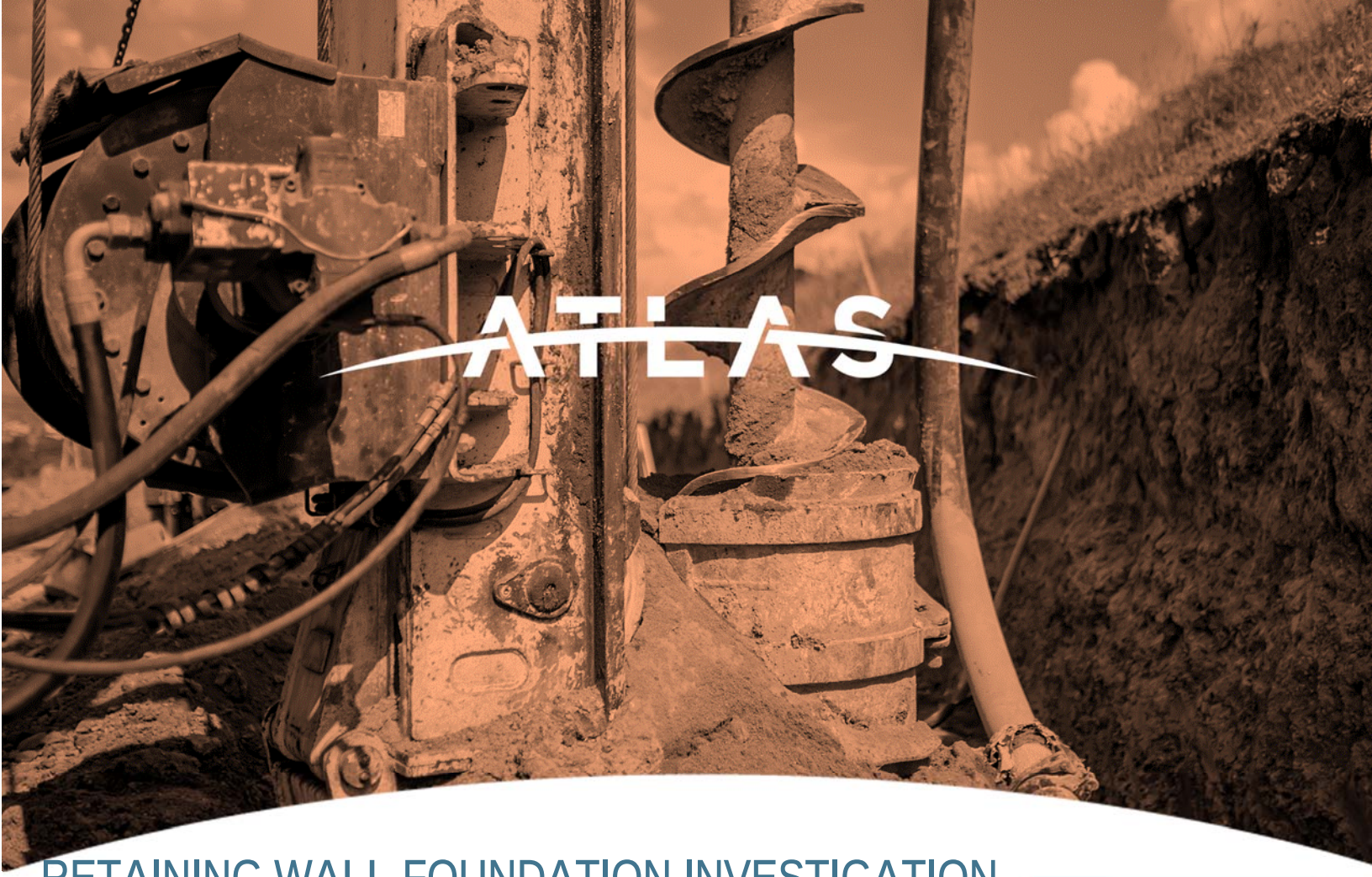


RETAINING WALL FOUNDATION INVESTIGATION

McGinnis Ferry Road **(CR3717) Widening** – Wall No. 19**C**

Forsyth and Fulton Counties, Georgia

PI NO. 0004634

December 13, 2021

PREPARED BY:
Atlas Technical Consultants, LLC
2450 Commerce Avenue
Suite 100
Duluth, Georgia 30096

Atlas Project No. FOR095

Wall Foundation Investigation, Wall #19C
PI No. 0004634, Forsyth and Fulton Counties
December 13, 2021

LOCATION (See Map) McGinnis Ferry Road (CR 3717) Widening, Wall No.19C

GENERAL INFORMATION

GEOLOGIC FORMATION This project will be geologically sited in the Biotitic Gneiss / Mica Schist/ Amphibolite Formation of the Georgia Piedmont Region.

SUBSURFACE FEATURES Subsurface soils consist of mostly medium dense silty sand or stiff to hard silty clay, no partially weathered rock/hard rock was encountered before the termination of the borings. No Ground water was encountered during drilling operation. For additional information see the boring layout and boring logs.

SITE CLASSIFICATION We recommend a site class of "D" per AASHTO LRFD 3.10.3.1.

WALL DESCRIPTION A soldier pile wall is proposed with a height range of 4.88 to 13.50 feet. The wall begins at station 287+00 and ends at station 289+21.96 for a total length of 212.85 feet. The purpose of the wall is for the widening construction.

1.1 – RETAINED SOIL PARAMETERS

Wall # (Station Range)	Unit Weight (pcf)	Internal Friction Angle (degrees)	Cohesion (psf)
Entire length	115	30	0

1.2 – FOUNDATION SOIL PARAMETERS

Wall # (Station Range)	Unit Weight (pcf)	Internal Friction Angle (degrees)	Cohesion (psf)
Entire length	120	34	0

Note: The retained soil parameters represent the soil above the bottom of the wall while the foundation soil parameters represent the soil below the bottom of the wall

1.3 – PILE PROPERTIES

Pile Type	Pile Size (in)	Nominal Compression Stress (ksi)	Nominal Tension Stress (ksi)	Maximum Factored Structural Resistance (kips)
HP (50 ksi)	12 x 53	45.0	45.0	384
HP (50 ksi)	14 x 73	45.0	45.0	520

1.4 – DESIGN DATA

Wall Station Ranges	Design Height	Pile Size	Pile Spacing	Pile Embedment Depth
287+00.00 to 287+73.25 288+69.25 to 289+21.96	10'-0"	HP 12x53	8'-0"	14'-6"
287+73.25 to 288+69.25	13'-6"	HP 14x73	8'-0"	18'-0"

Note: Pile embedment depths are provided by wall designer as results of stability analyses, which are used in global stability check.

2.0 -- GENERAL NOTES

Elevations All elevations are based on an Elevation 1001.02 of a rebar set into the ground at station 131+46.46, 4.94' Lt.

As Built Foundation Information The as built foundation information should be forwarded to the Geotechnical Engineering Bureau upon completion of the foundation system.

Soldier Piles in Rock Drill a 30 inches diameter pilot hole to the required minimum embedment depth on wall plan, where rock is encountered before the required embedment, pile shall socket into rock a minimum of 5 feet.

Global Stability Analyses Global stability analyses have been performed using Slope/W by GeoStudio Software. Factor of safety was evaluated with the Bishop and Morgenstern-Price methods, both circular and non-circular failure analyses were performed for the aforementioned methods.

The wall system meets the AASHTO LRFD requirements. The critical section was analyzed and the calculated factor of safety is listed below. Detailed analysis results are attached to this report.

Location (Station)	Required Resistance Factor	Required Minimum FoS	Calculated Minimum FoS
288+50	0.65	1.54	4.082

Vibration Monitoring Several properties are located within 75 feet of the construction limits of this project. Vibration monitoring will be required due to vibrations from construction activities which may cause some concern with property owners. A set of right of way plans should be submitted to the Geotechnical Bureau so that Special Provision 154: Vibration Monitoring — can be provided a later date.

3.0 – QA / QC

Prepared By: Jay Shah

Signature:

Reviewed By: Yong Shao, PhD, PE

Signature:

GEORGIA REGISTERED No. 26340 PROFESSIONAL ENGINEER YONG C. SHAO

APPENDICES

A – Site location Map

B – Boring locations and logs

C – Drilling calibration report

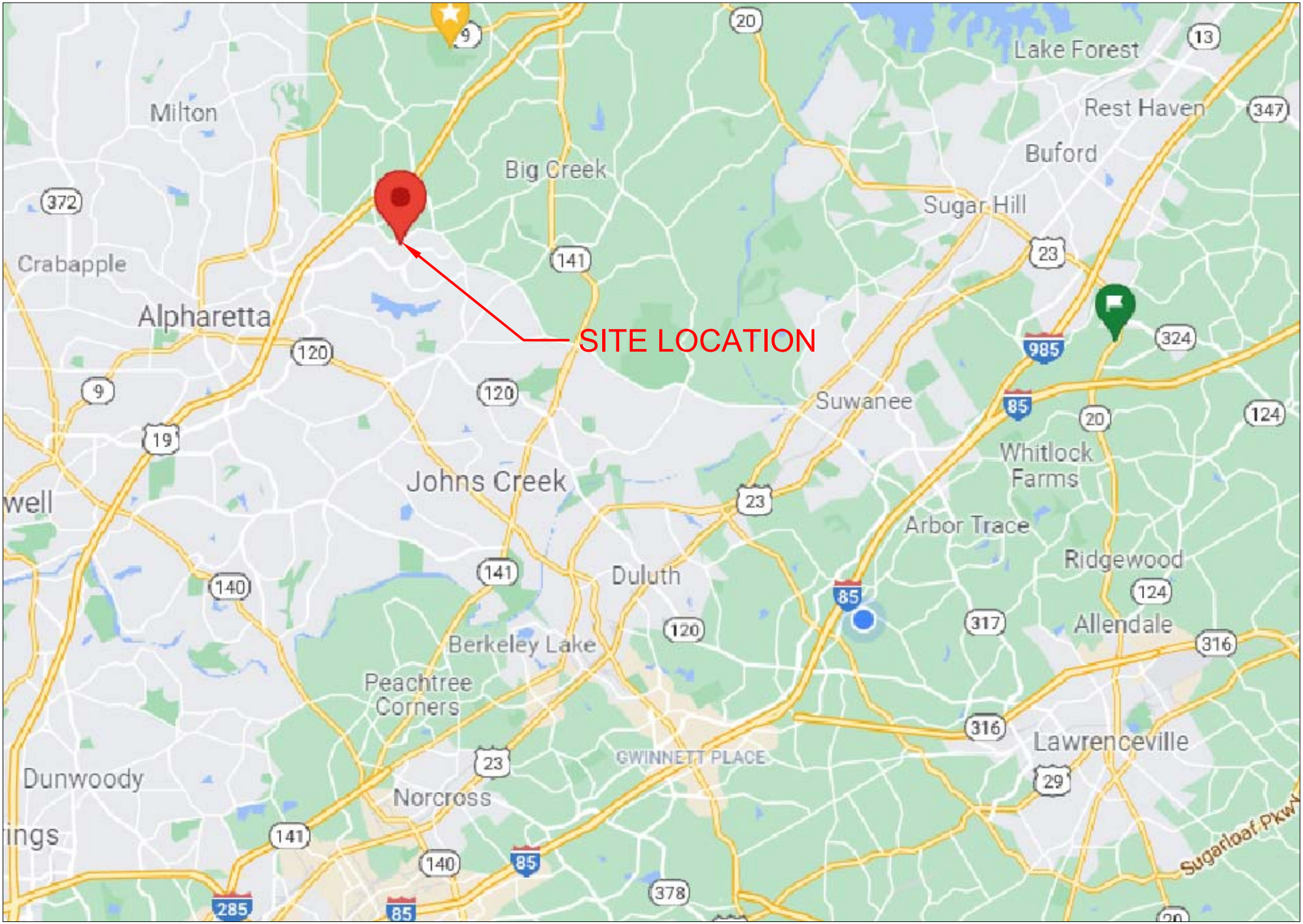
D – Soil laboratory tests

E – Seismic site class determination

F – Wall foundation design data

G – Global stability analysis graphical outputs

Appendix A – Site location map



TITLE: SITE LOCATION MAP	PROJECT NO: FOR095	ATLAS	ATLAS TECHNICAL CONSULTANTS
PROJECT: MCGINNIS FERRY ROAD OVER BIG CREEK FORSYTH/FULTON COUNTIES, GEORGIA	DRAWN BY: YCS		2450 COMMERCE AVE, SUITE 100 DULUTH, GEORGIA 30096 TEL: 770-2635945; FAX: 770-2635954
	DATE: 1/13/2021		

12/20/2018
CVE-Darla

GPLOT-V8
gplotborder-v81-PO.tbl

2016217_01-0001.dgn
GRMCOV

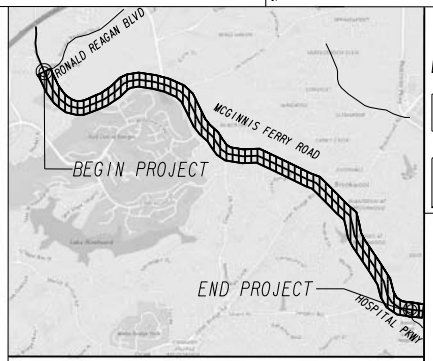
GDOT | P. I. No. 0004634

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PLAN AND PROFILE OF PROPOSED

MCGINNIS FERRY ROAD WIDENING

FROM RONALD REAGAN BLVD/UNION HILL RD TO HOSPITAL PARKWAY
FORSYTH AND FULTON COUNTIES



LOCATION SKETCH

DESIGN DATA:
TRAFFIC A.D.T.: 26,200 (2020)
TRAFFIC A.D.T.: 37,700 (2040)
TRAFFIC D.H.V.: 3580 (2040)
DIRECTIONAL DIST: 51/49
% TRUCKS: 2%
24 HR. TRUCKS %: 4%
SPEED DESIGN: 45 mph

LOCATION & DESIGN APPROVAL DATE:

FUNCTIONAL CLASS:
URBAN ARTERIAL

THIS PROJECT IS 50 % IN FULTON COUNTY NO.006, AND IS 50 % IN FORSYTH COUNTY CONG. DIST. NO. 007

PROJECT DESIGNATION: EXEMPT

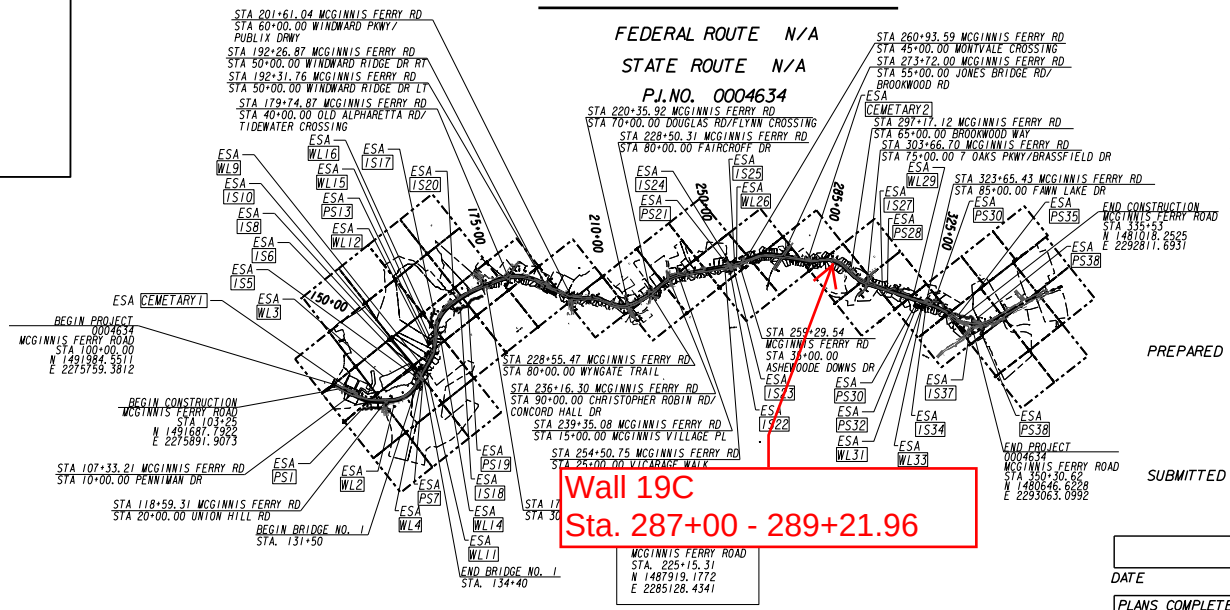
THIS PROJECT HAS BEEN PREPARED USING THE HORIZONTAL GEORGIA COORDINATE SYSTEM OF 1984 (NAD 1983)1994 WEST ZONE, AND THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

0004634

FEDERAL ROUTE N/A

STATE ROUTE N/A

P.I.NO. 0004634



SCALE IN FEET
0 2000 4000 8000

LENGTH OF PROJECT	COUNTY No. 121 AND 117 Project No. 0004634
	MILES
NET LENGTH OF ROADWAY	4.686
NET LENGTH OF BRIDGES	0.055
NET LENGTH OF PROJECT	4.741
NET LENGTH OF EXCEPTIONS	N/A
GROSS LENGTH OF PROJECT	4.741

NOTE :
ALL REFERENCES IN THIS DOCUMENT, WHICH INCLUDES ALL PAPERS, WRITINGS, DOCUMENTS, DRAWINGS, OR PHOTOGRAPHS USED, OR TO BE USED IN CONNECTION WITH THIS DOCUMENT, TO "STATE HIGHWAY DEPARTMENT OF GEORGIA", "STATE HIGHWAY DEPARTMENT", GEORGIA STATE HIGHWAY DEPARTMENT", "HIGHWAY DEPARTMENT", OR "DEPARTMENT" WHEN THE CONTEXT THEREOF MEANS THE STATE HIGHWAY DEPARTMENT OF GEORGIA, AND SHALL BE DEEMED TO MEAN THE DEPARTMENT OF TRANSPORTATION.

PE STAMP

MORELAND ALTOBELLI
AN ATLAS COMPANY
2450 Commerce Avenue
Suite 100
Duluth, Georgia 30096
770.263.5945

PREPARED BY: _____
DESIGN

SUBMITTED BY: _____
STATE PROGRAM DELIVERY ADMINISTRATOR

DATE CHIEF ENGINEER

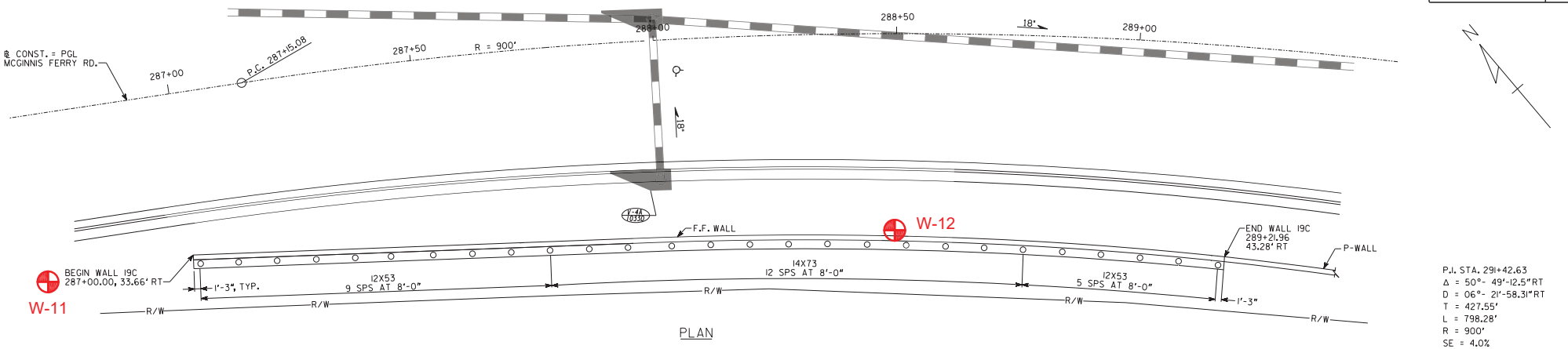
PLANS COMPLETED - -	
REVISIONS	

DRAWING No. 01-0001

THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS OR IN ANYWAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY, ARE NOT GUARANTEED, AND DO NOT BIND THE DEPARTMENT OF TRANSPORTATION IN ANY WAY. THE ATTENTION OF BIDDER IS SPECIFICALLY DIRECTED TO SUBSECTIONS 102.04, 102.05, AND 104.03 OF THE SPECIFICATIONS.

Appendix B – Boring locations and logs

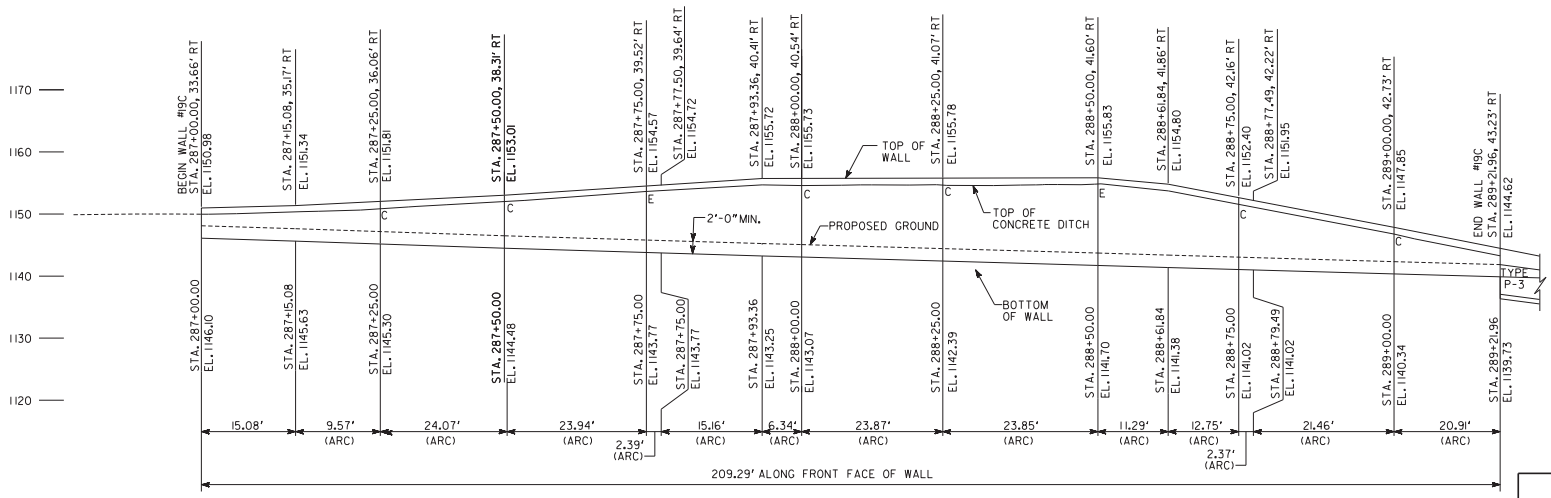
P.I. NO. 0004634



PLAN

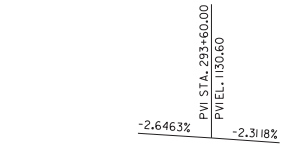
P.I. STA. 291+42.63
Δ = 50°- 49'-12.5"RT
D = 06°- 21'-58.31"RT
T = 427.55'
L = 798.28'
R = 900'
SE = 4.0%

HORIZONTAL CURVE DATA
CURVE #17



C = CONTRACTION JOINT
E = EXPANSION JOINT

ELEVATION
(LOOKING AT BACK FACE OF WALL)



VERTICAL CURVE DATA
MCGINNIS FERRY RD

BORING LOCATION MAP

WALL NO. 19C

ATLAS
2450 Commerce Avenue
Duluth, Georgia 30096-8910
Tel.: 770-263-8945
oneatlas.com

GEORGIA REGISTERED No. 43404 PROFESSIONAL ENGINEER KEVIN F. DASCALL

GEORGIA
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION-OFFICE OF BRIDGES AND STRUCTURES

WALL 19C
PLAN AND ELEVATION
MCGINNIS FERRY ROAD
FORSYTH COUNTY 0004634

SCALE: 1"= 10'-0" (UNLESS NOTED OTHERWISE) OCTOBER 2021

DESIGNED	JEM	CHECKED	SWW	REVIEWED	DLC/SKG
DRAWN	DAW	DESIGN GROUP	JRT	APPROVED	WMD

DRAWING NO. 32-0001
WALL SHEET 1 OF 4

DATE | REVISIONS | BY

1 INCH WHEN PRINTED FULL SIZE

$FILEL$ $USER$ DATE$$$ TIME$$$ SCON$

ATLAS
TECHNICAL CONSULTANTS
2450 Commerce Avenue, STE 100, Duluth, GA 30096
(770)-2635945

Boring W-11, Sta. 286+70, 33' Rt

McGinnis Ferry Road
Forsyth County, GA
GDOT : P I No. 0004634

Atlas Proj. No.: FOR095

Wall No. 19B (Station 286+19.39 to 289+17.59)

DATE COMPLETED	: 9/23/2019	SURFACE ELE.	: 1150'
ENERGY RATING	: 94%	DEPTH OF BORING	: 25'
DRILL RIG	: CME 550 (SN 380)	DEPTH TO WATER	: Not encountered
DRILLING METHOD	: HSA + SPT	LOGGED BY	: Jay
DRILLER	: Drilling Solutions, LLC.	BOTTOM OF WALL	: 1146'

Sample Condition: Remoulded; Undisturbed; Lost; Rock Core

Sampler Type: SS Split Spoon; ST Shelby Tube; PS Piston Sampler; DC Diamond Core Bar.

Depth in Feet	Surf. Elev. 1150	USCS	GRAPHIC	DESCRIPTION	Blow count	SPT-N Value	N Value Graph (0 50 100)	Sampler Type	Sample	Moist, %	Water Level
0	1150										
2	1148	SM		Brown, mica, SILTY SAND, mediumn dense, dry	4-6-7	20		SS			
4	1146	SM		Grey, mica, SILTY SAND, dense, dry	6-11-11	34		SS			
6	1144	SM		Brown, mica, SILTY SAND, medium dense, moist	2-4-6	16		SS			
8	1142										
10	1140	SM		Pink mica, SILTY SAND, medium dense, moist	2-3-5	13		SS			
12	1138										
14	1136	SM		Grey, mica, SILTY SAND, medium dense, moist	2-8-11	30		SS			
16	1134										
18	1132										
20	1130	SM		White/grey, mica, SILTY SAND, medium dense, moist (saprolite)	4-3-5	13		SS			
22	1128										
24	1126				5-7-9	25		SS			
26	1124			Boring terminated at depth of 25' BGS							
28	1122										
30	1120										
32	1118										
34											

NOTE: SPT N-values have been corrected with 94% energy rating

12-05-2021 C:\Users\yshao\Desktop\Yong Shao GDOT\TEMP\McGinnis Ferry\Boring Log\W-11.bor

ATLAS
TECHNICAL CONSULTANTS
2450 Commerce Avenue, STE 100, Duluth, GA 30096
(770)-2635945

Boring W-12, Sta. 288+50, 30' Rt

McGinnis Ferry Road
Forsyth County, GA
GDOT : P I No. 0004634

Atlas Proj. No.: FOR095

Wall No. 19B (Station 286+19.39 to 289+17.59)

DATE COMPLETED	: 9/20/2019	SURFACE ELE.	: 1154'
ENERGY RATING	: 94%	DEPTH OF BORING	: 30'
DRILL RIG	: CME 550 (SN 380)	DEPTH TO WATER	: Not encountered
DRILLING METHOD	: HSA + SPT	LOGGED BY	: Jay
DRILLER	: Drilling Solutions, LLC.	BOTTOM OF WALL	: 1142'

Sample Condition: Remoulded; Undisturbed; Lost; Rock Core

Sampler Type: SS Split Spoon; ST Shelby Tube; PS Piston Sampler; DC Diamond Core Bar.

Depth in Feet	Surf. Elev. 1154	USCS	DESCRIPTION	Blow count	SPT-N Value	Sampler Type	Sample
0	1154	ML	Brown/tan, mica SILT, stiff, slightly moist	4-3-3	9	SS	
4	1150	SM	Grey, SILTY SAND, loose, slightly moist	3-3-3	9	SS	
6	1148	SM	Grey/brown, SILTY SAND, medium dense, moist	3-4-7	17	SS	
8	1146	SM	Grey/white, SILTY SAND, medium dense	6-6-9	24	SS	
12	1142		Btm of Wall				
14	1140	SC/SM	Grey, SILTY CLAYEY SAND, dense (saprolite)	11-13-9	34	SS	
20	1134	SM	Grey/white, SILTY SAND, dense (Saprolite)	12-13-10	36	SS	
24	1130			10-13-13	41	SS	
30	1124		Boring terminated at depth of 30ft BGS	9-10-12	34	SS	

N Value Graph: 0 50 100

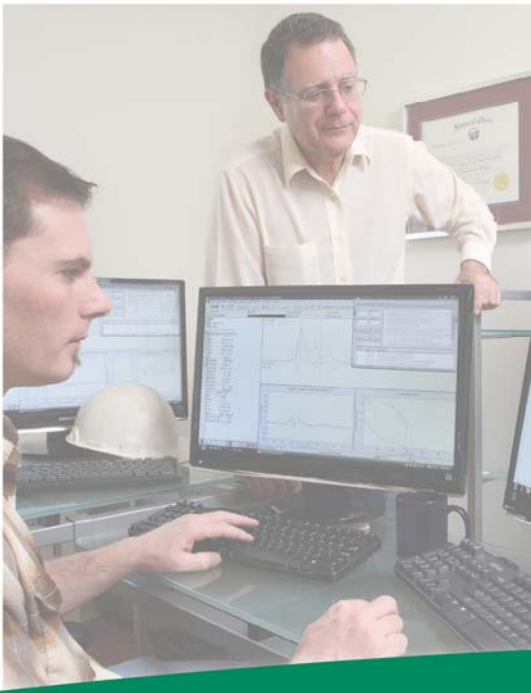
Moist, %

Water Level

NOTE: SPT N-values have been corrected with 94% energy rating

12-05-2021 C:\Users\yshao\Desktop\Yong Shao GDOT\TEMP\McGinnis Ferry\Boring Log\W-12.bor

Appendix C – Drilling calibration report



GRL engineers, inc.

Dynamic Measurements and Analyses

Job No. 179031-1

Report on: Standard Penetration Test Energy Measurements
Jonesboro, GA

Prepared for Drilling Solutions

By Thomas G. Hyatt, P.E. and Joel S. Webster, E.I.

June 20, 2018

June 20, 2018

Tony Trettel
Drilling Solutions, LLC
180 Gateway Dr.
Canton, GA 30115

Re: Standard Penetration Test Energy Measurements
Jonesboro, GA GRL Job No. 179031-1

Dear Mr. Trettel,

This report presents results of energy measurements obtained on June 8, 2019 during Standard Penetration Tests (SPT) sampling. Two automatic hammers mounted on two separate CME550 dill rigs that were tested generally following ASTM D4633-10 standards. All dynamic tests were performed on AWJ drill rods. GRL Engineers, Inc. obtained the dynamic measurements with an instrumented AW subsection that had AWJ adapters and a Model 8G Pile Driving Analyzer®. This report describes the testing procedures and summarizes the test results. Appendix A describes our measurement and analysis methods, Appendix B contains calibration information for the gages and equipment used, and Appendix C is a summary of the field data.

PURPOSE AND SCOPE OF WORK

At the request of Drilling Solutions, LLC., GRL conducted SPT energy measurements in Jonesboro, GA according to ASTM D4633-10. Specifically, we recorded SPT energy measurements at five-foot sample intervals between 18.5 and 43.5 feet below the existing ground surface. SPT samples were taken every five feet from the ground surface until a boring depth of about 43.5 feet was reached. All SPT samples were driven for a total of 3 six-inch increments, or 1.5 feet.

EQUIPMENT

Drilling and SPT Hammer Equipment

CME-550 (Serial # 380)

SPT energy measurements were made on an automatic hammer mounted on a CME-550 drill rig. The drilling method used to advance the boring was hollow stem auger. Energy measurements for this drill rig were collected at a borehole located in Jonesboro, GA. SPT energy measurements were performed at 5-foot sampling intervals between 18.5 and 40.0 feet. A total of five energy measurement events were performed for this drill rig.

CME-550 (Serial # 404)

SPT energy measurements were made on an automatic hammer mounted on a CME-550 drill rig. The drilling method used to advance the boring was hollow stem auger. Energy measurements for this drill rig were collected at a borehole located in Jonesboro, GA. SPT energy measurements were performed at 5-foot sampling intervals between 18.5 and 43.5 feet. A total of six energy measurement events were performed for this drill rig. The SPT energy measurements performed from 33.5 to 40 feet did not meet the ASTM D4633-10 specifications for blow counts and were not considered in the calibration of this drill rig.

Instrumentation

A Model 8G Pile Driving Analyzer (PDA) data acquisition system (SN# 4613LE) was used to collect and process the dynamic measurements of force and velocity. The data was collected using a two foot long section of AW rod subsection (SN# 246AW) with a cross sectional area of 1.21 square inches and instrumented with two full bridge foil resistance strain gages and two piezoresistive accelerometers mounted in the midpoint location of the instrumented rod. Couplings were used to convert the threads from the AW rod subsection to the AWJ rod string.

Analog signals from the strain gages and accelerometers were conditioned, digitized, stored and processed with the PDA. The sampling frequency used during the SPT testing was 50 kHz. Selected output from the PDA for each recorded impact included the energy transfer ratio (ETR), maximum rod top velocity (VMX), maximum energy transfer (EFV), maximum rod top force (FMX), and the hammer operating rate (BPM).

MEASUREMENTS AND CALCULATIONS

FV Method (EFV)

Energy transfer to the PDA gage location, EFV, was computed by the PDA using force, F(t), and velocity, v(t), records as follows:

$$EFV = \int_a^b F(t) \cdot v(t) dt$$

The time "a" corresponds to the start of the record when the energy transfer begins, and "b" is the time at which energy transferred to the rod reaches a maximum value. The FV Method is currently recognized in ASTM D4633-10, and is the theoretically correct result; therefore, no other energy calculation methods are reported.

Corrected SPT number (N_{60})

While the primary purpose of SPT energy testing is to calculate the maximum transferred energy (ETR) of each hammer blow, the overall average EFV value can be used to calculate the corrected SPT number (N_{60}). To adjust the SPT N-values for hammer performance, the following correction as suggested by Seed for N-value adjustment to 60% transfer efficiency (e.g. 210 ft-pounds) was used:

Where:

N_{60} = Corrected N-value
E_m = overall average measured energy transfer (EFV)
N_m =number of blows for last 12 inches of sampler penetration

$$N_{60} = \left(\frac{E_m}{210}\right) N_m$$

A general introduction to dynamic SPT testing methods is included in this report as Appendix A. References for more detailed descriptions of our testing and analysis methods are available upon request.

Any cross-sectional area difference between the GRL rod subsection and the drill rods, any loose connections or changes in area at section joints, or any cross-sectional area differences between the individual drill rod sections will result in stress wave reflections that can potentially influence the energy transfer. The EFV transferred energy calculation method, utilizing both force and velocity records, is theoretically correct and gives energy transfer results that are not adversely affected by cross-sectional area changes or loose connectors. The EFV results are included in Appendix C for all records collected and accepted after checking them for consistency.

RESULTS

Upon return to the office, the records collected by the PDA were checked for consistency and accuracy. For example, records from very weak startup or final impacts were not included in average results. Appendix C contains a representative plot of force and normalized velocity versus time, as well as tables of PDA results for all hammer blows at each dynamically monitored sampling depth. The results include the EFV (transferred energy by the FV method, as recommended by ASTM D4633-10), ETR (energy transfer efficiency for the EFV method), BPM (hammer operating rate), FMX (maximum rod top force) and VMX (maximum rod top velocity). The tables show statistical summaries for the final two 6 inch increments over which the SPT N value is calculated. At the end of each table is a statistical evaluation of these results which include the average and standard deviation.

The table below and the summary tables in Appendix C summarize the average transferred energy values calculated by the EFV method. The records consist of averaged hammer blows from the last 12 inches (i.e. N value) at each dynamically monitored sampling depth. The "energy transfer ratio" (ETR) is defined as the ratio of maximum transferred energy EFV divided by the theoretical hammer potential energy of 350 ft-lbs (i.e., computed per the 140 lb SPT hammer and the standard 30 inch drop as specified by ASTM D1586-08). The average hammer operating rate is reported in blows per minute (BPM). A summary of the dynamic measurements of the energy transfer to the drill rods using the EFV equation is provided in the table below.

Drill Rig	Avg. EFV (ft-lbs)	Avg ETR (%)	Range of EFV (ft-lbs)	Range of ETR (%)
CME-550 SN 380	330	94	309 – 367	88 – 105
CME-550 SN 404	325	78	302 – 343	66 – 88

CONCLUSIONS

Based upon the dynamic test data obtained, the following conclusions are presented:

1. Loose connections in the drill string were sometimes observed in the force and velocity records. However, energy transfer values calculated using the EFV equation are not adversely affected by the connectors and therefore are considered a better indication of transferred energy.

2. Dynamic measurements of the transferred energy to the drill rods using the EFV equation ranged from 309 to 367 ft-lbs for the CME-550, SN 380 drill rig. This corresponds to a transfer efficiency ranging from 88 to 105% of the SPT hammer energy of 350 ft-lbs.

3. Dynamic measurements of the transferred energy to the drill rods using the EFV equation ranged from 302 to 343 ft-lbs for the CME-550, SN 404 drill rig. This corresponds to a transfer efficiency ranging from 66 to 88% of the SPT hammer energy of 350 ft-lbs.

4. The average transferred energy (EFV) and energy transfer ratio (ETR) for the CME-550 drill rigs tested was as follows:

   CME-550, SN 380: Average EFV = 330 ft-lbs; Average ETR = 94%

   CME-550, SN 404: Average EFV = 325 ft-lbs; Average ETR = 78%

Please review both ASTM D4633-10 and ASTM D1586-08 prior to applying these test results. The energy calibrations reported herein are valid for the same hammer/drill rig, with the same drill operator, same anvil dimensions, and same drilling methods.

We appreciate the opportunity to be of assistance to you on this project. Please contact our office should you have any questions regarding this submittal, require additional information, or if we may be of further service.

Sincerely,

GRL Engineers, Inc.

Thomas G. Hyatt, P.E.

Joel S. Webster, E.I.

TGH:JSW:dms

Appendix D – Soil laboratory tests

2450 Commerce Avenue
Suite 100
Duluth, Georgia 30096
Tel: 770-2635945
Fax: 770-263-0166

Soil Classification

Project Name:	*McGinnis Ferry Road*			P I No.:004634	*0004634*
Sample Location:	*Wall 19C*	Sample Number:	W-11	Sample Depth:	*3.5'-5'*
Date Sampled:	*9/23/2019*	Sampled By:	*JS*	*Lab No.:*	
Date Tested:	*10/17/2019*	Tested By:	*Randy*	*Atlas Project Number:*	*FOR095*
Sample Description:	*Brown mica silty sand*				

Sieve Analysis

US Sieve Size	Sieve Opening		% Passing
	(inch)	(mm)	
3 Inch	3.0000	76.2	
1.5 Inch	1.5000	38.1	
1 Inch	1.0000	25.4	
No.4	1.8701	4.75	*100.0*
No.10	0.7874	2.00	*85.5*
No.20	0.3346	0.85	*67.9*
No.40	0.1673	0.425	*50.8*
No.60	0.0984	0.25	*43.9*
No.100	0.0591	0.15	*26.3*
No.200	0.0295	0.075	*18.6*
% Clay	0.0079	0.02	15.5

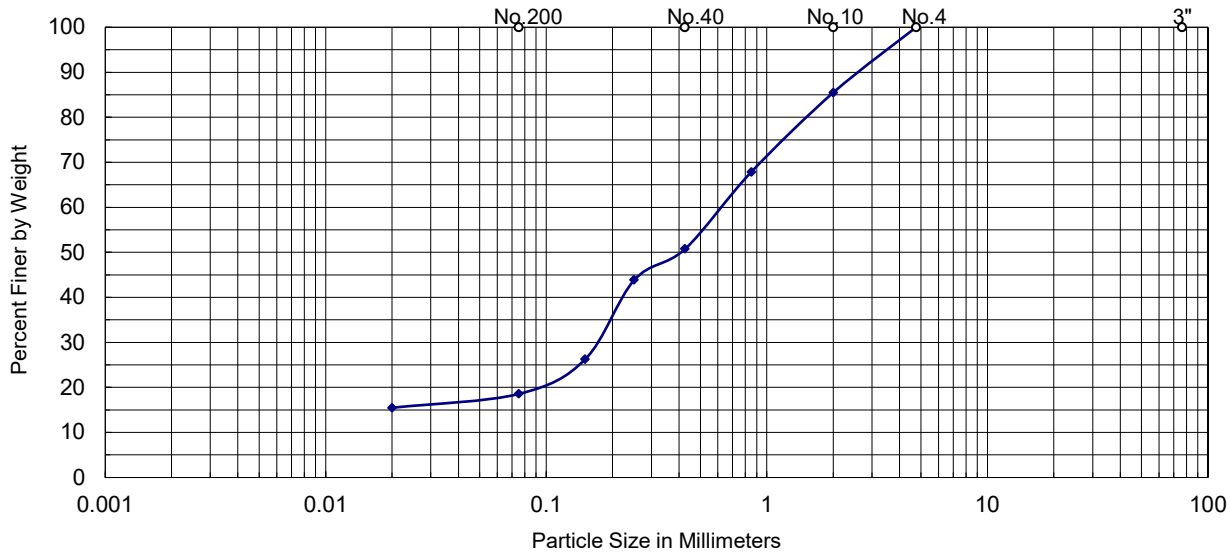
Atterberg Limits

Liquid limit (LL)	*36*
Plastic Limit (PL)	*29*
Plasticity Index (PI)	*7*

D_{10} (mm) =	
D_{30} (mm) =	
D_{75} (mm) =	
Coefficient of Uniformity, C_u =	
Coefficient of ccurvature, C_c =	

Organic Content, %	
Maximum Dry Density,pcf	
Volume Change, %	

Grain size distribution



Soil Classification

AASHTO	
USCS	SM - Silty sand
GDOT	

2450 Commerce Avenue
Suite 100
Duluth, Georgia 30096
Tel: 770-2635945
Fax: 770-263-0166

Soil Classification

Project Name:	*McGinnis Ferry Road*			P I No.:004634	*0004634*
Sample Location:	*Wall 19C*	Sample Number:	W-11	Sample Depth:	*13.5'-15'*
Date Sampled:	*9/23/2019*	Sampled By:	*JS*	*Lab No.:*	
Date Tested:	*10/17/2019*	Tested By:	*Randy*	*Atlas Project Number:*	*FOR095*
Sample Description:	*Pink mica silty sand*				

Sieve Analysis

US Sieve Size	Sieve Opening		% Passing
	(inch)	(mm)	
3 Inch	3.0000	76.2	
1.5 Inch	1.5000	38.1	
1 Inch	1.0000	25.4	
No.4	1.8701	4.75	*100.0*
No.10	0.7874	2.00	*89.4*
No.20	0.3346	0.85	*65.3*
No.40	0.1673	0.425	*51.8*
No.60	0.0984	0.25	*42.6*
No.100	0.0591	0.15	*24.3*
No.200	0.0295	0.075	*17.6*
% Clay	0.0079	0.02	13.5

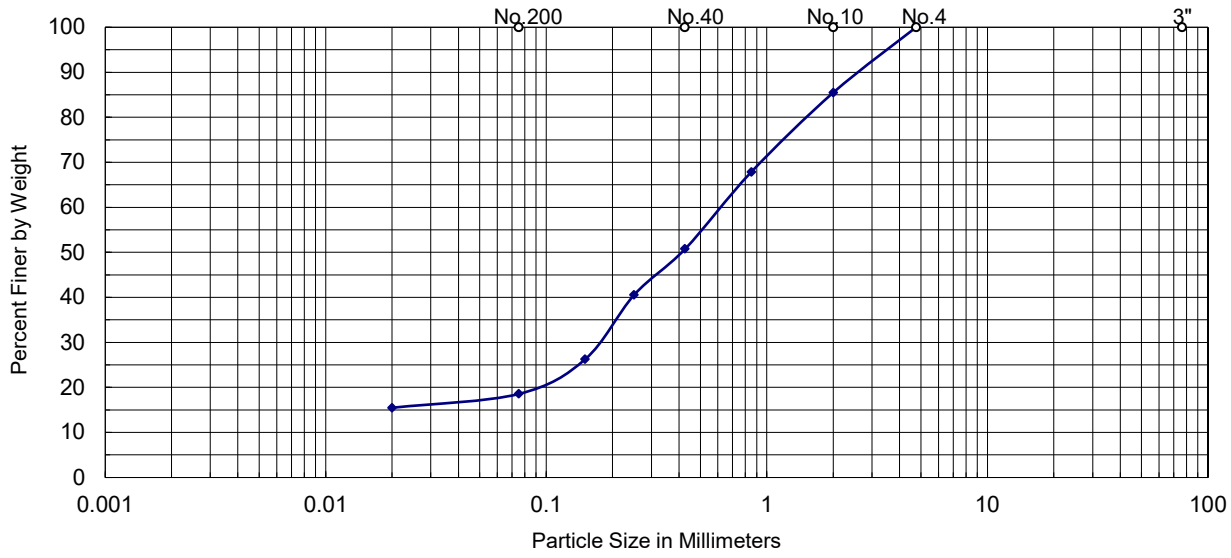
Atterberg Limits

Liquid limit (LL)	*33*
Plastic Limit (PL)	*26*
Plasticity Index (PI)	*7*

D_{10} (mm) =	
D_{30} (mm) =	
D_{75} (mm) =	
Coefficient of Uniformity, C_u =	
Coefficient of ccurvature, C_c =	

Organic Content, %	
Maximum Dry Density,pcf	
Volume Change, %	

Grain size distribution



Soil Classification

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Soil Classification

Project Name:	*McGinnis Ferry Road*			P I No.:	*0004634*
Sample Location:	*Wall No. 19C*	Sample Number:	W-12	Sample Depth:	*3.5-5'*
Date Sampled:	*9/20/2019*	Sampled By:	*JS*	*Lab No.:*	
Date Tested:	*10/17/2019*	Tested By:	*JS*	*Atlas Project Number:*	*FOR095*
Sample Description:	*Grey silty sand*				

Sieve Analysis

US Sieve Size	Sieve Opening		% Passing
	(inch)	(mm)	
3 Inch	3.0000	76.2	
1.5 Inch	1.5000	38.1	
1 Inch	1.0000	25.4	
No.4	1.8701	4.75	*100.0*
No.10	0.7874	2.00	*100.0*
No.20	0.3346	0.85	*91.6*
No.40	0.1673	0.425	*73.6*
No.60	0.0984	0.25	*58.7*
No.100	0.0591	0.15	*44.3*
No.200	0.0295	0.075	*26.1*
% Clay	0.0079	0.02	21.6

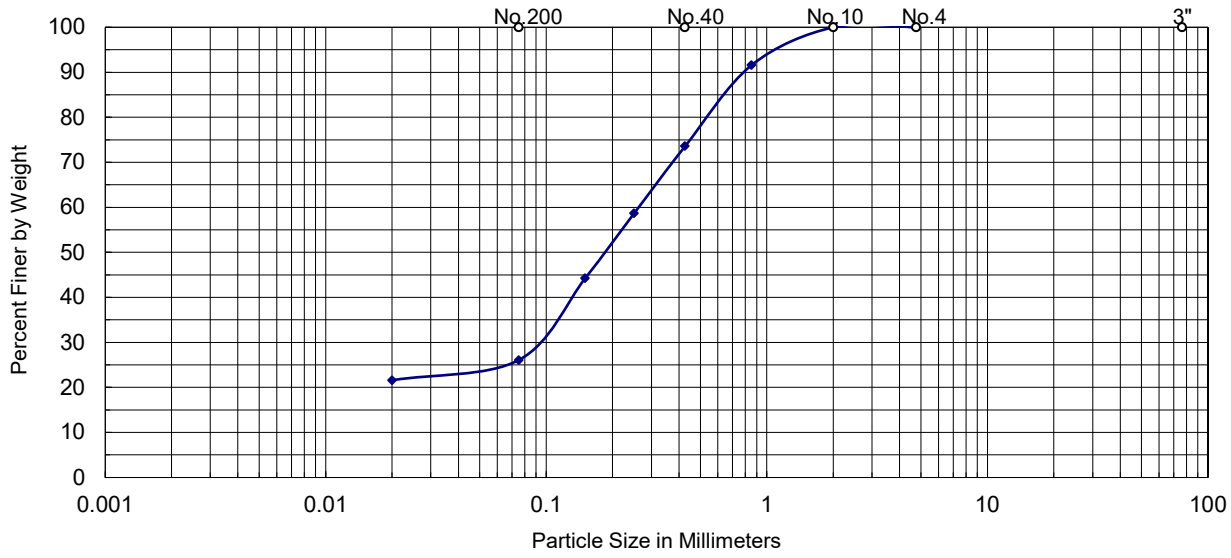
Atterberg Limits

Liquid limit (LL)	*14*
Plastic Limit (PL)	*11*
Plasticity Index (PI)	*3*

D_{10} (mm) =	
D_{30} (mm) =	
D_{75} (mm) =	
Coefficient of Uniformity, C_u =	
Coefficient of ccurvature, C_c =	

Organic Content, %	
Maximum Dry Density,pcf	
Volume Change, %	

Grain size distribution



Soil Classification

AASHTO	
USCS	SM - Silty sand
GDOT	

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Soil Classification

Project Name:	*McGinnis Ferry Road*			P I No.:	*0004634*
Sample Location:	*Wall No. 19C*	Sample Number:	W-12	Sample Depth:	*13.5-15'*
Date Sampled:	*9/20/2019*	Sampled By:	*JS*	*Lab No.:*	
Date Tested:	*10/17/2019*	Tested By:	*JS*	*Atlas Project Number:*	*FOR095*
Sample Description:	*Grey silty sand*				

Sieve Analysis

US Sieve Size	Sieve Opening		% Passing
	(inch)	(mm)	
3 Inch	3.0000	76.2	
1.5 Inch	1.5000	38.1	
1 Inch	1.0000	25.4	
No.4	1.8701	4.75	*100.0*
No.10	0.7874	2.00	*100.0*
No.20	0.3346	0.85	*84.6*
No.40	0.1673	0.425	*63.5*
No.60	0.0984	0.25	*50.3*
No.100	0.0591	0.15	*44.3*
No.200	0.0295	0.075	*36.2*
% Clay	0.0079	0.02	30.1

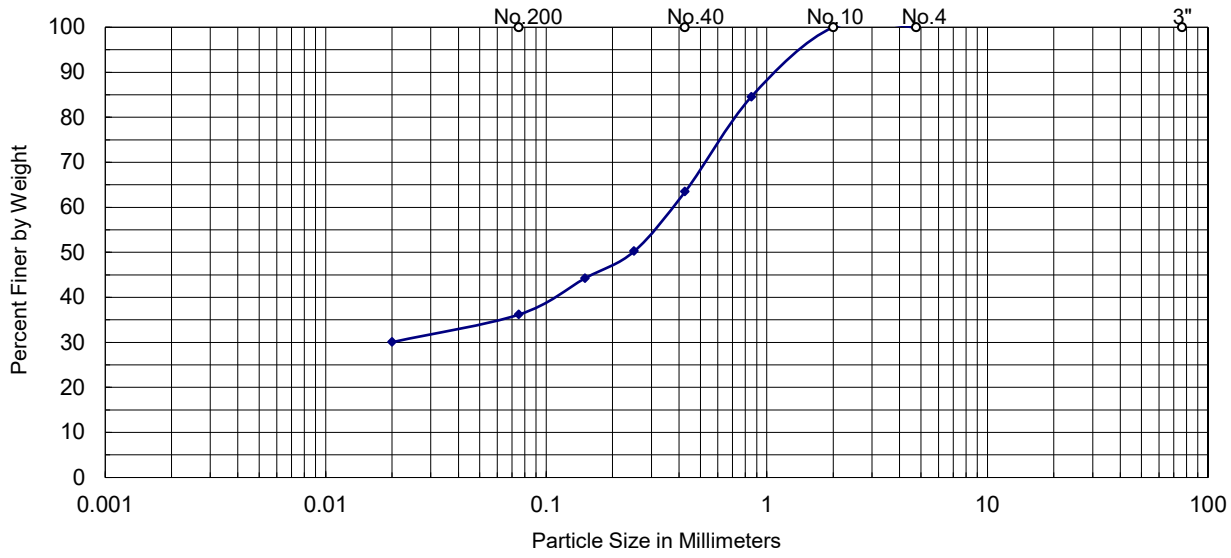
Atterberg Limits

Liquid limit (LL)	*22*
Plastic Limit (PL)	*16*
Plasticity Index (PI)	*6*

D_{10} (mm) =	
D_{30} (mm) =	
D_{75} (mm) =	
Coefficient of Uniformity, C_u =	
Coefficient of ccurvature, C_c =	

Organic Content, %	
Maximum Dry Density,pcf	
Volume Change, %	

Grain size distribution



Soil Classification

AASHTO	
USCS	SC-SM - Silty, clayey sand
GDOT	

Appendix E – Seismic site class determination

McGinnis Ferry Road, Wall #19C - PI 0004634, Forsyth Co.

Table 3.10.3.1-1—Site Class Definitions

Site Class	Soil Type and Profile
A	Hard rock with measured shear wave velocity, $\bar{v}_s > 5{,}000$ ft/s
B	Rock with 2,500 ft/sec $< \bar{v}_s < 5{,}000$ ft/s
C	Very dense soil and soil rock with 1,200 ft/sec $< \bar{v}_s < 2{,}500$ ft/s, or with either $\bar{N} > 50$ blows/ft, or $\bar{s}_u > 2.0$ ksf
D	Stiff soil with 600 ft/s $< \bar{v}_s < 1{,}200$ ft/s, or with either $15 < \bar{N} < 50$ blows/ft, or $1.0 < \bar{s}_u < 2.0$ ksf
E	Soil profile with $\bar{v}_s < 600$ ft/s or with either $\bar{N} < 15$ blows/ft or $\bar{s}_u < 1.0$ ksf, or any profile with more than 10.0 ft of soft clay defined as soil with $PI > 20$, $w > 40$ percent and $\bar{s}_u < 0.5$ ksf
F	Soils requiring site-specific evaluations, such as: • Peats or highly organic clays ($H > 10.0$ ft of peat or highly organic clay where H = thickness of soil) • Very high plasticity clays ($H > 25.0$ ft with $PI > 75$) • Very thick soft/medium stiff clays ($H > 120$ ft)

Boring W-11

Sample	di	N	di/N
1	2.5	20	0.1250
2	2.5	34	0.0735
3	2.5	16	0.1563
4	2.5	13	0.1923
5	5	30	0.1667
6	5	13	0.3846
7	5	25	0.2000
8	5	25	0.2000
9	5	25	0.2000
10	5	25	0.2000
11	5	25	0.2000
12	5	25	0.2000
13	5	25	0.2000
14	5	25	0.2000
15	5	25	0.2000
16	5	25	0.2000
17	5	25	0.2000
18	5	25	0.2000
19	5	25	0.2000
20	5	25	0.2000
21	5	25	0.2000
22	5	25	0.2000
∑di=	100	∑di/N=	4.2984

Average N= 23.3
Site Class = D

Boring W-12

Sample	di	N	di/N
1	2.5	9	0.2778
2	2.5	9	0.2778
3	2.5	17	0.1471
4	2.5	24	0.1042
5	5	34	0.1471
6	5	36	0.1389
7	5	41	0.1220
8	5	34	0.1471
9	5	34	0.1471
10	5	34	0.1471
11	5	34	0.1471
12	5	34	0.1471
13	5	34	0.1471
14	5	34	0.1471
15	5	34	0.1471
16	5	34	0.1471
17	5	34	0.1471
18	5	34	0.1471
19	5	34	0.1471
20	5	34	0.1471
21	5	34	0.1471
22	5	34	0.1471
∑di=	100	∑di/N=	3.4206

Average N= 29.2
Site Class = D

Appendix F – Wall foundation design data

Designer: Atlas Technical Consultants
Date: 12/1/2021
PI Number: 0004634
Project: McGinnis Ferry Road (CR 3717) in Forsyth and Fulton Counties, GA
From: Jaime Mandujano, EIT
To: Patrick Allen, P.E., State Materials Engineer

SUBJECT: Wall Foundation Design Data (LRFD)

The following pile design loads have been calculated for the above listed structure. Please use the provided values to complete the Wall Foundation Investigation report for the above referenced project.

Structural Data for Foundation Design					
Wall No.	**Pile Size**	**Design Height (ft)**	**Wall Station**	**Spacing (ft)**	**Embedment Depth (ft)**
19C	Hp 12x53	10.00	STA 287+00.00 to STA 287+73.25 STA 288+69.25 to STA 289+21.96	8.00	14'-6"
19C	HP 14x73	13.50	STA 287+73.25 to STA 288+69.25	8.00	18'-0"

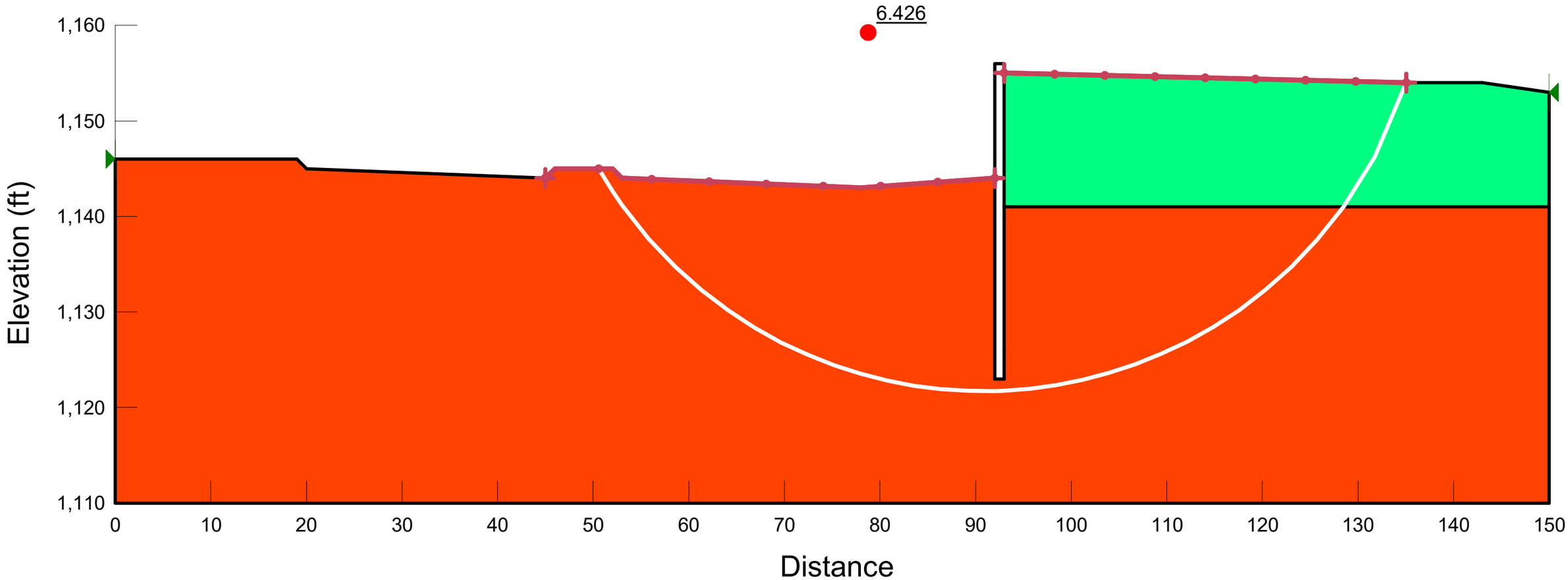
If you have any questions or require additional information, please call or email Jaime Mandujano at 770-263-5945 or Jaime.Mandujano@oneatlas.com

Thank you,

Appendix G – Global stability analysis graphical outputs

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Foundation Soils	120	0	34
	Retained Soils	115	0	30
	Walll	135	412,000	1

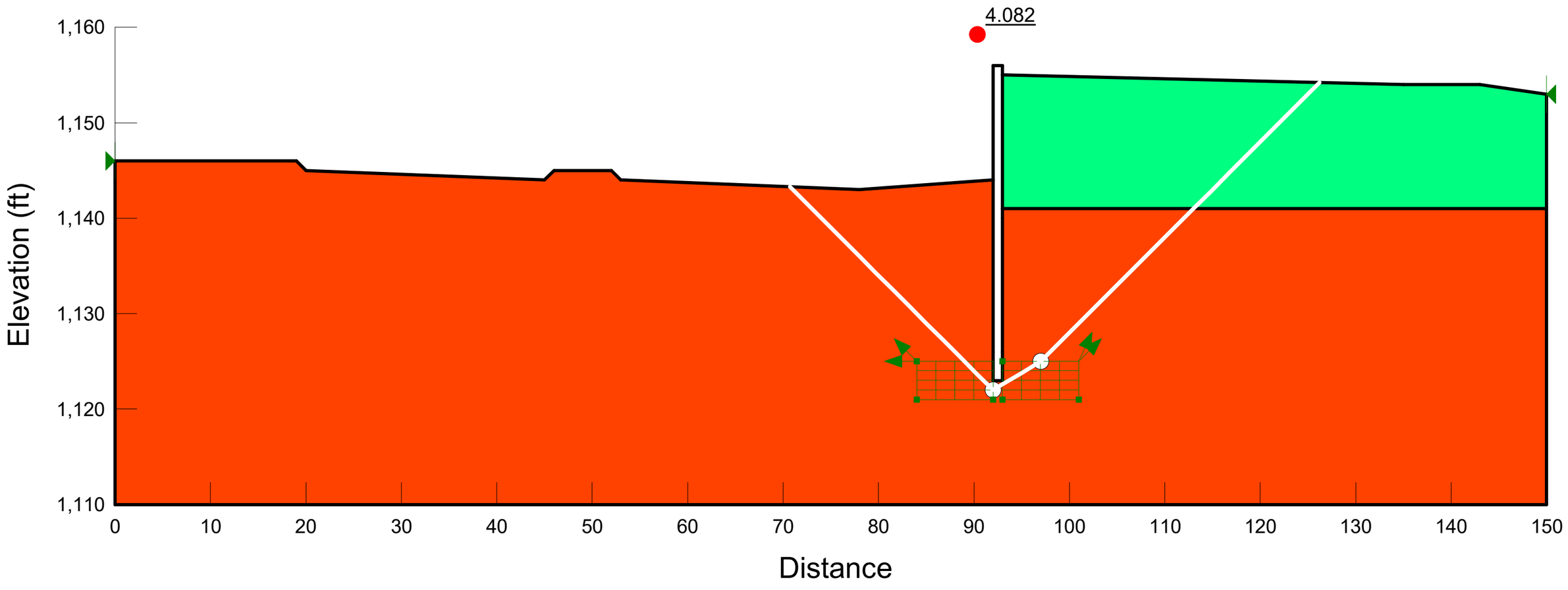
Wall Height = 13.5 ft
Wall Embedment = 18 ft



Bishop Non Rigorous Analysis - Circular
McGinnis Ferry Road - FOR095-PH2 - Wall 19C - STA 288+50.gsz
12/10/2021 1:129

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Foundation Soils	120	0	34
	Retained Soils	115	0	30
	Walll	135	412,000	1

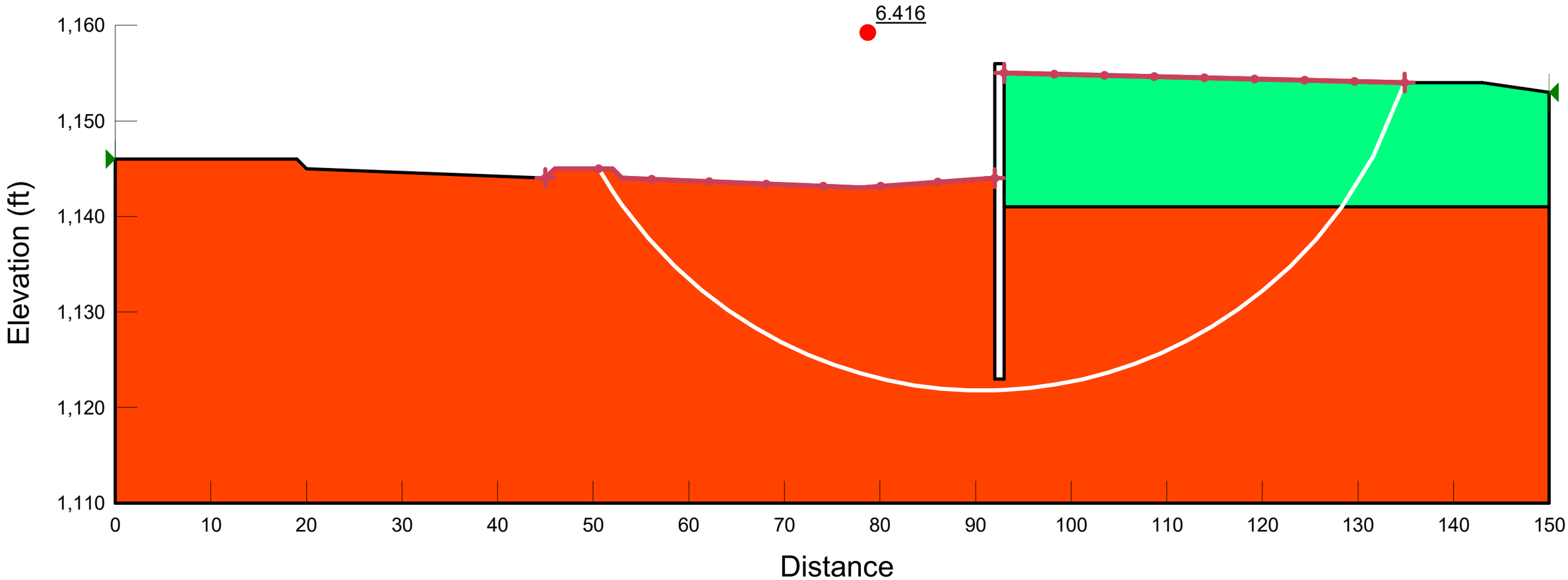
Wall Height = 13.5 ft
Wall Embedment = 18 ft



Bishop Non Rigorous Analysis - Non Circular
McGinnis Ferry Road - FOR095-PH2 - Wall 19C - STA 288+50.gsz
12/10/2021 1:129

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Foundation Soils	120	0	34
	Retained Soils	115	0	30
	Walll	135	412,000	1

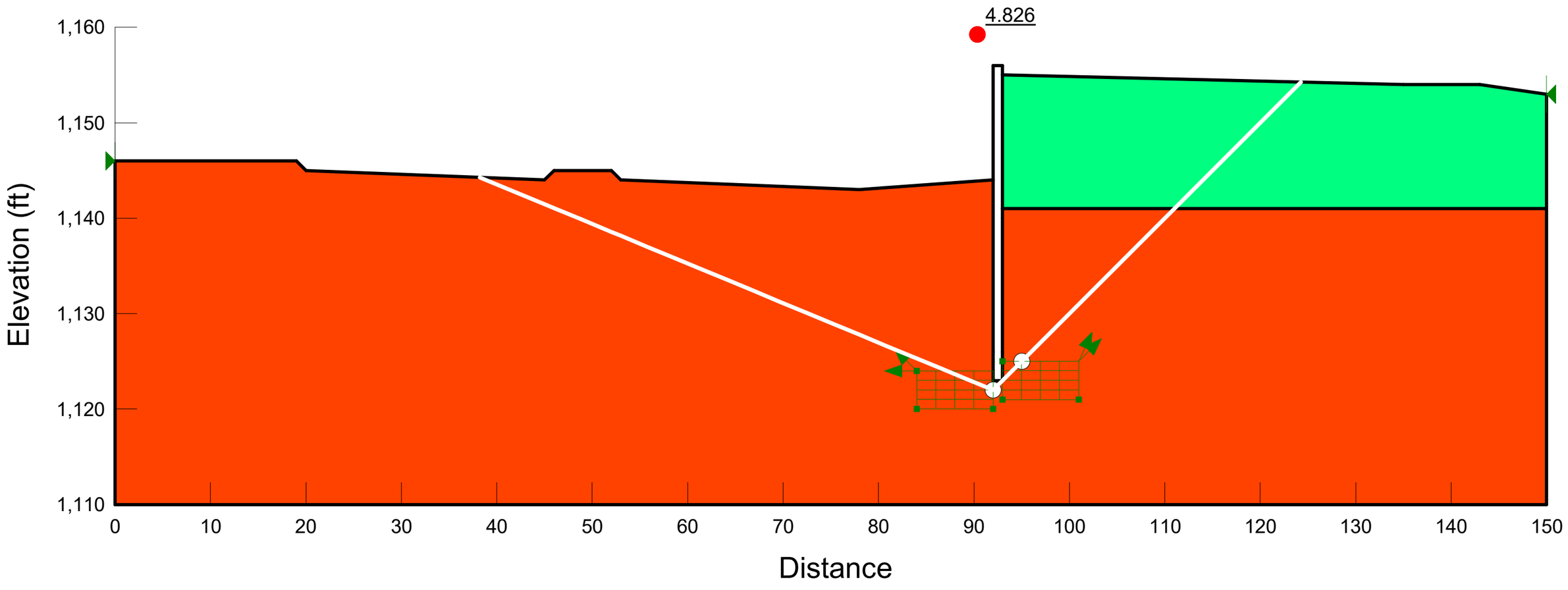
Wall Height = 13.5 ft
Wall Embedment = 18 ft



Morgenstern Price Rigorous Analysis - Circular
McGinnis Ferry Road - FOR095-PH2 - Wall 19C - STA 288+50.gsz
12/10/2021 1:129

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Foundation Soils	120	0	34
	Retained Soils	115	0	30
	Walll	135	412,000	1

Wall Height = 13.5 ft
Wall Embedment = 18 ft



Morgenstern Price Rigorous Analysis - Non Circular
McGinnis Ferry Road - FOR095-PH2 - Wall 19C - STA 288+50.gsz
12/10/2021 1:129