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October 26, 2016

SCHIELE MUSEUM FOUNDATION REPAIR & MODIFICATIONS
Addendum #1

- Please see attached Geotechnical Report by Geoscience Group, dated January 8, 2016.

If you have any questions, or require additional information, please do not hesitate to contact me at 704-869-1037 or caryr@cityofgastonia.com.

Bidders shall acknowledge receipt of this addendum on the outside of their bid packages.

Respectfully,

_____
Cary Rodriguez, Project Manager

cc: Curtis C. Bost, III, PE; City Engineer / Director Engineering & Building Services
Gary Saine, PE; Assistant City Engineer
Margo M. Tauzel, Project Administrator

January 8, 2016

Consulting Engineers

GEOSCIENCE GROUP

City of Gastonia
Engineering Department
150 South York Street
Gastonia, North Carolina 28052

Attention: Mr. Gary V. Saine, P.E.
Assistant City Engineer

Reference: Report Of Geotechnical Engineering Services
Schiele Museum
1500 East Garrison Boulevard
Gastonia, North Carolina
Geoscience Project No. CH11.0047.GE

Geoscience Group, Inc. (Geoscience) has completed the soil test borings, laboratory testing and geotechnical analysis for the above referenced project. This work was performed in general accordance with Geoscience Proposal No. CH15.187P.GE. The purpose of this work was to obtain subsurface information and laboratory data in an effort to determine the logical cause(s) of the observed building distress. This report presents the results of our geotechnical engineering services and provides our general recommendations for the remedial repair.

BACKGROUND

The following background information was compiled from our site observations, our review of information on Gaston County's GIS website, and our correspondence with Mark Rudisill of The Schiele Museum and Barry Lambert, P.E. of Barry Lambert Engineering, PC.

The Schiele Museum has a physical address of 1500 East Garrison Boulevard in Gastonia, North Carolina. The museum was constructed in multiple phases with the most recent phase (Environmental Studies Center) built in 2012. The focus of this investigation and report is the westernmost portion of the museum which entails The Robinson Hall Of Earth And Man, The Hall Of North American Wildlife, adjoining office spaces and asphalt pavements. The building construction consists primarily of cast-in-place concrete floor slabs, structural steel framing and load bearing brick/masonry walls. The approximate date of each phase of building construction for this portion of the museum is shown on the *Photograph Location Diagram*, Drawing No. CH11.0047.GE-1, included in the Appendix.

The westernmost section of the museum is located near elevation 758 feet (MSL). The ground surface immediately adjacent to the exterior of this section of museum is sloping gently downward towards the west over a horizontal distance of approximately 20 to 30 feet. At this point, the ground surface slopes moderately to steeply downward to a creek that flows in a north-south direction. The creek elevation is near 735 feet (MSL).

During various site visits by the undersigned engineers from Geoscience, stair-step cracking was observed at various locations in the exterior and interior walls of The Robinson Hall Of Earth And Man, The Hall Of North American Wildlife and the adjoining office spaces. According to

museum personnel, the cracking was first noticed in 2012 during construction of the Environmental Studies Center. It is important to note that the adjoining pavements appeared to be in good condition with no visible signs of extensive cracking, depressions or potholes. Photographs documenting these cracks are included in the Appendix of this report. The approximate location and direction of each photograph is shown on the above referenced *Photograph Location Diagram.*

SCOPE OF INVESTIGATION

Soil Test Borings: Six (6) soil test borings (B-101 through B-105 and B-101A) were performed at the approximate locations shown on the *Boring Location Diagram*, Drawing No. CH11.0047.GE-1A, included in the Appendix. The soil test borings were extended to depths ranging between approximately 8½ and 19½ below the ground surface using continuous-flight, hollow-stem augers; drilling fluid was not used in this process. Standard Penetration Tests were performed in general accordance with ASTM D 1586-84 at continuous intervals in the borings. The Standard Penetration Test is used to provide an index for estimating soil strength and density. In conjunction with the penetration testing, split-barrel soil samples were recovered and returned to our laboratory for soil classification and laboratory testing. Copies of the Test Boring Records are included in the Appendix.

Slope Inclinometer: Slope inclinometer casing was installed and grouted in-place in soil test boring B-102. The purpose of the inclinometer casing is to determine if lateral movement, or creep, of the existing fill slope is occurring. The slope inclinometer casing consists of a 2¾-inch diameter grooved casing. The slope inclinometer casing was installed in the exposed borehole and grouted in-place on the same day the boring was drilled. A baseline reading was recorded on January 8, 2016. In accordance with our proposal, six (6) additional readings will be taken over a 6 month monitoring period and a summary report will be issued after the final reading.

Laboratory Testing: The laboratory testing for this project included visual classification of the soil samples by the project engineer. The color, texture and plasticity characteristics were used to identify each soil sample in general accordance with the Unified Soil Classification System (USCS). The results of the soil classifications are presented on the Test Boring Records included in the Appendix.

Representative split-spoon samples were selected for laboratory testing. The laboratory testing consisted of Atterberg Limits tests, natural moisture content determinations, grain size distributions and hydrometer analyses. The purpose of this testing was to further assess the gradation, plasticity and moisture characteristics of the onsite soils. Copies of the laboratory test results are included in the Appendix of this report.

SUBSURFACE FINDINGS

The subsurface conditions at the boring locations generally consist of fill soils that are underlain by residual soils which have formed from the in-place weathering of the underlying parent bedrock. The generalized subsurface conditions are described below and illustrated the *Generalized Subsurface Profiles*, Drawing Nos. CH11.0047.GE-2 and CH11.0047.GE-3, included in the Appendix. For soil descriptions and general stratification at a particular boring location, the respective Test Boring Record should be reviewed.

Existing Fill: An upper stratum of existing fill is present to depths ranging from approximately 6½ to 10½ feet below the ground surface. The fill materials consisted of a wide range of soil types that included silty CLAY, clayey SILT, sandy SILT and silty SAND soils. The fill soils also included varying amounts of trace organics and small rock fragments (less than ½-inch in diameter). However, a zone of large rock fragments (greater than ½-inch in diameter) was encountered in boring B-102 between the approximate depths of 4 and 8 feet. The Standard Penetration Test results (Blow Counts) within the fill soils were erratic and ranged between 1 and 95 Blows Per Foot (BPF). The majority of the Standard Penetration Test results are between 2 and 5 BPF. In addition, the natural moisture contents of the fill soils ranged between 2 and 31 percent. It should be noted that the composition, Blow Counts and moisture contents of the existing fill were erratic within each boring as well as between adjacent boring locations.

Residual Soils: Subjacent to the existing fill in soil test boring B-101, B-101A, B-103 and B-104, residual very silty CLAY, sandy SILT and silty SAND soils are present to depths ranging between approximately 8 and 12 feet below the ground surface. Soil test borings B-102 and B-105 encountered partially weathered rock immediately beneath the existing fill. The Standard Penetration Test results within these residual soils ranged from 6 to 25 BPF.

Partially weathered rock was encountered in all the soil test borings at depths ranging from approximately 7½ to 12 feet below the ground surface. For engineering purposes, partially weathered rock is considered any dense residual soil exhibiting a Standard Penetration Resistance value in excess of 100 BPF. When sampled, the partially weathered rock generally consists of a silty SAND.

Auger refusal was encountered in soil test borings B-101, B-101A and B-105 at the respective depths of approximately 10½, 11 and 8½ feet below the ground surface. Generally, auger refusal within residual soils is encountered within very dense soils, at bedrock and/or on top of boulders.

Groundwater: Groundwater measurements were attempted at the completion of each soil test boring and again prior to backfilling the open auger hole. A shallow water level of approximately 1⅓ feet below the ground surface was recorded in boring B-101A at the time of drilling. This water appeared to be the result of trapped water in the ABC stone. A deep groundwater level was observed in soil test boring B-104 at a depth of approximately 17 feet below the ground surface. No measurable groundwater was observed in soil test borings B-101, B-102, B-103 and B-105.

CONCLUSIONS

The results of the soil test borings indicate that up to 10½ feet of existing fill is present beneath the westernmost portion of the museum. The fill materials consist of a wide range of soil types that include silty CLAY, clayey SILT, sandy SILT and silty SAND soils. The Standard Penetration Test results (Blow Counts) within the fill soils were erratic and ranged between 1 and 95 Blows Per Foot (BPF). The majority of the Standard Penetration Test results are between 2 and 5 BPF. The erratic and low Blow Counts confirm the variability of the fill soil types and apparent lack of adequate compaction achieved during its placement. Improperly placed and softened fill soils will negatively impact structures that are constructed over this material. Therefore, some of the building settlement can be attributed to zones of poor quality and inadequately compacted fill that have consolidated beneath its own weight and the weight of the foundation loads.

A second possible mechanism that may have contributed to the settlement and distress of the westernmost portion of the museum would be lateral movement, or creep, of the existing fill slope. As mentioned previously, slope inclinometer casing was installed in soil test boring B-102. Readings will be taken over a 6 month monitoring period to determine if the inclinometer casing is deforming. Excessive deformation of the slope inclinometer would be an indicator that slope creep is occurring. Additional recommendations in this regard will be provided at the conclusion of the 6 month monitoring period.

A third potential mechanism that may have contributed to the observed building distress would be an inadequately designed or constructed foundation. As mentioned previously, construction of The Robinson Hall Of Earth And Man, The Hall Of North American Wildlife and the adjoining office spaces occurred in multiple phases. In addition, several of the building sections share a common wall. Foundation drawings and construction records documenting the building construction are not available for our review. As a result, it is unknown if the existing foundations are sufficient to support the loads imposed by the multiple phases of building construction.

RECOMMENDATIONS

We recommend that Barry Lambert, P.E. of Barry Lambert Engineering, PC be engaged to help analyze the integrity of the existing foundations and their load carrying capacity. Determination of the foundation type and size will likely be required to assist in this analysis. This information will also be useful to determine the best method for connecting the foundation repair elements to the existing foundations.

We recommend that helical piers be installed along the exterior wall of the Robinson Hall Of Earth And Man Building. In addition, helical piers should be installed for the first 50 linear feet of the exterior walls for the adjoining office spaces. The approximate helical pier limits are shown on the *Proposed Foundation Repair Diagram*, Drawing No. CH11.0047.GE-4, included in the Appendix. These pier limits should be verified by the structural engineer and specialty foundation repair contractor. Helical pier capacities on the order of 30 to 40 kips could be achieved by extending the piers through the existing fill and residual soils to bear within the partially weathered rock beginning at depths ranging from approximately 7½ to 12 feet below the ground surface. The number of the helical piers and their spacing should be determined by the structural engineer. The helical pier installation should be performed by a qualified contractor and monitored to verify that the actual diameter, depth and torque of each helical pier are adequate to reach the design capacities.

We recommend that micropiles be installed along the interior east-west walls of the Robinson Hall Of Earth And Man Building. The approximate micopile limits are shown on the above referenced *Proposed Foundation Repair Diagram*. These micropile limits should be verified by the structural engineer and specialty foundation repair contractor. It is anticipated that 20 kip capacity micropiles can be achieved by extending the piles through the existing fill and residual soils to bear within the partially weathered rock. As with the helical piers above, the number of the micropiles and their spacing should be determined by the structural engineer. The micropile installation should be performed by a qualified contractor that can demonstrate the appropriate expertise with this type of remediation.

GEOSCIENCE GROUP

CLOSURE

Geoscience appreciates having had the opportunity to assist you during this phase of the project. If you have any questions concerning the information outlined in this report, please contact us.

Respectfully,
GEOSCIENCE GROUP, INC.

William A. [illegible]
Project Engineer

NORTH CAROLINA PROFESSIONAL SEAL 24977 ENGINEER DANIELA MICKNEY

Daniel A. Mickney, P.E.
Vice President
North Carolina Registration No. 24977

Enclosures
File: P:/Work Files/Geotech/2011/Schiele Museum/geotechnical report.doc

APPENDIX

Photograph Location Diagram

Site Photographs

Boring Location Diagram

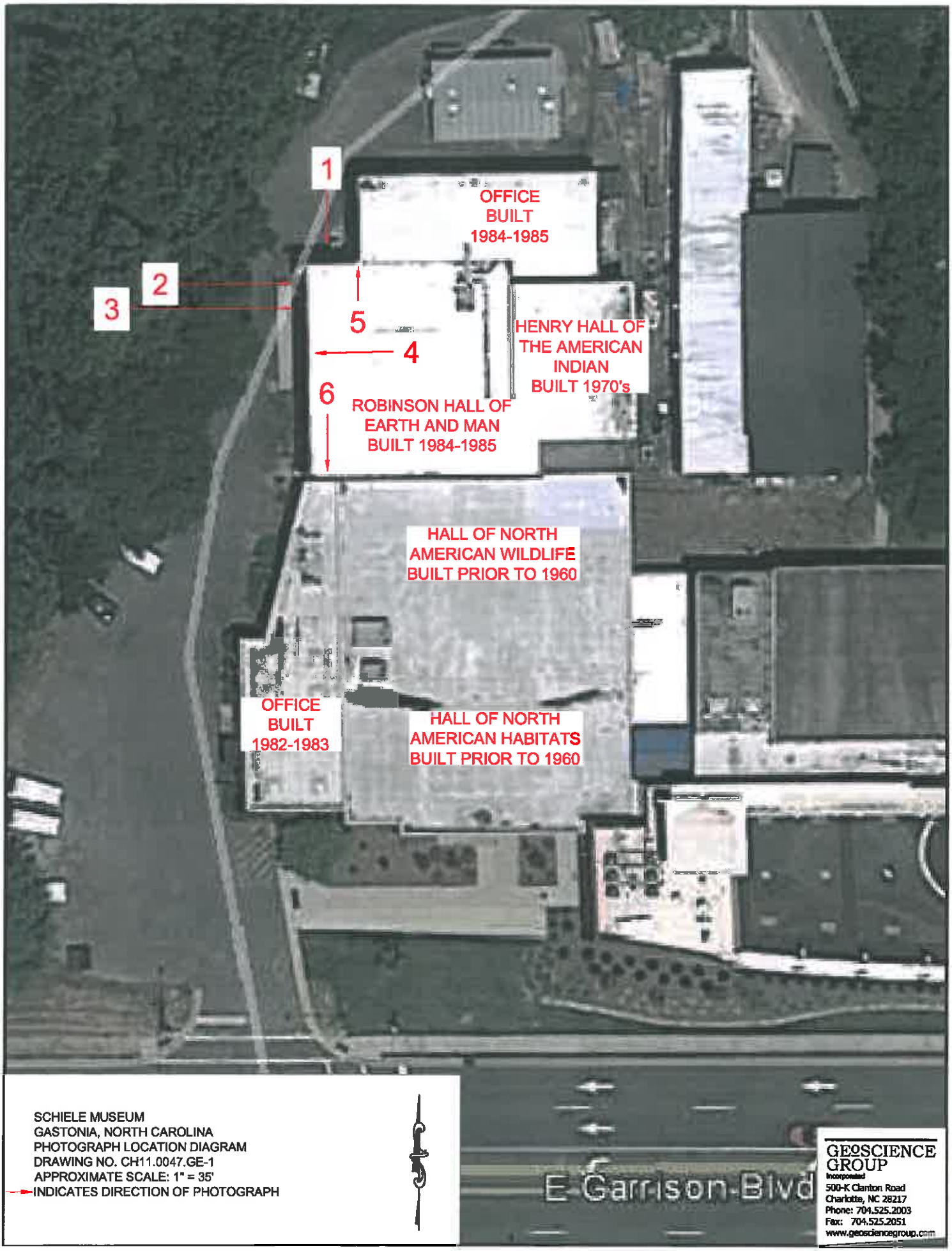
Generalized Subsurface Profiles

Test Boring Records

Summary Of Laboratory Test Data

Laboratory Test Results

Proposed Foundation Repair Diagram



SCHIELE MUSEUM
GASTONIA, NORTH CAROLINA
PHOTOGRAPH LOCATION DIAGRAM
DRAWING NO. CH11.0047.GE-1
APPROXIMATE SCALE: 1" = 35'
→ INDICATES DIRECTION OF PHOTOGRAPH

GEOSCIENCE GROUP
Incorporated
500-K Clanton Road
Charlotte, NC 28217
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Fax: 704.525.2051
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SITE PHOTOGRAPHS

Photo 1: Crack In Exterior Wall – Robinson Hall Of Earth And Man

SITE PHOTOGRAPHS

Photo 2: Crack In Exterior Wall – Robinson Hall Of Earth And Man

SITE PHOTOGRAPHS

Photo 3: Crack In Exterior Wall Over Door Jamb – Robinson Hall Of Earth And Man

SITE PHOTOGRAPHS

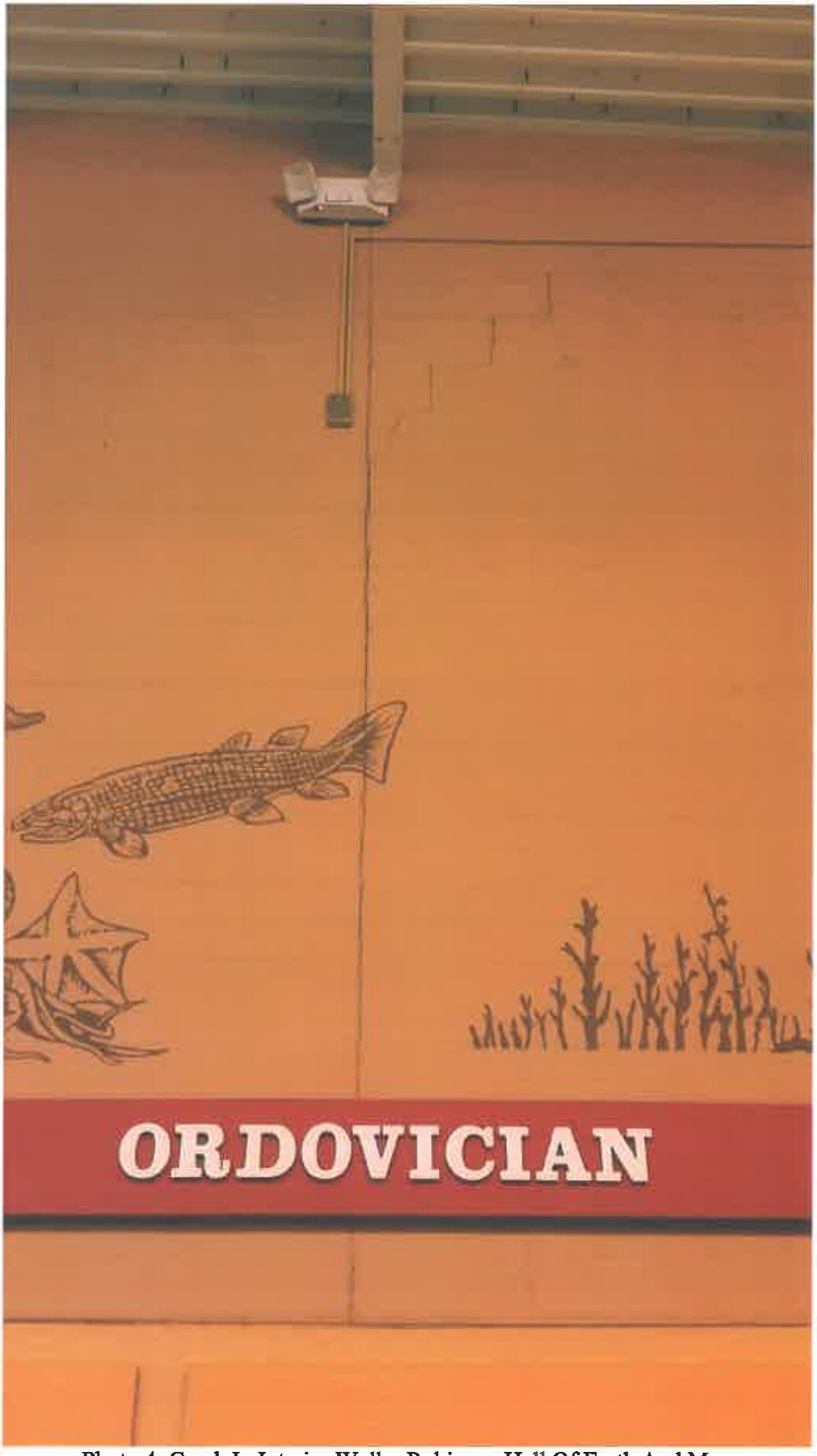


Photo 4: Crack In Interior Wall – Robinson Hall Of Earth And Man

SITE PHOTOGRAPHS

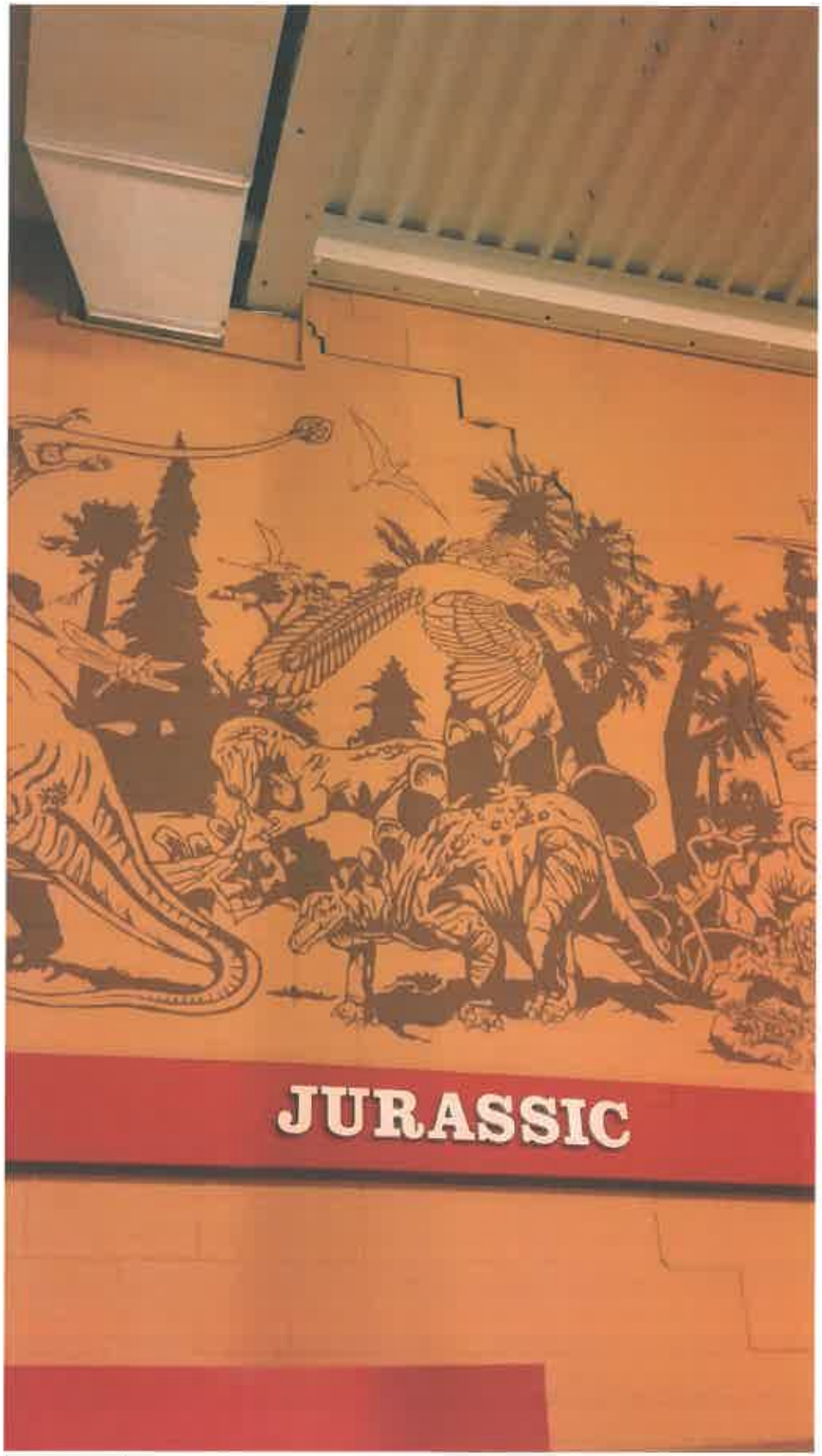
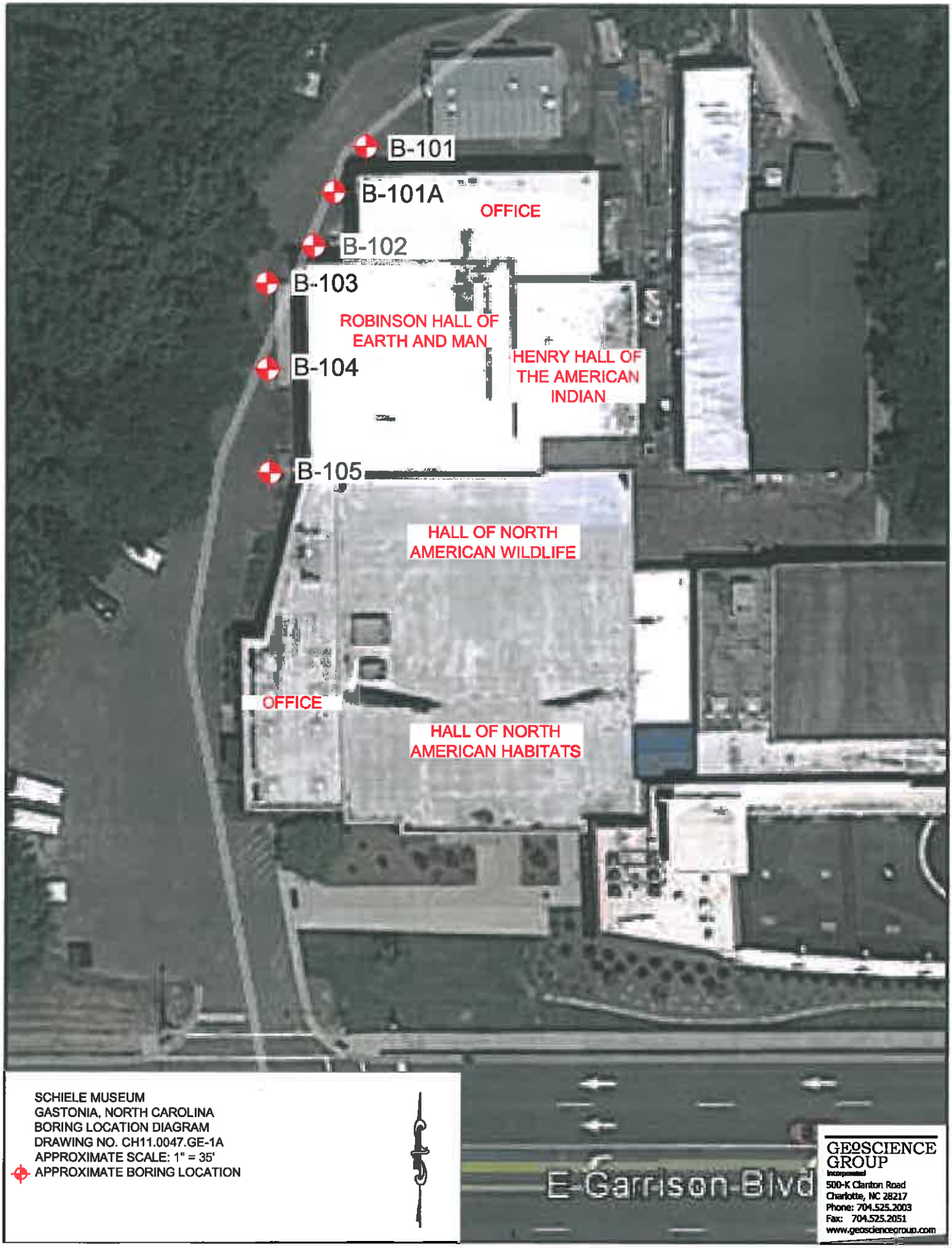


Photo 5: Crack In Shared Interior Wall – Office And Robinson Hall Of Earth And Man

SITE PHOTOGRAPHS

Photo 6: Crack In Shared Interior Wall – Hall Of North American Wildlife And Robinson Hall Of Earth And Man



SCHIELE MUSEUM
GASTONIA, NORTH CAROLINA
BORING LOCATION DIAGRAM
DRAWING NO. CH11.0047.GE-1A
APPROXIMATE SCALE: 1" = 35'
APPROXIMATE BORING LOCATION

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500-K Clanton Road
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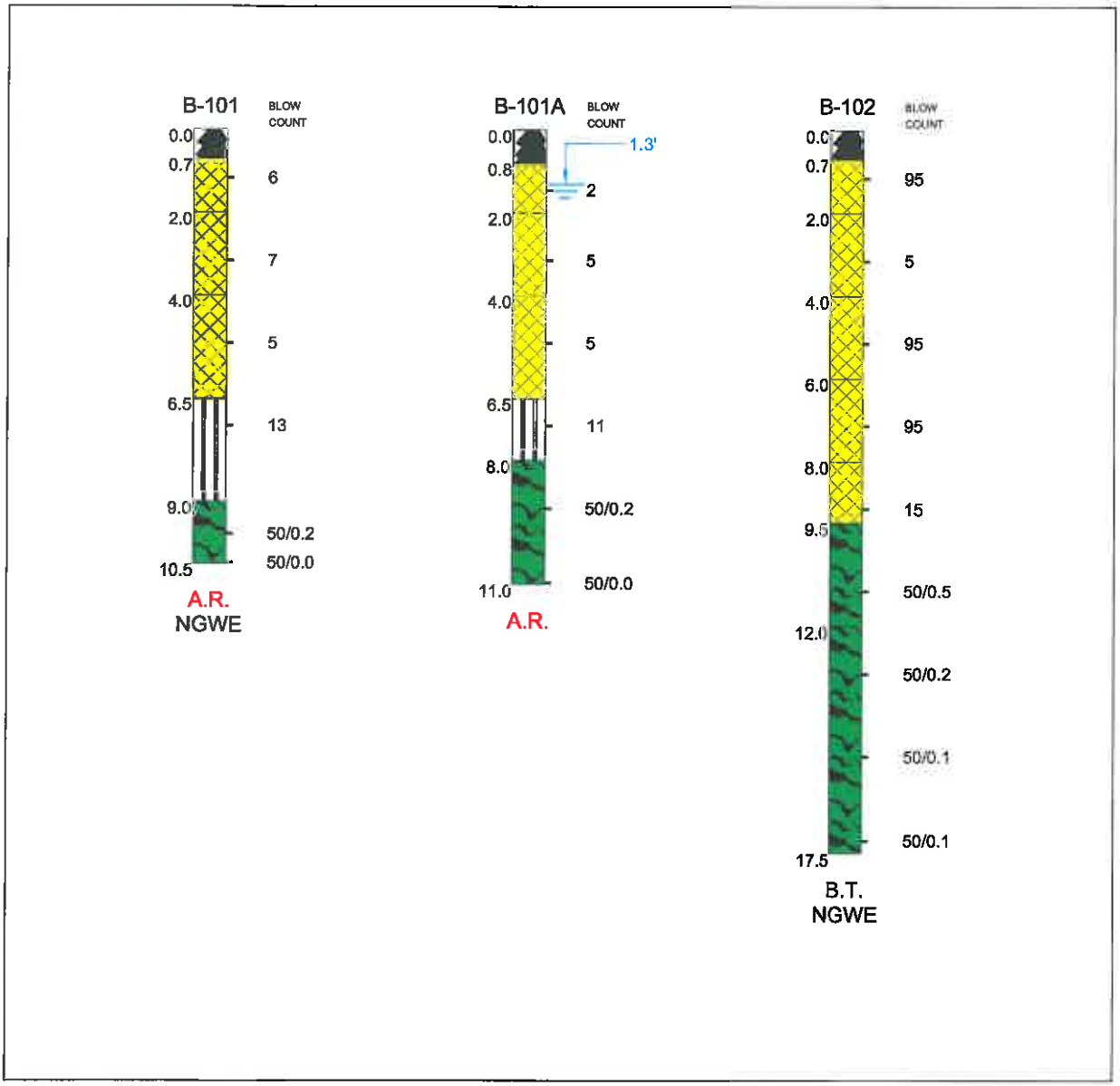


LEGEND

- Water Table - 24 HR.
- Water Table 1 HR.
- Loss of Drilling Water
- Cavein Depth
- A.R. - Auger Refusal
- B.T. - Boring Terminated
- C.T. - Coring Terminated
- WOH - Weight of Hammer
- NGWE - No Groundwater

- Asphalt/Crushed Stone/ Topsoil
- Existing Fill
- Clayey SILT/Sandy SILT
- Weathered Rock

GEOSCIENCE GROUP, INC.

DRAWN BY: DR	APPROVED BY	VERTICAL: AS SHOWN
DATE: 12/28/15		HORIZONTAL: N.T.S.

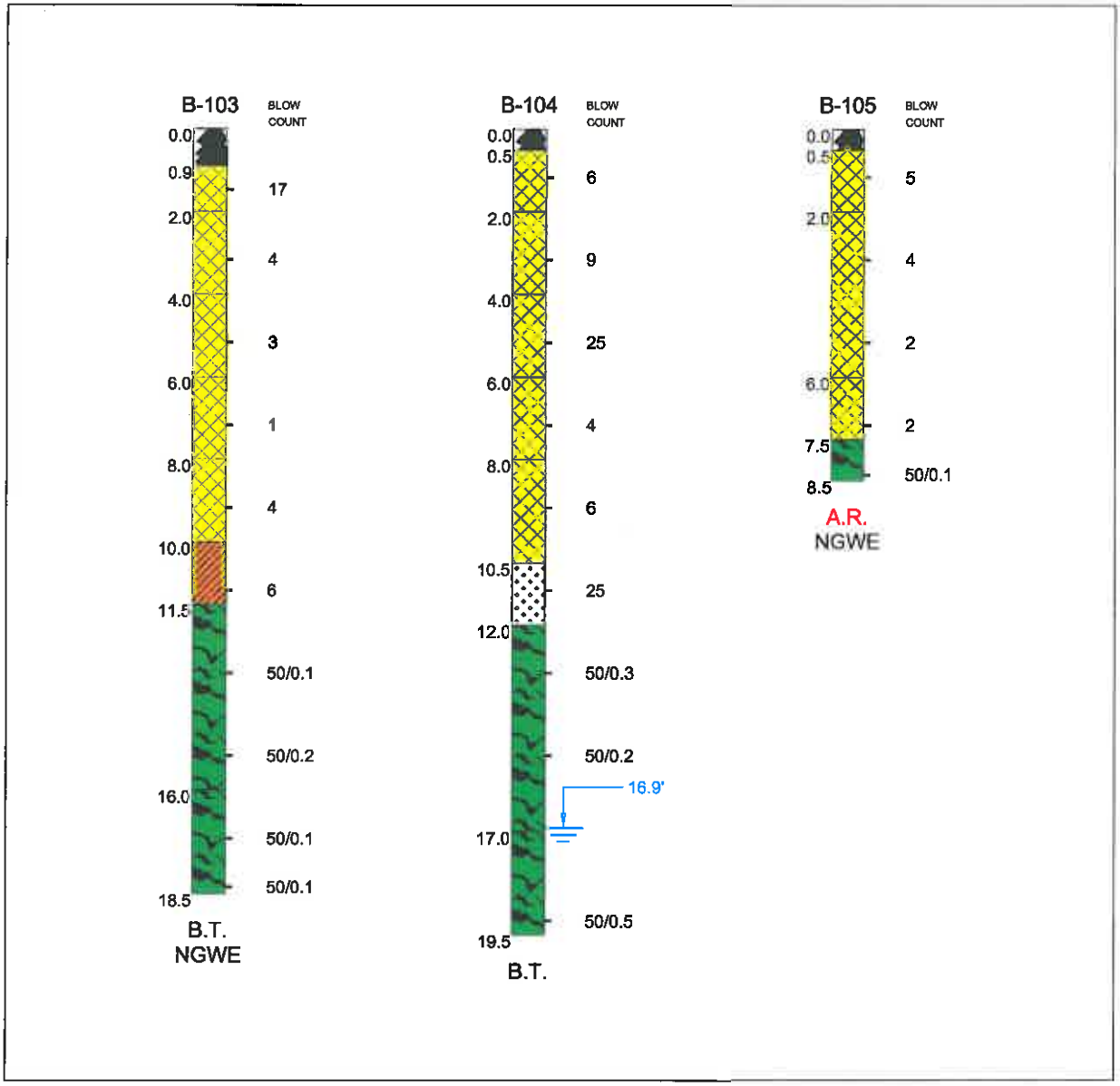
SCHIELE MUSEUM

GASTONIA, NORTH CAROLINA

GENERALIZED SUBSURFACE PROFILE

DRAWING NUMBER

CH11.0047.GE-2



LEGEND

- Water Table - 24 HR.
- Water Table 1 HR.
- Loss of Drilling Water
- Cavein Depth
- A.R. - Auger Refusal
- B.T. - Boring Terminated
- C.T. - Coring Terminated
- WOH - Weight of Hammer
- NGWE - No Groundwater

- Asphalt/Crushed Stone/ Topsoil
- Existing Fill
- Very Silty CLAY
- Weathered Rock
- Silty SAND

GEOSCIENCE GROUP, INC.

DRAWN BY: DR	APPROVED BY	VERTICAL: AS SHOWN
DATE: 12/28/15		HORIZONTAL: N.T.S.

SCHIELE MUSEUM

GASTONIA, NORTH CAROLINA

GENERALIZED SUBSURFACE PROFILE

DRAWING NUMBER

CH11.0047.GE-3

BORING NO: B-101
DATE DRILLED: 12/11/15
DRILLING CONTRACTOR: Soil Drilling Services
JOB NO: CH11.0047.GE
PROJECT: SCHIELE MUSEUM

TEST BORING RECORD

GEOSCIENCE GROUP, INC.

DEPTH, FT.	DESCRIPTION	Moisture Content	Blow Count
0.0	1.5 Inches Asphalt And 7 Inches Crushed Stone		
0.7	Firm Brown And Tan Slightly Micaceous Medium To Fine Sandy Very Silty CLAY (LL=40|PL=21|PI=19) With Rock Fragments - Fill Note: Sample Moist	19.7%	6
2.0	Firm Brown And Tan Slightly Micaceous Medium To Fine Sandy Very Silty CLAY With Rock Fragments - Fill Note: Sample Moist	22.1%	7
4.0	Loose Brown Clayey Silty Medium To Fine SAND With Rock Fragments - Fill Note: Sample Moist	14.5%	5
6.5	Stiff Brown, Tan And Grey Slightly Micaceous Clayey Coarse To Fine Very Sandy SILT - Residual	13.8%	13
9.0	Partially Weathered Rock When Sampled Becomes Brown, Tan And Grey Silty Coarse To Fine SAND		50/0.2
10.5	Auger Refusal No Groundwater Encountered		50/0.0

● PENETRATION - BLOW COUNT*

5 10 20 30 40 60 80 100

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

*PENETRATION IS THE NUMBER OF BLOWS OF A 140 LB. (63.5kg) HAMMER FALLING 30 IN. (76.2cm) REQUIRED TO DRIVE A 1.4 IN. (3.6cm) I.D. SAMPLER 1 FT. (30.5cm)

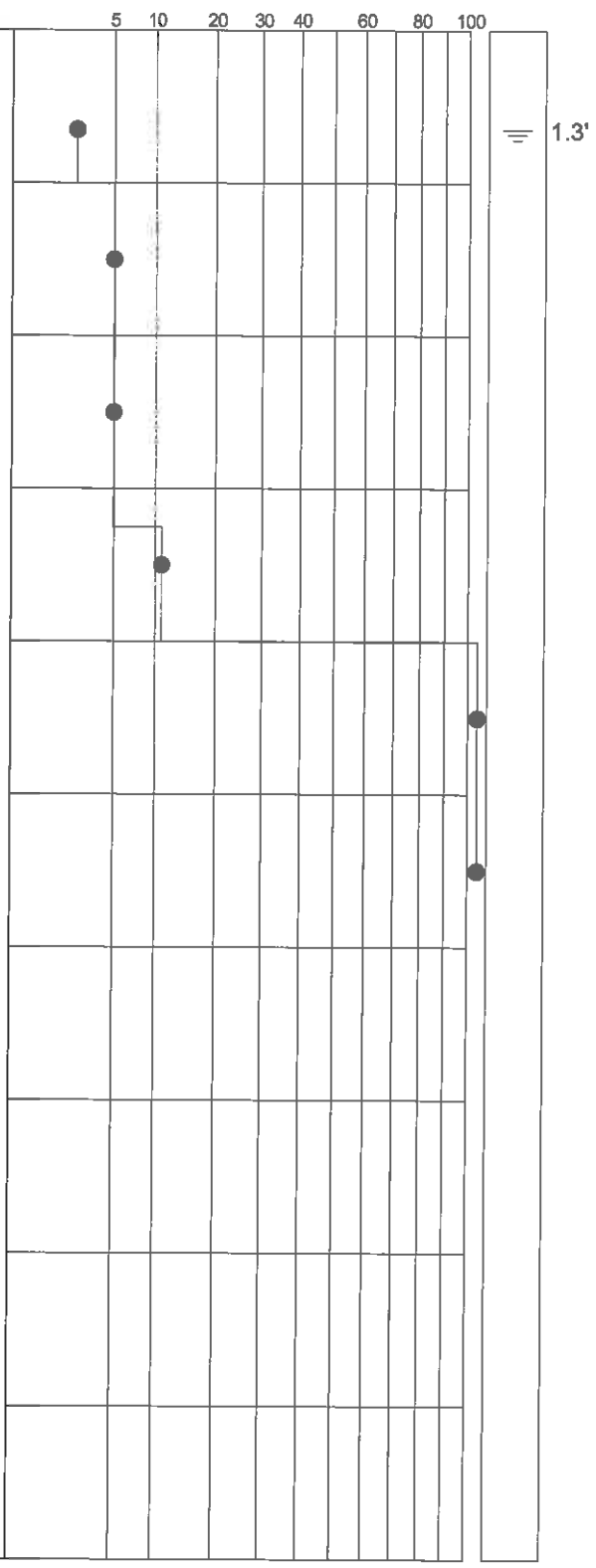
PRESSUREMETER TEST
50/% ROCK CORE RECOVERY
◄ LOSS OF DRILLING WATER
WOH WEIGHT OF HAMMER
WATER TABLE - 24 HR.
WATER TABLE - 1 HR.
CAVE-IN DEPTH

BORING NO. B-101A
DATE DRILLED 12/14/15
DRILLING CONTRACTOR Soil Drilling Services
JOB NO. CH11.0047.GE
PROJECT SCHIELE MUSEUM

TEST BORING RECORD

GEOSCIENCE GROUP, INC.

DEPTH, FT.	DESCRIPTION	Moisture Content	Blow Count
0.0	4 Inches Asphalt And 5 Inches Crushed Stone		
0.8	Soft Brown And Grey Slightly Micaceous Medium To Fine Sandy Clayey SILT With Rock Fragments - Fill	28.9%	2
2.0	Note: Sample Very Moist		
	Firm Brown And Black Slightly Micaceous Medium To Fine Sandy Clayey SILT With Large Rock Fragments - Fill	23.9%	5
4.0	Soft Reddish-Brown, Brown And Grey Slightly Micaceous Medium To Fine Sandy Clayey SILT With Small Rock Fragments - Fill	31.0%	5
	Note: Sample Very Moist		
6.5	Stiff Brown And Grey Slightly Micaceous Clayey Coarse To Fine Sandy SILT With Weathered Rock Fragments - Residual	16.1%	11
8.0	Partially Weathered Rock When Sampled Becomes Brown, Black And White Silty Coarse To Fine SAND		50/0.2
11.0	Auger Refusal		50/0.0



BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

*PENETRATION IS THE NUMBER OF BLOWS OF A 140 LB. (63.5kg) HAMMER FALLING 30 IN. (76.2cm) REQUIRED TO DRIVE A 1 4 IN. (3.6cm) I.D. SAMPLER 1 FT. (30.5cm)

PRESSUREMETER TEST
50/% ROCK CORE RECOVERY
◄ LOSS OF DRILLING WATER
WOH WEIGHT OF HAMMER
WATER TABLE - 24 HR.
WATER TABLE - 1 HR.
CAVE-IN DEPTH

BORING NO. B-102
DATE DRILLED 12/15/15
DRILLING CONTRACTOR Soil Drilling Services
JOB NO. CH11.0047.GE
PROJECT SCHIELE MUSEUM

TEST BORING RECORD

GEOSCIENCE GROUP, INC.

DEPTH, FT.	DESCRIPTION	Moisture Content	Blow Count
0.0	1 Inch Asphalt And 7 Inches Crushed Stone		
0.7	Stiff Brown And Grey Medium To Fine Sandy Clayey SILT With Large Rock Fragments - Fill Note: Blow Count Influenced By Large Rock Fragments	18.1%	95
2.0	Firm Brown, Tan And Grey Medium To Fine Sandy Clayey SILT (LL=39|PL=28|PI=11) With Rock Fragments - Fill	22.1%	5
4.0	Split-Spoon Sample Recovery Consisted Of Large Rock Fragments Note: Blow Count Influenced By Large Rock Fragments	2.1%	95
6.0	Firm Brown, Tan And Grey Medium To Fine Sandy Very Clayey SILT With Large Rock Fragments - Fill Note: Blow Count Influenced By Large Rock Fragments	25.6%	95
8.0	Stiff Brown, Tan And Grey Medium To Fine Sandy Clayey SILT With Rock Fragments - Fill	12.2%	15
9.5	Partially Weathered Rock When Sampled Becomes Tan, Grey And White Silty Coarse To Fine SAND - Residual		50/0.5
12.0	Partially Weathered Rock When Sampled Becomes Brown, Tan And Grey Silty Coarse To Fine SAND		50/0.2
			50/0.1
17.5	Boring Terminated No Groundwater Encountered Inclinometer Casing Installed From Ground Surface To Boring Termination Depth Of 17.5 Feet		50/0.1

● PENETRATION - BLOW COUNT*

5 10 20 30 40 60 80 100

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

*PENETRATION IS THE NUMBER OF BLOWS OF A 140 LB. (63.5kg) HAMMER FALLING 30 IN. (76.2cm) REQUIRED TO DRIVE A 1.4 IN. (3.6cm) I.D. SAMPLER 1 FT. (30.5cm)

PRESSUREMETER TEST
50/% ROCK CORE RECOVERY
◄ LOSS OF DRILLING WATER
WOH WEIGHT OF HAMMER
WATER TABLE - 24 HR.
WATER TABLE - 1 HR.
CAVE-IN DEPTH

BORING NO. B-103
DATE DRILLED 12/15/15
DRILLING CONTRACTOR Soil Drilling Services
JOB NO. CH11.0047.GE
PROJECT SCHIELE MUSEUM

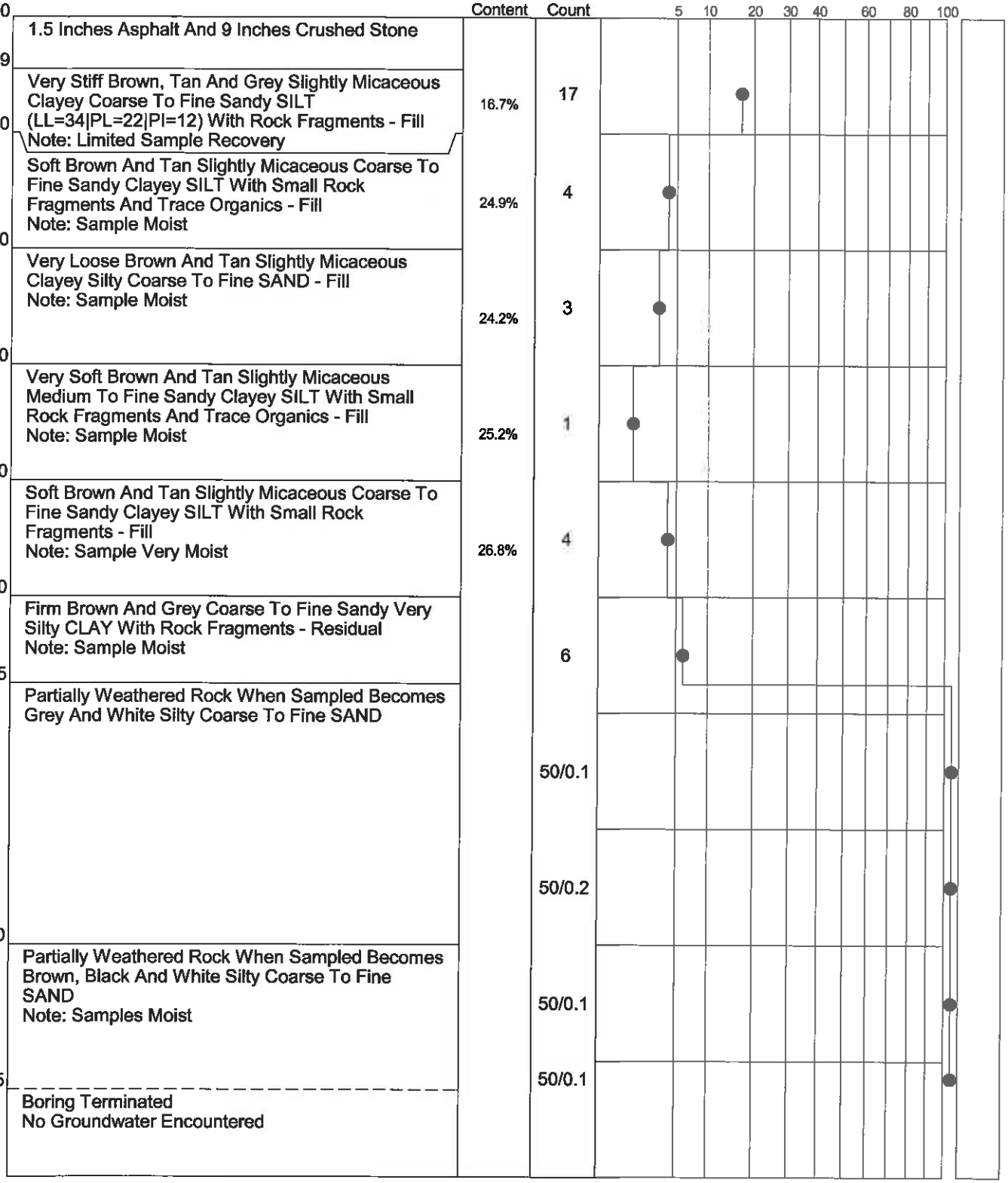
TEST BORING RECORD

GEOSCIENCE GROUP, INC.

DEPTH, FT.	DESCRIPTION	Moisture Content	Blow Count
0.0	1.5 Inches Asphalt And 9 Inches Crushed Stone		
0.9	Very Stiff Brown, Tan And Grey Slightly Micaceous Clayey Coarse To Fine Sandy SILT (LL=34|PL=22|PI=12) With Rock Fragments - Fill Note: Limited Sample Recovery	16.7%	17
2.0	Soft Brown And Tan Slightly Micaceous Coarse To Fine Sandy Clayey SILT With Small Rock Fragments And Trace Organics - Fill Note: Sample Moist	24.9%	4
4.0	Very Loose Brown And Tan Slightly Micaceous Clayey Silty Coarse To Fine SAND - Fill Note: Sample Moist	24.2%	3
6.0	Very Soft Brown And Tan Slightly Micaceous Medium To Fine Sandy Clayey SILT With Small Rock Fragments And Trace Organics - Fill Note: Sample Moist	25.2%	1
8.0	Soft Brown And Tan Slightly Micaceous Coarse To Fine Sandy Clayey SILT With Small Rock Fragments - Fill Note: Sample Very Moist	26.8%	4
10.0	Firm Brown And Grey Coarse To Fine Sandy Very Silty CLAY With Rock Fragments - Residual Note: Sample Moist		6
11.5	Partially Weathered Rock When Sampled Becomes Grey And White Silty Coarse To Fine SAND		50/0.1
16.0	Partially Weathered Rock When Sampled Becomes Brown, Black And White Silty Coarse To Fine SAND Note: Samples Moist		50/0.2
18.5	Boring Terminated No Groundwater Encountered		50/0.1

● PENETRATION - BLOW COUNT*

5 10 20 30 40 60 80 100



BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

*PENETRATION IS THE NUMBER OF BLOWS OF A 140 LB. (63.5kg) HAMMER FALLING 30 IN. (76.2cm) REQUIRED TO DRIVE A 1.4 IN (3.6cm) I.D. SAMPLER 1 FT. (30.5cm)

PRESSUREMETER TEST
50/4 ROCK CORE RECOVERY
◄ LOSS OF DRILLING WATER
WOH WEIGHT OF HAMMER

WATER TABLE - 24 HR.
WATER TABLE - 1 HR.
CAVE-IN DEPTH

BORING NO. B-104
DATE DRILLED 12/11/15
DRILLING CONTRACTOR Soil Drilling Services
JOB NO. CH11.0047.GE
PROJECT SCHIELE MUSEUM

TEST BORING RECORD

GEOSCIENCE GROUP, INC.

DEPTH, FT.	DESCRIPTION	Moisture Content	Blow Count
0.0			
0.5	2 Inches Asphalt And 4 Inches Crushed Stone		
	Firm Brown And Reddish-Brown Slightly Micaceous Medium To Fine Sandy Very Clayey SILT With Rock Fragments - Fill	17.8%	6
2.0			
	Stiff Brown Slightly Micaceous Clayey Medium To Fine Sandy SILT With Rock Fragments - Fill	16.5%	9
4.0			
	Firm Reddish-Brown Slightly Micaceous Medium To Fine Sandy Clayey SILT With Rock Fragments - Fill Note: Blow Count Influenced By Rock Fragments/Sample Moist	27.1%	25
6.0			
	Soft Reddish-Brown Slightly Micaceous Medium To Fine Sandy Clayey SILT With Rock Fragments - Fill Note: Limited Sample Recovery	16.9%	4
8.0			
	Loose Brown And Tan Silty Clayey Coarse To Fine SAND With Rock Fragments - Fill	18.0%	6
10.5			
	Very Firm Brown Clayey Silty Medium To Fine SAND - Residual		25
12.0			
	Partially Weathered Rock When Sampled Becomes Grey And White Silty Coarse To Fine SAND		50/0.3
			50/0.2
17.0			
	Partially Weathered Rock When Sampled Becomes Brown, Black And White Silty Coarse To Fine SAND With Clay Seams		50/0.5
19.5			
	Boring Terminated		

● PENETRATION - BLOW COUNT*

5 10 20 30 40 60 80 100

16.9'

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

*PENETRATION IS THE NUMBER OF BLOWS OF A 140 LB. (63.5kg) HAMMER FALLING 30 IN. (76.2cm) REQUIRED TO DRIVE A 1.4 IN. (3.6cm) I.D. SAMPLER 1 FT. (30.5cm)

PRESSUREMETER TEST
50/0% ROCK CORE RECOVERY
◄ LOSS OF DRILLING WATER
WOH WEIGHT OF HAMMER

WATER TABLE - 24 HR.
WATER TABLE - 1 HR.
CAVE-IN DEPTH

BORING NO. B-105
DATE DRILLED 12/11/15
DRILLING CONTRACTOR Soil Drilling Services
JOB NO. CH11.0047.GE
PROJECT SCHIELE MUSEUM

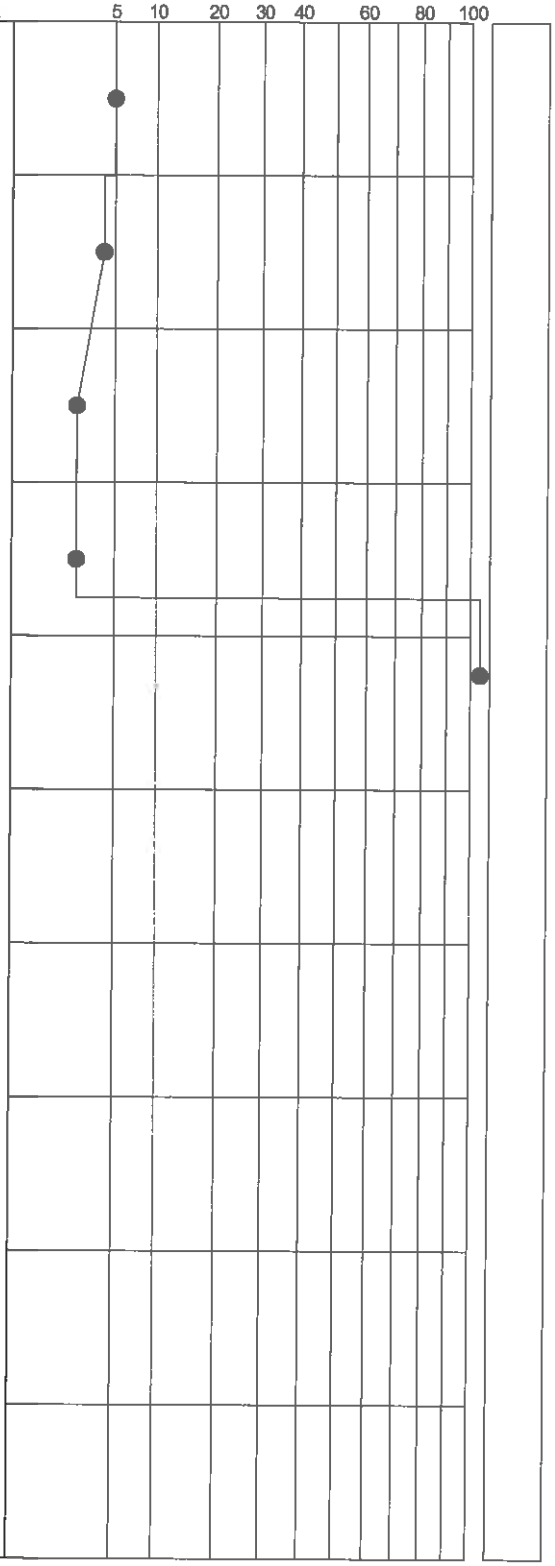
TEST BORING RECORD

GEOSCIENCE GROUP, INC.

DEPTH, FT.	DESCRIPTION	Moisture Content	Blow Count
0.0			
0.5	Topsoil And Roots		
	Firm Brown And Black Slightly Micaceous Medium To Fine Sandy Clayey SILT With Rock Fragments And Trace Organics - Fill Note: Sample Moist	25.7%	5
2.0	Soft Reddish-Brown, Brown And Grey Slightly Micaceous Clayey Coarse To Fine Sandy SILT With Rock Fragments, Asphalt Pieces, Concrete Fragments And Trace Organics - Fill Note: Samples Moist	15.1%	4
		19.4%	2
6.0	Very Loose Brown Clayey Silty Coarse To Fine SAND With Small Rock Fragments - Fill Note: Sample Moist	15.3%	2
7.5	Partially Weathered Rock When Sampled Becomes Grey And White Silty Coarse To Fine SAND - Residual		50/0.1
8.5	Auger Refusal No Groundwater Encountered		

● PENETRATION - BLOW COUNT*

5 10 20 30 40 60 80 100



BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

*PENETRATION IS THE NUMBER OF BLOWS OF A 140 LB. (63.5kg) HAMMER FALLING 30 IN. (76.2cm) REQUIRED TO DRIVE A 1.4 IN. (3.6cm) I.D. SAMPLER 1 FT. (30.5cm)

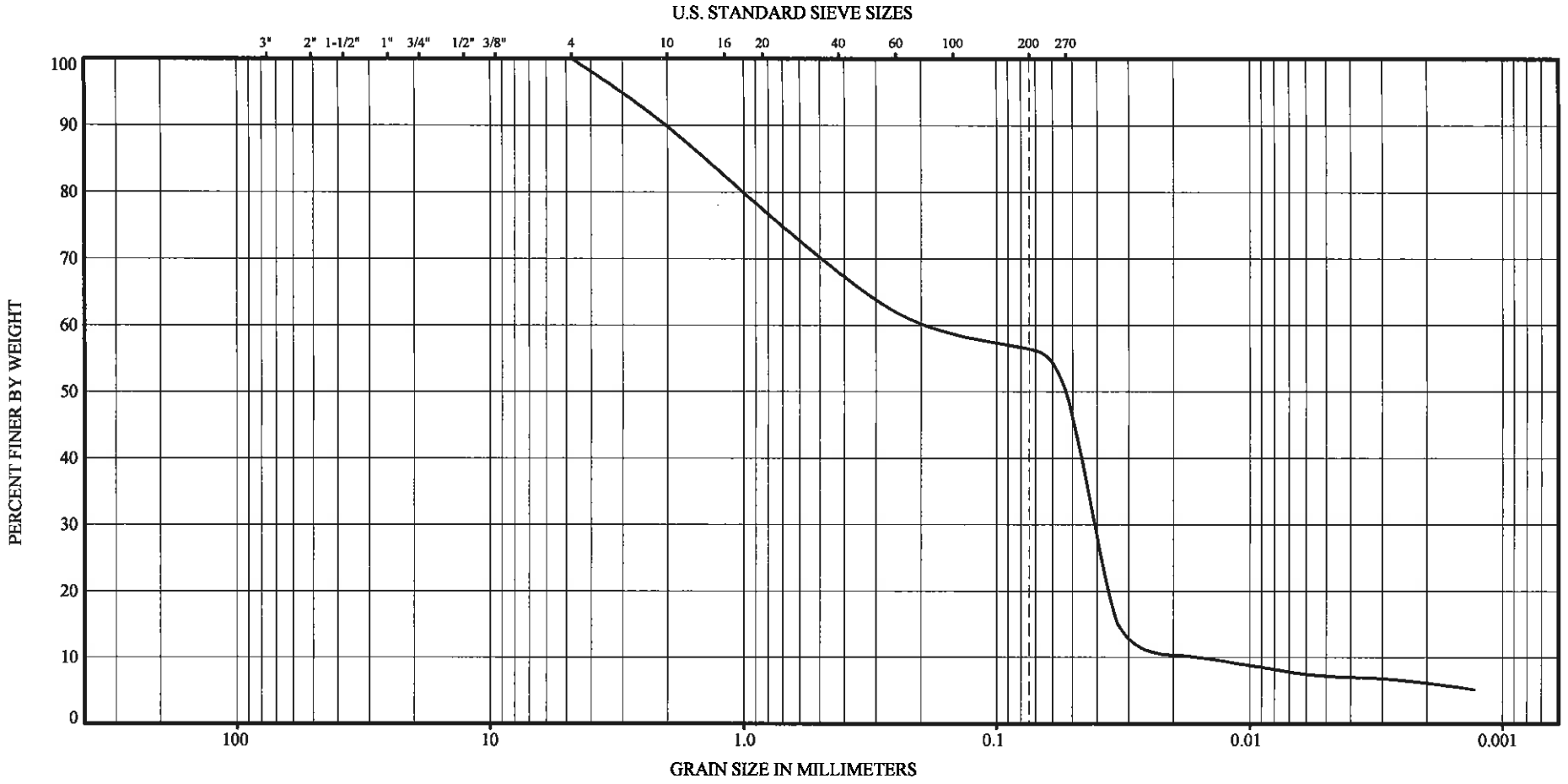
PRESSUREMETER TEST
50/6" ROCK CORE RECOVERY
LOSS OF DRILLING WATER
WOH WEIGHT OF HAMMER

WATER TABLE - 24 HR.
WATER TABLE - 1 HR.
CAVE-IN DEPTH

SUMMARY OF LABORATORY TEST DATA
SCHIELE MUSEUM
GASTONIA, NORTH CAROLINA
GEOSCIENCE PROJECT NO. CH11.0047.GE

TABLE 1 OF 1

Boring Location	Sample Depth (feet)	Sample Type	Moisture Content (%)	Atterberg Limits			Max. Dry Density (pcf)	Optimum Moisture Content (%)	Grain Size Distribution	
				L.L.	P.L.	P.I.			%SAND	%SILT & %CLAY
B-101	0-2	Split-Spoon	19.7	40	21	19				
B-101	2-4	Split-Spoon	22.1							
B-101	4-6	Split-Spoon	14.5							
B-101	6-8	Split-Spoon	13.8							
B-101A	0-2	Split-Spoon	28.9							
B-101A	2-4	Split-Spoon	23.9							
B-101A	4-6	Split-Spoon	31.0							
B-101A	6-8	Split-Spoon	16.1							
B-102	0-2	Split-Spoon	18.1							
B-102	2-4	Split-Spoon	22.1	39	28	11				
B-102	4-6	Split-Spoon	2.1							
B-102	6-8	Split-Spoon	25.6							
B-102	8-10	Split-Spoon	12.2							
B-103	0-2	Split-Spoon	16.7	34	22	12			38	62
B-103	2-4	Split-Spoon	24.9						25	75
B-103	4-6	Split-Spoon	24.2						48	52
B-103	6-8	Split-Spoon	25.2							
B-103	8-10	Split-Spoon	26.8							
B-104	0-2	Split-Spoon	17.8							
B-104	2-4	Split-Spoon	16.5							
B-104	4-6	Split-Spoon	27.1							
B-104	6-8	Split-Spoon	16.9							
B-104	8-10	Split-Spoon	18.0							
B-105	0-2	Split-Spoon	25.7							
B-105	2-4	Split-Spoon	15.1							
B-105	4-6	Split-Spoon	19.4							
B-105	6-8	Split-Spoon	15.3							



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING:	DEPTH:	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
B-103	0.0' - 2.0'	16.7	34	22	12	Brown, Tan And Grey Slightly Micaceous Clayey Coarse To Fine Sandy SILT

GRAIN SIZE DISTRIBUTION

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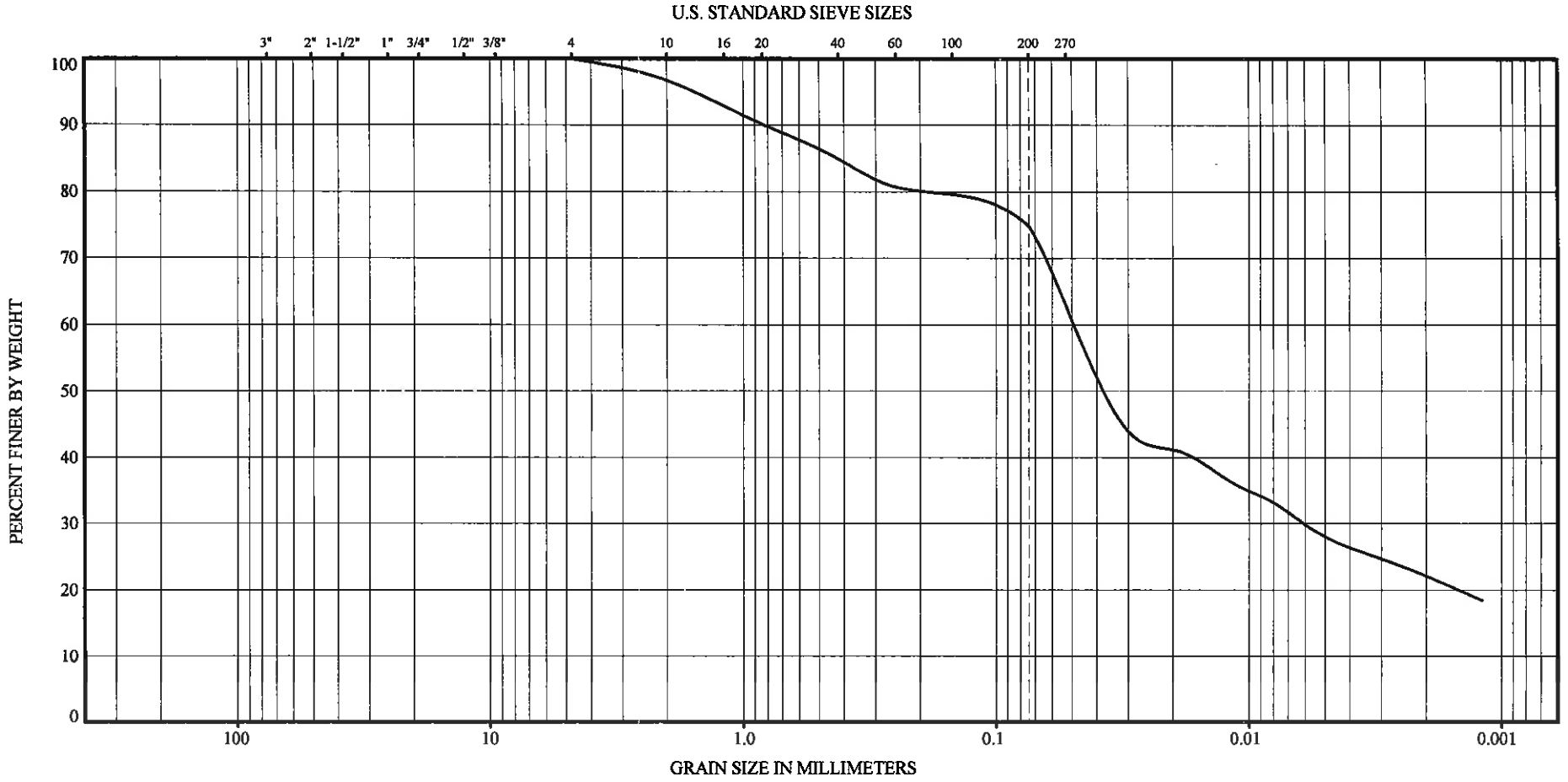
Geoscience Group, Inc.
500-K Clanton Road
Charlotte, North Carolina



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING:	DEPTH:	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
B-103	2.0' - 4.0'	24.9				Brown And Tan Slightly Micaceous Coarse To Fine Sandy Clayey SILT

GRAIN SIZE DISTRIBUTION

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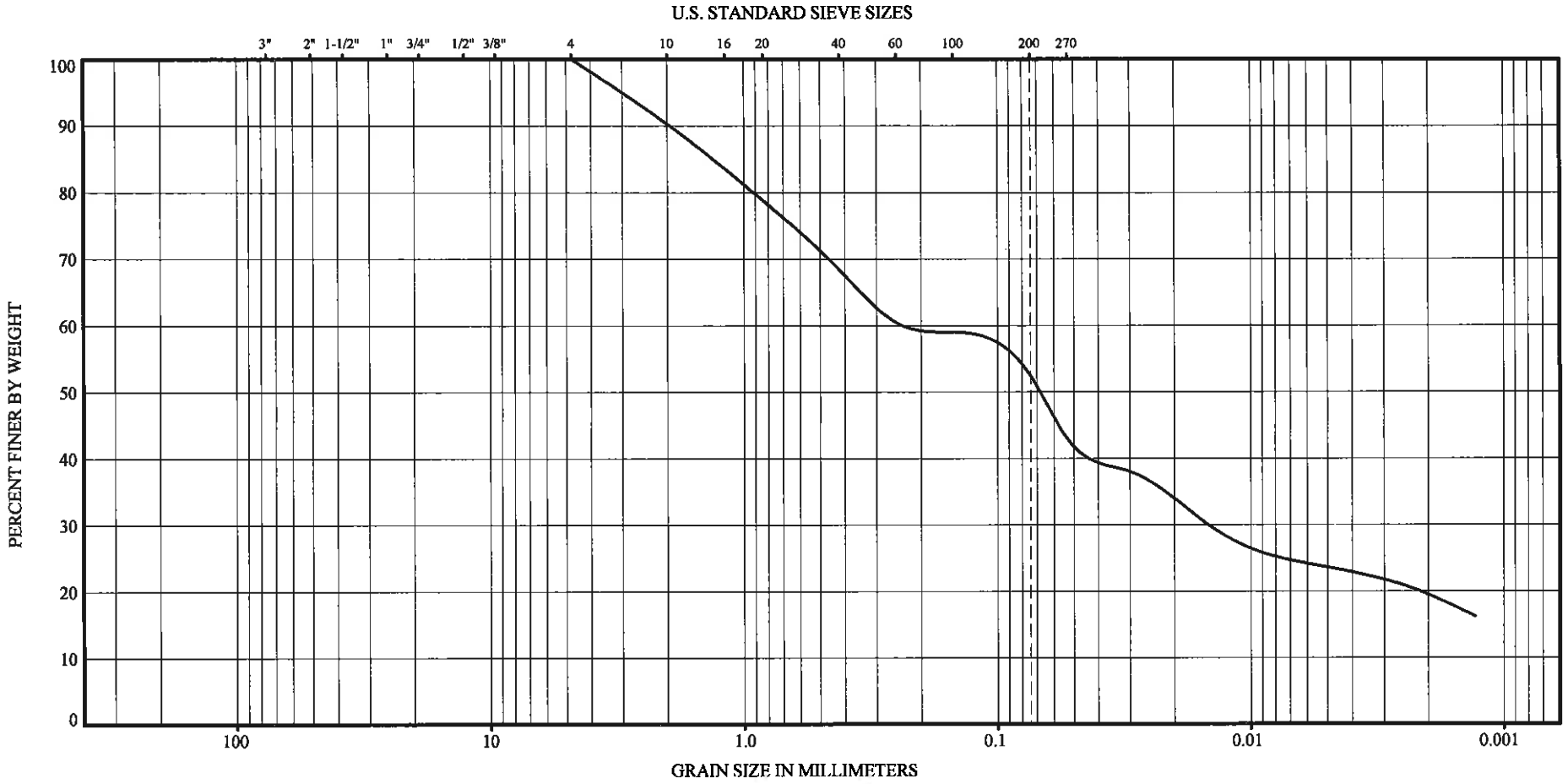

BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING:	DEPTH:	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
B-103	4.0' - 6.0'	24.2				Brown And Tan Slightly Micaceous Clayey Silty Coarse To Fine SAND

GRAIN SIZE DISTRIBUTION

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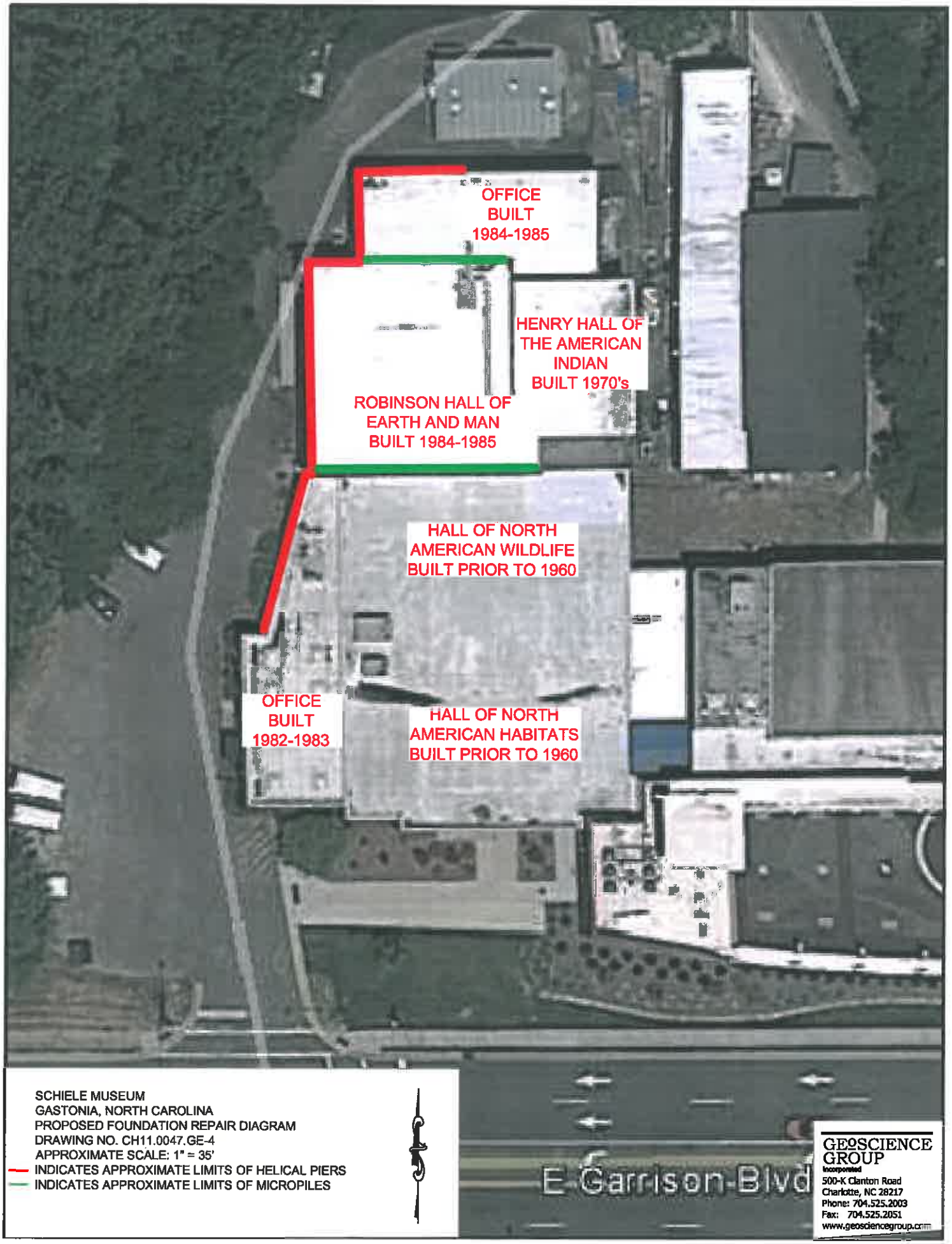
Charlotte, North Carolina



SCHIELE MUSEUM
GASTONIA, NORTH CAROLINA
PROPOSED FOUNDATION REPAIR DIAGRAM
DRAWING NO. CH11.0047.GE-4
APPROXIMATE SCALE: 1" = 35'
INDICATES APPROXIMATE LIMITS OF HELICAL PIERS
INDICATES APPROXIMATE LIMITS OF MICROPILES

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