension boardwalk structure can be supported by the designed deep foundation system of helical piers, driven to a minimum depth of 15.0 feet below the existing ground surface elevations. The helical piers should adequately reach the designed parameters of an allowable pile capacity of 12.5 kips per pile with an ultimate capacity of 12.5 tons per pile providing a factor of safety of 2. The design engineer should select the type of the helical piers.

GEOTECHNICAL CONTROLS

DMD Engineering & Testing, Inc. as the Geotechnical Engineer of the record should monitor the installation of the helical piers deep foundation system to verify design criteria are implemented.

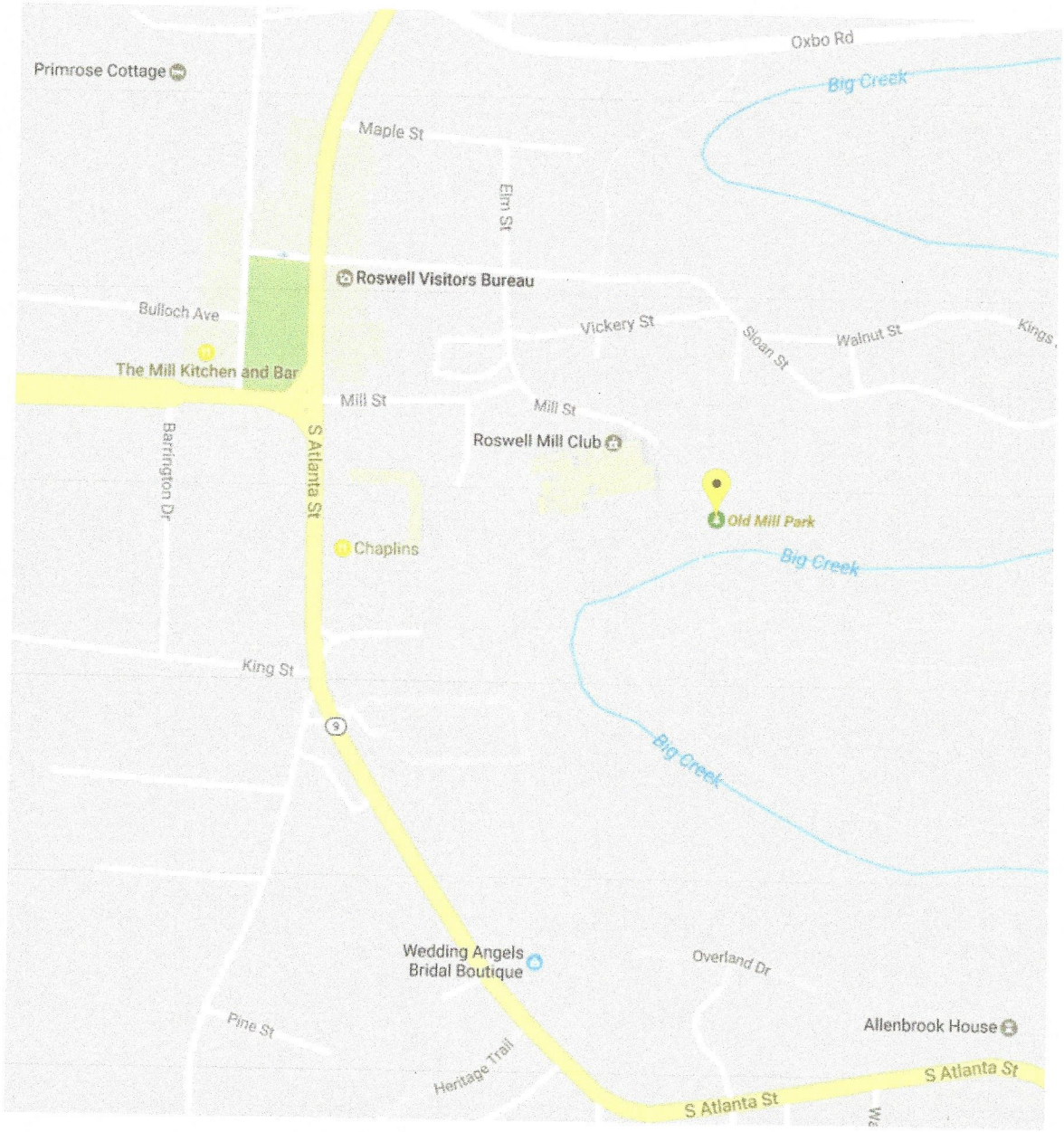
LIMITATIONS

This report has been prepared for the exclusive use of City of Roswell Parks and Recreations Department and their designees for specific application to the project previously discussed. Our conclusions and recommendations have been rendered using generally accepted standards of geotechnical engineering and engineering geology practice in the State of Georgia. No other warranty is expressed or implied. This company is not responsible for the conclusions, opinions, or recommendations of others based on these data.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from the previously described subsurface exploration, and our past experience. They do not reflect variations in the subsurface conditions, which are likely to exist intermediate of our borings, and in unexplored areas of the site due to the inherent variability of the subsurface conditions in this geologic region as well as past land usage. Should such variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon on-site observations of the conditions.

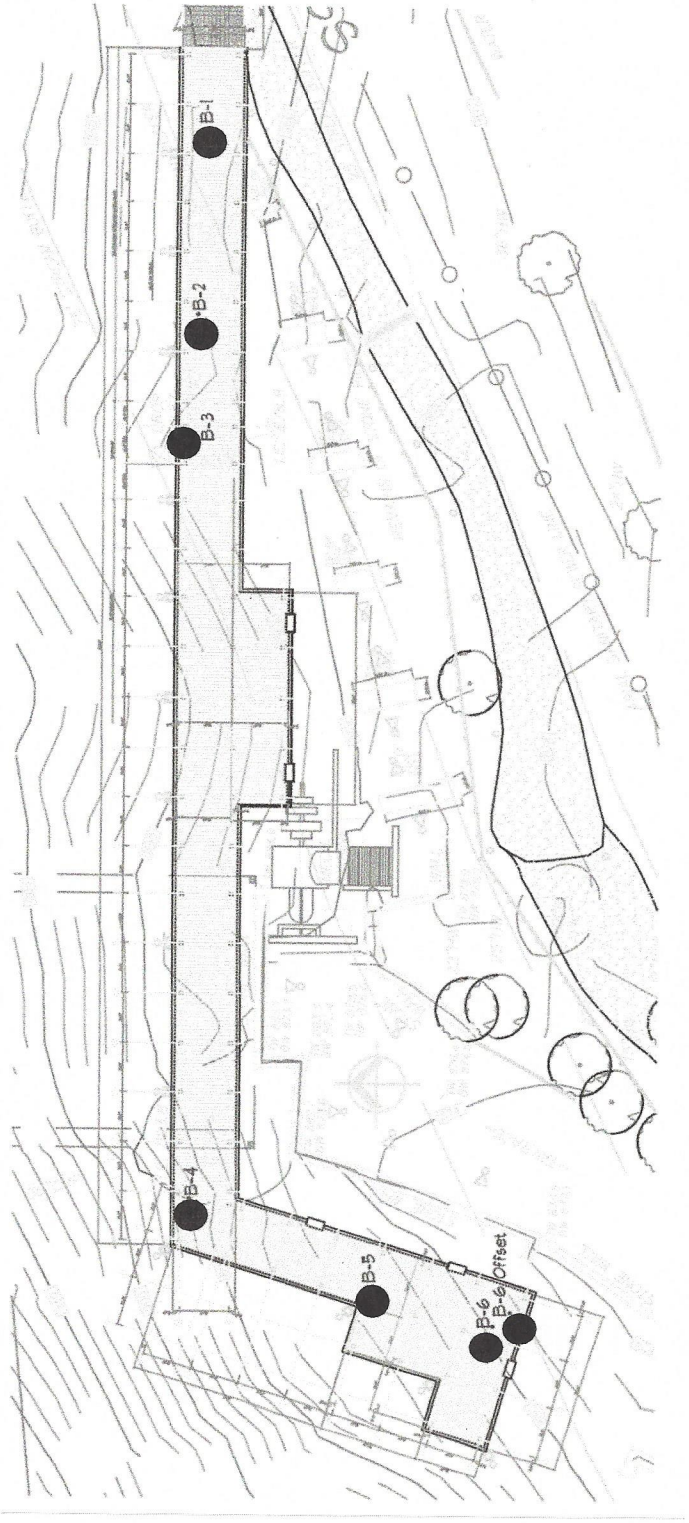
If changes are made in the overall design or location of the structure, the recommendations presented in this report must not be considered valid unless the changes are reviewed by our firm and our recommendations modified or verified in writing. We should be given the opportunity to review the foundation plan, grading plan, and applicable portions of the project specifications when the design is finalized. This review will allow us to check whether these documents are consistent with the intent of our recommendations.

APPENDIX



Site Location Map
Roswell Mill Park – Trail Extension
Lot No. 416, 95 Mill View Ave.
Roswell, GA 30075
Project No.: 176001B

DMD Engineering & Testing, Inc.
255 Norcross Street, Suite A
Roswell, Georgia 30075
OFFICE: (770) 998-5521
FAX (770) 998-3952



● Boring Location – NOT TO SCALE

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DMD Engineering & Testing, Inc.

255 Norcross Street, Suite A
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REFERENCE NOTES FOR BORING LOGS

I. Drilling and Sampling Symbols:

SS	Split Spoon Sampler
ST	Shelby Tube Sampler
RC	Rock Core: NX, BX, AX
PM	Pressuremeter
WOH	Sample Advanced w/Wt. Of Hammer & Rods
RB	Rock Bit Drilling
BS	Bulk Sample of Cuttings
PA	Power Auger (no sample)
HSA	Hollow Stem Auger
WS	Wash Sample

Standard Penetration Test Blow Count (Blows/Ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2 inch O.D. split spoon sampler, as specified in ASTM D-1586. The blow count is commonly referred to as the N-value.

II. Correlation of Penetration Resistance to Soil Consistency:

Sands & Silts		Cohesive Soils – Clays		
SPT N value	Consistency	SPT N value	Consistency	Unconfined Compressive Strength, Qp, tsf
0 - 3	Very Loose	0 - 2	Very Soft	0 - 0.25
4 - 9	Loose	3 - 4	Soft	0.25 - 0.5
10 - 29	Medium Dense	5 - 8	Medium Stiff	0.5 – 1.0
30 - 49	Dense	9 - 16	Stiff	1.0 – 2.0
50 - 100	Very Dense	17 - 29	Very Stiff	2.0 – 4.0
100+	Partially Weathered Rock	30 - 50	Hard	4.0 - 8.0
		50 - 100	Very Hard	> 8.00
		100+	Partially Weathered Rock	

III. Unified Soil Classification Symbols:

GP	Poorly Graded Gravel
GW	Well Graded Gravel
GM	Silty Gravel
GC	Clayey Gravel
SP	Poorly Graded Sand
SW	Well Graded Sand
SM	Silty Sand
SC	Clayey Sand
ML	Low Plasticity Silt
MH	High Plasticity Silt
CL	Low Plasticity Clay
CH	High Plasticity Clay
OL	Low Plasticity Organics
OH	High Plasticity Organics
CL-ML	Dual Classification (Typical)

Modifiers: "trace" = 0% to 10%, "with" = 15% to 25%, "clayey, silty or sandy" = 30% to 50%

IV. Water Level Measurement Symbols:

WL	Water Level
WS	While Sampling
WD	While Drilling
BCR	Before Casing Removal
ACR	After Casing Removal
WCI	Wet Cave In
DCI	Dry Cave In

The water levels are those water levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clays and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

Test Boring Record

DMD Engineering & Testing Inc.

DEPTH (FEET)	SOIL DESCRIPTION	ELEV.	PENETRATION RESISTANCE 0 10 20 40 60 80 100
	MEDIUM DENSE DARK BROWN SILTY MICACEOUS SAND (FILL) W/ BOULDER	884.0	
	12" Recovery		
5.0			
8.0	LOOSE BROWN SILTY MICACEOUS SAND (RESIDUAL)		
10.0			
	VERY DENSE GRAY BROWN SILTY MICACEOUS SAND (RESIDUAL)(PWR)		50/5"
	12" Recovery		
15.0	BORING TERMINATED		
20.0			

Water Table 24 hr _____

Water Table 1 hr 0.0

Project Name ROSWELL MILL PARK TRAIL EXPANSION

Boring Number B-1

Date Drilled 1/30/17

Project Number 176001B

Page 1 OF 1

Test Boring Record

DMD Engineering & Testing Inc.

DEPTH (FEET)	SOIL DESCRIPTION	ELEV.	PENETRATION RESISTANCE 0 10 20 40 60 80 100
	LOOSE TO MEDIUM DENSE DARK BROWN SILTY MICACEOUS SAND (FILL)	885.0	
	12" Recovery		
5.0			
8.0	LOOSE TAN BROWN SILTY MICACEOUS SAND (RESIDUAL)		
10.0			
	VERY DENSE GRAY BROWN SILTY MICACEOUS SAND (RESIDUAL)(PWR)		50/1"
	1" Recovery		
15.0	BORING TERMINATED		
20.0			

Water Table 24 hr _____

Water Table 1 hr 0.0

Project Name ROSWELL MILL PARK TRAIL EXPANSION

Boring Number B-2

Date Drilled 1/30/17

Project Number 176001B

Page 1 OF 1

Test Boring Record

DMD Engineering & Testing Inc.

DEPTH (FEET)	SOIL DESCRIPTION	ELEV.	PENETRATION RESISTANCE 0 10 20 40 60 80 100
	LOOSE GRAY BROWN SILTY MICACEOUS SAND (FILL)	884.0	
	8" Recovery		
5.0			
8.0	VERY LOOSE TAN BROWN SILTY MICACEOUS SAND (RESIDUAL)		
	12" Recovery		
10.0			
	VERY DENSE GRAY BROWN SILTY MICACEOUS SAND (RESIDUAL)(PWR)		50/5"
	5" Recovery		
15.0	BORING TERMINATED		
20.0			

Water Table 24 hr _____

Water Table 1 hr 12.0'

Project Name ROSWELL MILL PARK TRAIL EXPANSION

Boring Number B-3

Date Drilled 1/30/17

Project Number 176001B

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DMD Engineering & Testing Inc.

Test Boring Record

DEPTH (FEET)	SOIL DESCRIPTION	ELEV.	PENETRATION RESISTANCE 0 10 20 40 60 80 100
	VERY LOOSE TO MEDIUM DENSE DARK BROWN SILTY MICACEOUS SAND (FILL)	892.0	
	12" Recovery		
5.0			
8.0	VERY DENSE GRAY BROWN SILTY MICACEOUS SAND W/ROCK FRAGMENTS (BOULDER) (FILL)		50/3"
	3" Recovery		
10.0	AUGER REFUSAL		
11.0	BORING TERMINATED		
15.0			
20.0			

Water Table 24 hr _____

Water Table 1 hr 0.0

Project Name ROSWELL MILL PARK TRAIL EXPANSION

Boring Number B-4

Date Drilled 1/30/17

Project Number 176001B

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Test Boring Record

DMD Engineering & Testing Inc.

DEPTH (FEET)	SOIL DESCRIPTION	ELEV.	PENETRATION RESISTANCE 0 10 20 40 60 80 100
	MEDIUM DENSE DARK BROWN SILTY MICACEOUS SAND (FILL)	884.0	
	12" Recovery		
5.0			
8.0	VERY DENSE GRAY BROWN SILTY MICACEOUS SAND W/ROCK FRAGMENTS (BOULDER) (FILL)		50/2"
	2" Recovery		
10.0	AUGER REFUSAL		
	BORING TERMINATED		
15.0			
20.0			

Water Table 24 hr _____

Water Table 1 hr 0.0

Project Name ROSWELL MILL PARK TRAIL EXPANSION

Boring Number B-5

Date Drilled 1/30/17

Project Number 176001B

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Test Boring Record

DMD Engineering & Testing Inc.

DEPTH (FEET)	SOIL DESCRIPTION	ELEV.	PENETRATION RESISTANCE 0 10 20 40 60 80 100
		879.0	
	VERY DENSE DARK BROWN SILTY MICACEOUS SAND (BOULDER) (FILL)		50/3"
	6" Recovery		
5.0			
	AUGER REFUSAL		
6.0	BORING TERMINATED		
10.0			
15.0			
20.0			

Water Table 24 hr _____

Water Table 1 hr 0.0

Project Name ROSWELL MILL PARK TRAIL EXPANSION

Boring Number B-6

Date Drilled 1/30/17

Project Number 176001B

Page 1 OF 1

Test Boring Record

DMD Engineering & Testing Inc.

DEPTH (FEET)	SOIL DESCRIPTION	ELEV.	PENETRATION RESISTANCE 0 10 20 40 60 80 100
		877.0	
	VERY DENSE DARK BROWN SILTY MICACEOUS SAND (BOULDER) (FILL)		50/3"
	6" Recovery		
	AUGER REFUSAL		
4.0	BORING TERMINATED		
5.0			
10.0			
15.0			
20.0			

Water Table 24 hr _____

Water Table 1 hr 0.0

Project Name ROSWELL MILL PARK TRAIL EXPANSION

Boring Number B-6 (5' offset)

Date Drilled 1/30/17

Project Number 176001B

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