HALEY & ALDRICH

CORE BORING REPORT DRAFT

Boring No. HA-03 (OW)
File No. 39155-000
Sheet No. 2 of 2

Depth (ft)	Drilling Rate (min./ft)	Run No.	Run Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Elev./Depth (ft)	Visual Description and Remarks
								SEE TEST BORING REPORT FOR OVERBURDEN DETAILS
20								
							811.0 24.0	TOP OF BEDROCK 24.0 FT
						Highly to Moderately		
25								
		C1	27.3 32.3	60 33	100 55	Fresh to Slightly		C1: Medium to moderately hard, fresh to slightly weathered, gray, aphanitic, SHALE. Joints horizontal to low angle, very close to moderately close, rough, undulating, open.
30								
		C2	32.3 37.3	60 43	100 72			C2: Similar to C1.
35								
							797.7 37.3	BOTTOM OF EXPLORATION 37.3 FT
40								
45								
50								

H+A_CORE+WELL07-1 HA-1B07-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-04

Project: Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client: Griffiths Engineering, LLC
Contractor: Earth Dimensions, Inc.

File No. 39155-000
Sheet No. 1 of 1
Start: April 25, 2013
Finish: April 29, 2013
Driller: A. Morris
H&A Rep.: D. Keller/Derouchey
Elevation: 835.0 (est.)
Datum: NAVD 88
Location: See Plan

	Casing	Sampler	Barrel
Type	HW	S	--
Inside Diameter (in.)	4	1 3/8	--
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures
Rig Make & Model: Acker 5 HP Tripod
Bit Type: N/A
Drill Mud: None
Casing: Driven
Hoist/Hammer: Cat-Head Doughnut Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test: Dilatancy	Toughness	Plasticity	Strength
0	4 8 10 8	S1 14	0.0 2.0		SM	Medium dense, brown, silty SAND with gravel (SM), mps 24 mm., no odor with organics, moist. -FILL-	5	10	10	20	35	20				
	8 5 2 3	S2 0	2.0 4.0		SM	* No Recovery. Drillers went down to 2.0 and resampled from 2.0-4.0 ft with 3 in. spoon 5 in. recovery.										
5	5 7 9 7	S3 5	4.0 6.0		SM	S2: Similar to S1. Medium dense, light brown, silty SAND with gravel (SM), mps 32 mm., no odor, trace organics, moist.	5	15	10	20	35	15				
	15 13 9 9	S4 7	6.0 8.0			S4: Similar to S3										
	15 17 20 20	S5 4	8.0 10.0	826.0 9.0	SM	S5A: Dense, brown silty SANd (SM), mps 23 mm., no odor, dry.	5	5	5	25	40	20				
10	17 15 16 17	S6 9	10.0 12.0		SM	S5B: Dense, mottled brown and gray-brown, silty SAND with gravel (SM), mps 28 mm., no odor, moist. Reworked natural. S6: Similar to S5B.	5	10	0	5	65	15				
	11 11 8 14	S7 7	12.0 14.0	821.0 14.0		S7: Similar to S5B except with wood.										
15	9 8 8 25	S8 6	14.0 16.0		SC	S8: Medium dense, gray-brown, clayey SAND with gravel (SC), mps 33 mm., no odor, wet. -GLACIAL OUTWASH-	10	5	5	10	55	15				
	6 12 8 6	S9 4	16.0 18.0			S9: Similar to S8.										
	36 37 16 15	S10 9	18.0 20.0			S10: Similar to S8 except very dense.										
20	22 22 30 47	S11 7	20.0 22.0			S11: Similar to S8 except very dense.										
	17 100/3	S12 3	22.0 22.8	812.2 22.8		S12: Similar to S8 except very dense.	15	10	5	10	45	15				
						BOTTOM OF EXPLORATION 22.8 FT										
						See Well Installation Report										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
4/26/13	07:00	15.5	16.0	18.0	8.8
4/29/13	09:40	70.5	22.0	22.8	8.4

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 22.8
Rock Cored (ft) –
Samples 12S

Boring No. HA-04

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-27-1 HA-LIB07-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-05

Project: Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client: Griffiths Engineering, LLC
Contractor: Earth Dimensions, Inc.

File No. 39155-000
Sheet No. 1 of 1
Start: April 30, 2013
Finish: May 1, 2013
Driller: P. Bence
H&A Rep.: D. Keller
Elevation: 835.0 (est.)
Datum: NAVD 88
Location: See Plan

	Casing	Sampler	Barrel
Type	--	S	--
Inside Diameter (in.)	--	1 3/8	--
Hammer Weight (lb)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures
Rig Make & Model: Acker 5 HP Tripod
Bit Type:
Drill Mud: None
Casing: Open hole
Hoist/Hammer: Cat-Head Doughnut Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	3 8 10 10	S1 12	0.0 2.0		SM	Medium dense, mottled brown and gray-brown, silty SAND with gravel (SM), mps 30 mm., no odor, moist. Reworked alluvial deposits. -FILL-	10	10	5	15	35	25				
	27 33 17 14	S2 6	2.0 4.0			S2: Similar to S1 except dense, dry.										
5	7 7 6 12	S3 6	4.0 6.0			S3: Similar to S1 except with wood.										
	6 12 17 31	S4 9	6.0 8.0			S4: Similar to S1.										
	11 15 16 20	S5 3	8.0 10.0			S5: Similar to S1.										
10	10 15 16 17	S6 8	10.0 12.0	825.0 10.0	CL	Hard, mottled gray-brown and yellow-brown, sandy lean CLAY (CL), mps 30 mm., no odor, wet, trace organic fibers. -ALLUVIAL DEPOSITS-	5	0	0	10	25	60				
				821.5 13.5												
15	23 20 13 10	S7 10	15.0 17.0		SC	Medium dense, mottled gray-brown and yellow-brown, clayey SAND (SC), mps 30 mm., no odor, wet. -ALLUVIAL DEPOSITS-	5	5	10	15	35	30				
20	71 36 100/2 100/0	S8 12 NR	20.0 21.2 21.2 21.2	813.8 21.2		S8: Similar to S7. Attempted split spoon sample at 21.2 ft to verify refusal. BOTTOM OF EXPLORATION 21.2 ft. Split spoon refusal										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
5/1/13	09:45	0.00	NA	21.2	9.4

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 21.2
Rock Cored (ft) --
Samples 8S

Boring No. HA-05

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HA-TEST BORING-07-1 HA-LIB07-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-06

Project: Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client: Griffiths Engineering, LLC
Contractor: Earth Dimensions, Inc.

File No. 39155-000
Sheet No. 1 of 2
Start: April 22, 2013
Finish: April 23, 2013
Driller: A. Morris
H&A Rep.: D. Keller
Elevation: 829.0 (est.)
Datum: NAVD 88
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	–
Inside Diameter (in.)	4	1 3/8	–
Hammer Weight (lb)	–	140	-
Hammer Fall (in.)	–	30	-

Drilling Equipment and Procedures
Rig Make & Model: Diedrich D-50 Track
Bit Type: Cutting Head
Drill Mud: None
Casing: Spun
Hoist/Hammer: Cat-Head Safety Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Well Diagram	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	% Coarse Gravel	% Fine Gravel	% Coarse Sand	% Medium Sand	% Fine Sand	% Fines	Dilatancy	Toughness	Plasticity	Strength
0	3 4 6 4	S1 10	0.0 2.0			SM	Medium dense, brown, silty SAND (SM), mps 20 mm., no odor, moist. Reworked natural, trace organics. -FILL-	5	5	5	10	55	20				
	2 2 2 3	S2 14	2.0 4.0				S2: Similar to S1.										
5	2 3 1 3	S3 7	4.0 6.0				S3: Similar to S1.										
	6 6 4 4	S4 10	6.0 8.0				S4: Similar to S1.										
	1 2 3	S5 5	8.0 10.0				S5: Similar to S1.										
					819.0 10.0												
10	3 1 2 3 3	S6 8	10.0 12.0			SM	Loose, brown, silty SAND (SM), mps 20 mm., no odor, wet. -FLUVIAL DEPOSITS-	5	5	5	10	55	20				
15	5 9 8	S7A 20	15.0 16.6				S7A: Similar to S6. TOP OF BEDROCK AT 16.6 FT										
	100/4"	S7B 2	16.6 16.8		812.4 16.6		S7B: Highly weathered SHALE. -BEDROCK- Note: Pulled augers and moved NE of original location due to possible conflict with existing force main. (16.8 ft obstruction drilling)										
	100/2"	S8 2	19.5 19.7		809.3 19.7		S8: Highly weathered SHALE. BOTTOM OF EXPLORATION 19.7 FT See Well Installation Report										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
4/23/13	08:20	17.0	15.0	16.8	6.0
4/23/13	09:47	.75	19.5	19.7	6.9

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 19.7 + 16.8
Rock Cored (ft) --
Samples 8S

Boring No. HA-06

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Toughness: L - Low M - Medium H - High; Plasticity: N - Nonplastic L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HA-TEST BORING-07-1 HA-LIB07-REVISED 11-20-12.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-07

Project: Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client: Griffiths Engineering, LLC
Contractor: Earth Dimensions, Inc.

File No. 39155-000
Sheet No. 1 of 2
Start: April 22, 2013
Finish: April 22, 2013
Driller: A. Morris
H&A Rep.: D. Keller
Elevation: 835.0 (est.)
Datum: NAVD 88
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	–
Inside Diameter (in.)	4	1 3/8	–
Hammer Weight (lb)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures
Rig Make & Model: Diedrich D-50 Track
Bit Type: Cutting Head
Drill Mud: None
Casing: Spun
Hoist/Hammer: Cat-Head Safety Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	8 13 13 19	S1 12	0.0 2.0	834.8 0.2	SM	-TOPSOIL- Medium dense, gray-brown, silty SAND (SM), mps 22 mm., no odor, moist with asphalt. Reworked natural.	5	5	5	10	45	30				
	17 100/0	S2 6	2.0 2.5			-FILL- Similar to S1 except no asphalt, probable cobbles.										
	7 6 7 13	S3 14	4.0 6.0			Similar to S1 except no asphalt.										
5	11 10 11 10	S4 12	6.0 8.0	828.8 6.2	SP-SM	Wood at transition. Medium dense, mottled gray and yellow-brown, poorly-graded SAND with silt (SP-SM), mps 26 mm., no odor, moist, trace organic fibers. -ALLUVIAL DEPOSITS-	5	0	5	5	75	10				
	3 4 5 4	S5 14	8.0 10.0			S5: Similar to S4.										
10	7 4 4 4	S6 12	10.0 12.0			S6: Similar to S5. Water table noted at ~ 10.5 ft. Reading taken at bottom of exploration, not stabilized.										
				821.5 13.5												
15	19 25 38 29	S7 10	15.0 17.0		SC	Very dense, yellow-brown, clayey SAND with gravel (SC), mps 30 mm., no odor, wet, with wood fibers. -FLUVIAL DEPOSITS-	15	15	15	20	20	15				
				817.5 17.5												
20	16 21 13 23	S8 14	20.0 22.0		CL	Hard, light-brown, sandy lean CLAY (CL), mps 20 mm., no odor, wet, occasional sand layers.	5	0	0	5	20	70				
25	100/4	S9 3	25.0 25.3			Similar to S8 except with probable cobbles or boulders.										
				807.5 27.5		TOP OF BEDROCK 27.5 FT										
	100/2	S10	29.0	805.8 29.2		Highly weathered SHALE. - BEDROCK-										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
4/22/13	15:00	0.50	29.2	29.2	NE*

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 29.2
Rock Cored (ft) --
Samples 10S

Boring No. HA-07

Field Tests: Dilatancy: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 H&A LIB07-REVISED 11-20-12.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT

DRAFT

Boring No. HA-07

File No. 39155-000

Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		2	29.2			BOTTOM OF EXPLORATION 29.2 FT										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-07

H&A-TEST BORING-07-1 HA-LIB07-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-12

Project	Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client	Griffiths Engineering, LLC
Contractor	Earth Dimensions, Inc.

File No.	39155-000
Sheet No.	1 of 1
Start	May 1, 2013
Finish	May 2, 2013
Driller	P. Bence
H&A Rep.	D. Keller
Elevation	827.0 (est.)
Datum	NAVD 88
Location	See Plan

	Casing	Sampler	Barrel
Type	HW	S	--
Inside Diameter (in.)	4	1 3/8	--
Hammer Weight (lb)	140	140	-
Hammer Fall (in.)	30	30	-

Drilling Equipment and Procedures

Rig Make & Model: Acker 5 HP Tripod
Bit Type: N/A
Drill Mud: None
Casing: Driven
Hoist/Hammer: Cat-Head Doughnut Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	1 1 9 9	S1 10	0.0 2.0		SM	Loose, mottled brown and gray-brown silty SAND (SM), mps 10 mm., no odor, moist with small roots. Reworked alluvial deposits. -FILL-	0	5	5	10	60	20				
	11 12 5 7	S2 10	2.0 4.0			S2: Similar to S1 except medium dense, with large roots, trace coarse gravel.										
	7 4 3 5	S3 19	4.0 6.0			S3: Similar to S1 except with shells, trace brick particles, wood. Reworked alluvial deposits. -FILL-										
5	2 2 1 1	S4 1	6.0 8.0	820.0 7.0		S4: Similar to S1 except very loose.										
	1/12 1/12	S5 24	8.0 10.0		SC	Very loose, gray, clayey SAND (SC), mps 0.5 mm., no odor, wet, trace organic fibers, occasional brown sandy layers with fine gravel. -ALLUVIAL DEPOSITS-	0	0	0	10	70	20				
10	4 3 4 9	NR	10.0 12.0	815.0 12.0		Attempted split spoon sample from 10 to 12 ft, no recovery.										
	16 12 14 16	S6 11	12.0 14.0		CL	Very stiff, gray-brown, sandy lean CLAY (CL), mps 0.1 mm., no odor, moist. -GLACIOLACUSTRINE DEPOSITS-	0	0	0	0	45	55				
15																
	4 17 19 30	S7 12	16.0 18.0			S7: Similar to S6 except hard.										
	4 19 23 48	S8 12	18.0 20.0			S8: Similar to S6 except hard.										
20				805.5 21.5												
	14 34 54 100/2"	S9 20	23.0 24.7	802.3 24.7		Hard, gray-brown, silty lean CLAY (CL), mps 30 mm., no odor, dry.	5	5	5	5	10	60				
						BOTTOM OF EXPLORATION 24.7 FT										
						Split spoon refusal										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	24.7
Rock Cored (ft)	--
Samples	9S

Boring No. HA-12

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Toughness: L - Low M - Medium H - High; Plasticity: N - Nonplastic L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 H-4-1807-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BINC-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT

DRAFT

Boring No. HA-13

Project	Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall Vestal, NY
Client	Griffiths Engineering, LLC
Contractor	Earth Dimensions, Inc.

File No.	39155-000
Sheet No.	1 of 2
Start	April 24, 2013
Finish	April 25, 2013
Driller	A. Morris
H&A Rep.	D. Keller/Derouchey
Elevation	830.0 (est.)
Datum	NAVD 88
Location	See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	4	1 3/8	--
Hammer Weight (lb)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-50 Track
Bit Type: Cutting Head
Drill Mud: None
Casing: Spun
Hoist/Hammer: Cat-Head Safety Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	1 1 1/12	S1 13	0.0 2.0	828.0 2.0	SM	Very loose, dark brown, silty SAND (SM), mps 3 mm., no odor, moist. -TOPSOIL-	0	0	5	20	45	30				
	1 1 1 3	S2 14	2.0 4.0		SM	Very loose, light brown, silty SAND (SM), mps 6 mm., no odor, moist, with roots/organics. -ALLUVIAL DEPOSITS-	0	5	5	5	55	30				
5	3 2 3 4	S3 18	4.0 6.0			S3: Similar to S2 except loose.										
	3 2 2 3	S4 20	6.0 8.0			S4: Similar to S2.										
	1 2 1 2	S5 22	8.0 10.0			S5: Similar to S2 except mottled light-brown and yellow-brown.										
10	1/12 1/12	S6 21	10.0 12.0			S6: Similar to S2 except mottled light-brown and yellow brown, wet.										
				816.5 13.5												
15	5 26 33 23	S7 6	15.0 17.0		SM	Very dense, mottled gray-brown and yellow-brown, silty SAND (SM), mps 33 mm., no odor, moist. -GLACIOLACUSTRINE DEPOSITS-	5	5	5	10	30	45				
				811.5 18.5												
20	7 11 19 22	S8 20	20.0 22.0		CL	Very stiff, gray-brown, sandy LEAN CLAY (CL), mps 27 mm., no odor, moist.	5	5	5	5	30	50				
25	7 12 16 15	S9 20	25.0 27.0			S9: Similar to S8.										
30																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
4/25/13	0750	0	40.0	42.0	36.0

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	42.0
Rock Cored (ft)	--
Samples	12S
Boring No.	**HA-13**

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Toughness: L - Low M - Medium H - High; Plasticity: N - Nonplastic L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-13

File No. 39155-000

Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
30	9 13 17 26	S10 18	30.0 32.0		CL	Very stiff, gray-brown, sandy lean CLAY (CL), mps 27 mm., no odor, moist. -GLACIOLACUSTRINE DEPOSITS-	5	5	5	5	30	50				
35	20 33 68	S11 7	35.0 36.5		CL	Similar to S10 except hard, mps 32 mm.										
40	11 20 19 37	S12 17	40.0 42.0		CL	Similar to S10 except hard, mps 32 mm.										
				788.0 42.0		BOTTOM OF EXPLORATION 42.0 FT										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-13

HA-TEST BORING-07-1 HA-LBG7-REVISED 11-2012.GLB HA-TB-HQ2RE-WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-26

Project	Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client	Griffiths Engineering, LLC
Contractor	Earth Dimensions, Inc.

File No.	39155-000
Sheet No.	1 of 2
Start	April 15, 2013
Finish	April 15, 2013
Driller	P. Bence
H&A Rep.	D. Keller
Elevation	843.0 (est.)
Datum	NAVD 88
Location	See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	4	1 3/8	--
Hammer Weight (lb)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures

Rig Make & Model: Diedrich D-120 Truck
Bit Type: Cutting Head
Drill Mud: None
Casing: Spun
Hoist/Hammer: Cat-Head Safety Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	9 8 8 6	S1 15	0.0 2.0		SM	Medium dense, yellow-brown, silty SAND (SM), mps 22 mm, no odor. -FILL-	5	5	10	20	35	25				
				838.9 4.1	SC	-BURIED TOPSOIL-	0	5	5	20	35	35				
5	2 3 2 3	S2 10	4.0 6.0	838.8 4.2		Loose, gray, clayey SAND (SC), mps ? -ALLUVIAL DEPOSITS-										
				835.5 7.5												
10	6 10 12 13	S3 24	9.0 11.0		SC	Medium dense, mottled, yellow-brown and light brown, clayey SAND (SC), mps 0.5 mm., no odor, moist. moderately bonded. -FLUVIAL DEPOSITS-	0	0	0	10	55	35				
				830.5 12.5												
15	5 6 10 17	S4 12	14.0 16.0		SM	Medium dense, light brown, silty SAND with gavel (SM), mps 22 mm., no odor, wet.	5	10	5	25	40	15				
				825.5 17.5												
20	19 23 24 27	S5 18	19.0 21.0		SC	Dense, gray clayey SAND (SC), mps 20 mm., no odor, dry (with a wet fine sand layer), trace clay, moderately bonded. -GLACIOLACUSTRINE DEPOSITS-	5	5	5	10	50	25	M			
25	36 46 46	S6 18	24.0 25.5			Similar to S5 except very dense.										
30	34	S7	29.0		SC	Very dense, gray clayey SAND (SC), mps 20 mm., no odor, dry, moderately	5	5	5	10	40	35	M			

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
4/15/13	16:40	0.00	34.0	35.4	NF.
4/16/13	07:10	14:50	34.0	35.4	28.9

Sample ID

O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	35.4
Rock Cored (ft)	--
Samples	8S

Boring No. HA-26

Field Tests: Dilatancy: R - Rapid S - Slow N - None Toughness: L - Low M - Medium H - High Plasticity: N - Nonplastic L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HA-TEST BORING-07-1 HA-U1907-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-26
File No. 39155-000
Sheet No. 2 of 2

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
30	35 34	18	30.5			honded, trace clay. -GLACIOLACUSTRINE DEPOSITS-										
35	36 52 100/5	S8 8	34.0 35.4	807.6 35.4		S8: Similar to S7. BOTTOM OF EXPLORATION 35.4 FT										

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-26

H&A-TEST BORING-07-1 HA-LIB07-REVISED 11-2012.GLB HA-TB-CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-25

Project: Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client: Griffiths Engineering, LLC
Contractor: Earth Dimensions, Inc.

File No. 39155-000
Sheet No. 1 of 2
Start: April 15, 2013
Finish: April 15, 2013
Driller: P. Bence
H&A Rep.: D. Keller
Elevation: 841.0 (est.)
Datum: NAVD 88
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	4	1 3/8	--
Hammer Weight (lb)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures
Rig Make & Model: Diedrich D-120 Truck
Bit Type: Cutting Head
Drill Mud: None
Casing: Spun
Hoist/Hammer: Cat-Head Safety Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	9 12 12 14	S1 20	0.0 2.0		SM	Medium dense, olive-brown, silty SAND with gravel (SM), mps 25 mm., no odor, moist, trace brick particles. -FILL-	10	10	10	15	30	25				
	13 9 8 3	S2 8	2.0 4.0			S2: Similar to S1 except medium dense.										
				837.0 4.0												
5	8 9 9 12	S3 12	4.0 6.0		SC	Medium dense, gray, clayey SAND (SC), mps 22 mm., no odor, moist with wood. Reworked Alluvial. -FILL-	5	5	10	20	35	25				
	9 8 12 8	S4 14	6.0 8.0			S4: Similar to S3.										
	7 9 10 9	S5 11	8.0 10.0		SC	Medium dense, gray, clayey SAND with gravel (SC), mps 20 mm., no odor, moist with wood.	5	15	10	15	20	35				
10																
	6 4 4 7	S6A 7 S6B 6 S6C 6	13.0 13.6 13.6 14.1 14.1 15.0	827.4 13.6 826.9 14.1	SM CH	S6A: Similar to S5. (no jar) S6B: Loose, dark brown silty SAND (SM), with roots. - BURIED TOPSOIL- S6C: Stiff, gray, sandy fat CLAY (CH), mps 20 mm., no odor, moist, trace organic fibers. -ALLUVIAL DEPOSITS-	5	5	5	5	20	60				
15																
	9 8 8 8	S7 22	18.0 20.0			S7: Similar to S6C.										
20																
	3 6 7 8	S8 15	23.0 25.0			S8: Similar to S6C. Note: Gravel angular with fossils, small roots.										
25				814.5 26.5												
	7 6 10	S9 20	28.0 30.0		CL	Very stiff, gray-brown, lean CLAY with sand (CL), mps 0.1 mm., no odor, dry, varved. -GLACIOLACUSTRINE DEPOSITS-	0	0	0	0	20	80				
30																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
4/15/13	14:15	0.25	33.0	35.0	NE
4/16/13	07:05	16.75	N/A	29.0	29

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 35.0
Rock Cored (ft) --
Samples 10S
Boring No. HA-25

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Toughness: L - Low M - Medium H - High; Plasticity: N - Nonplastic L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.
Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HA-TEST BORING-07-1 HA-LB07-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0507_BINC-JOHNSON CITY-TEST BORINGS.GPJ May 23, 13

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TEST BORING REPORT DRAFT

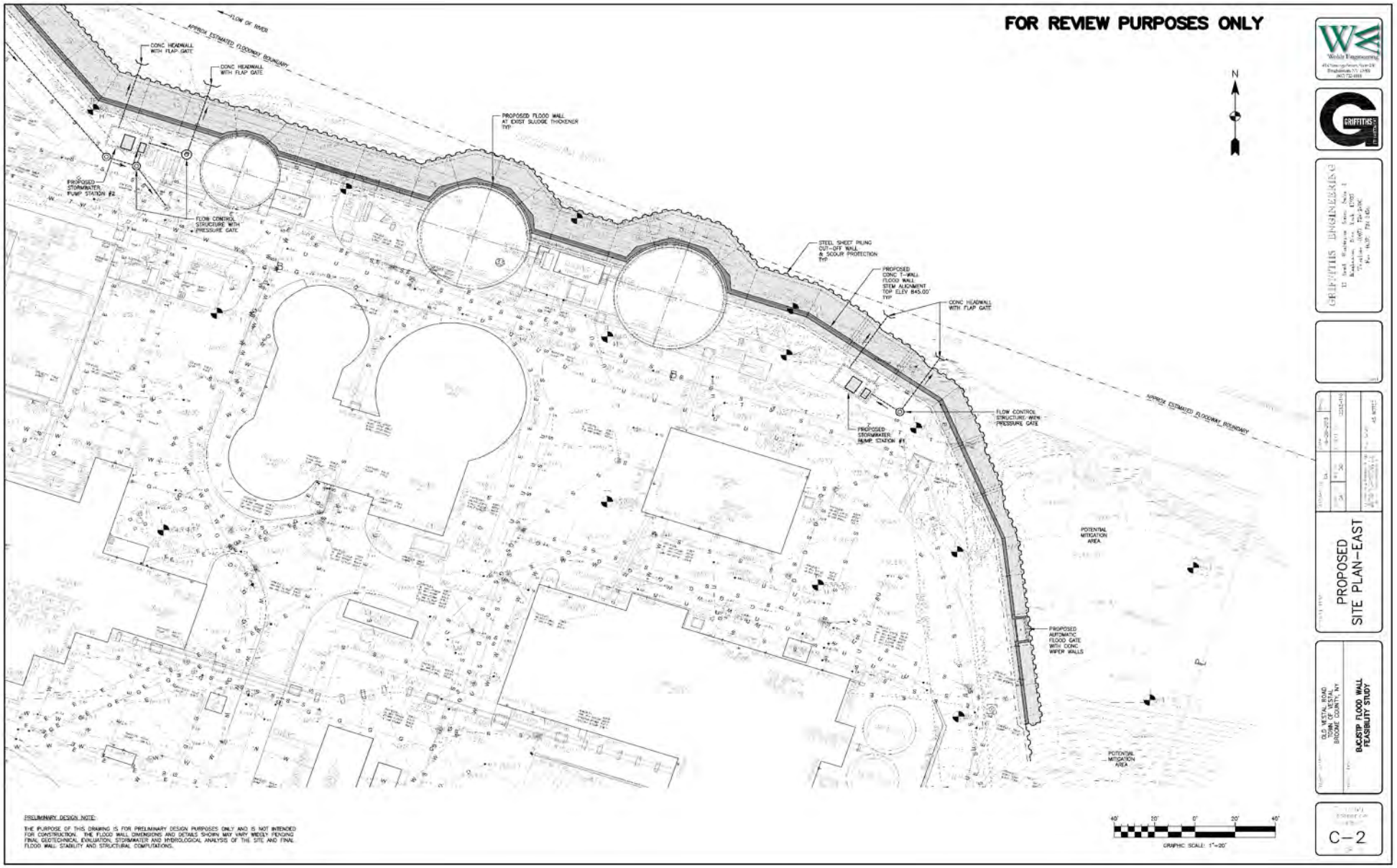
Boring No. HA-25
File No. 39155-000
Sheet No. 2 of 2

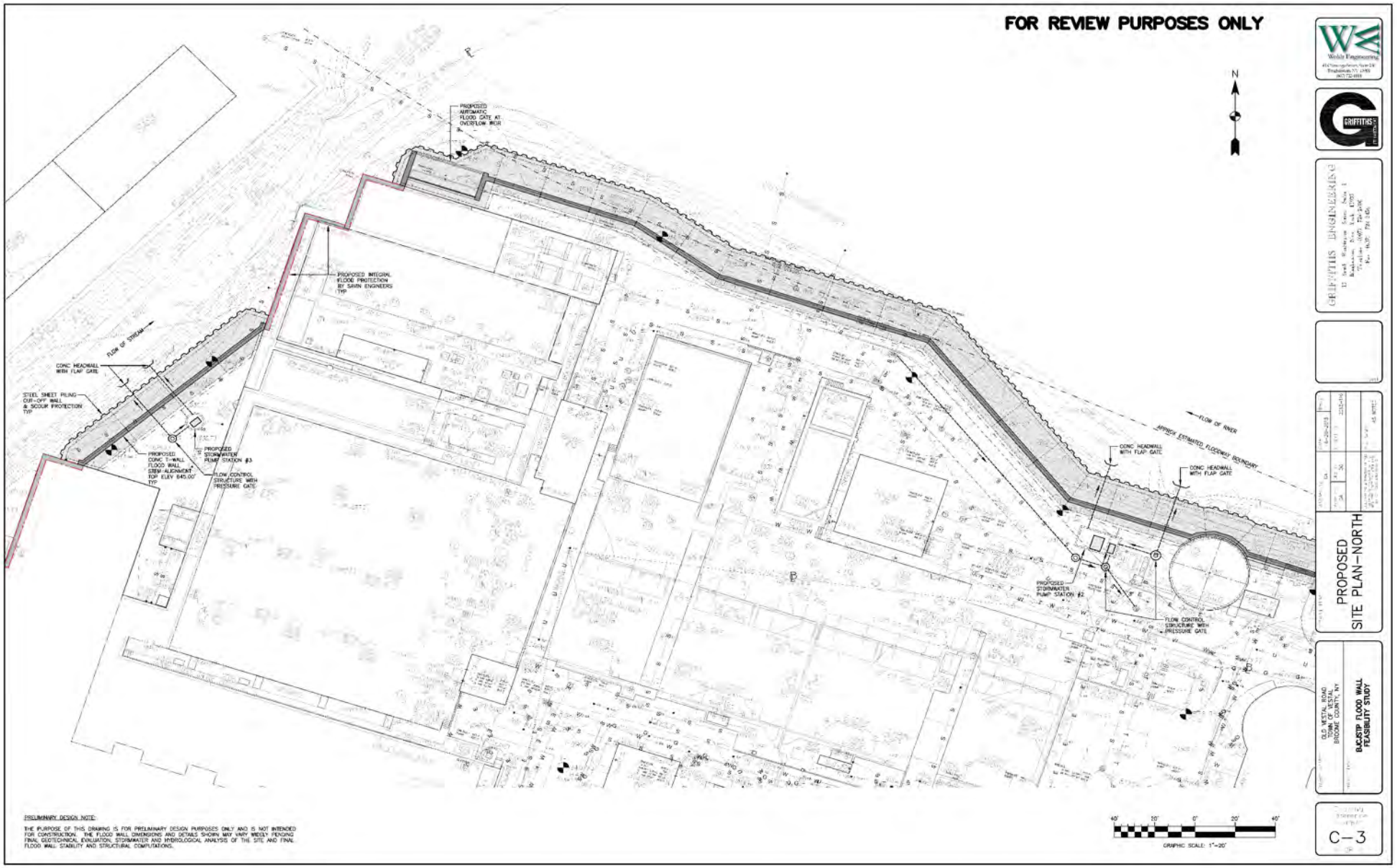
Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
30	13															
	20 24 27 22	S10 24	33.0 35.0		CL	Hard, gray-brown, lean CLAY with sand (CL), mps 0.1 mm., no odor, dry, varved. -GLACIOLACUSTRINE DEPOSITS-	0	0	0	0	30	70				
35				806.0 35.0		BOTTOM OF EXPLORATION 35.0 FT										
						No Refusal. Note: borehole collapsed overnight, possibly from above. Material on the water level indicator was wet, but it covered up the sensor.										

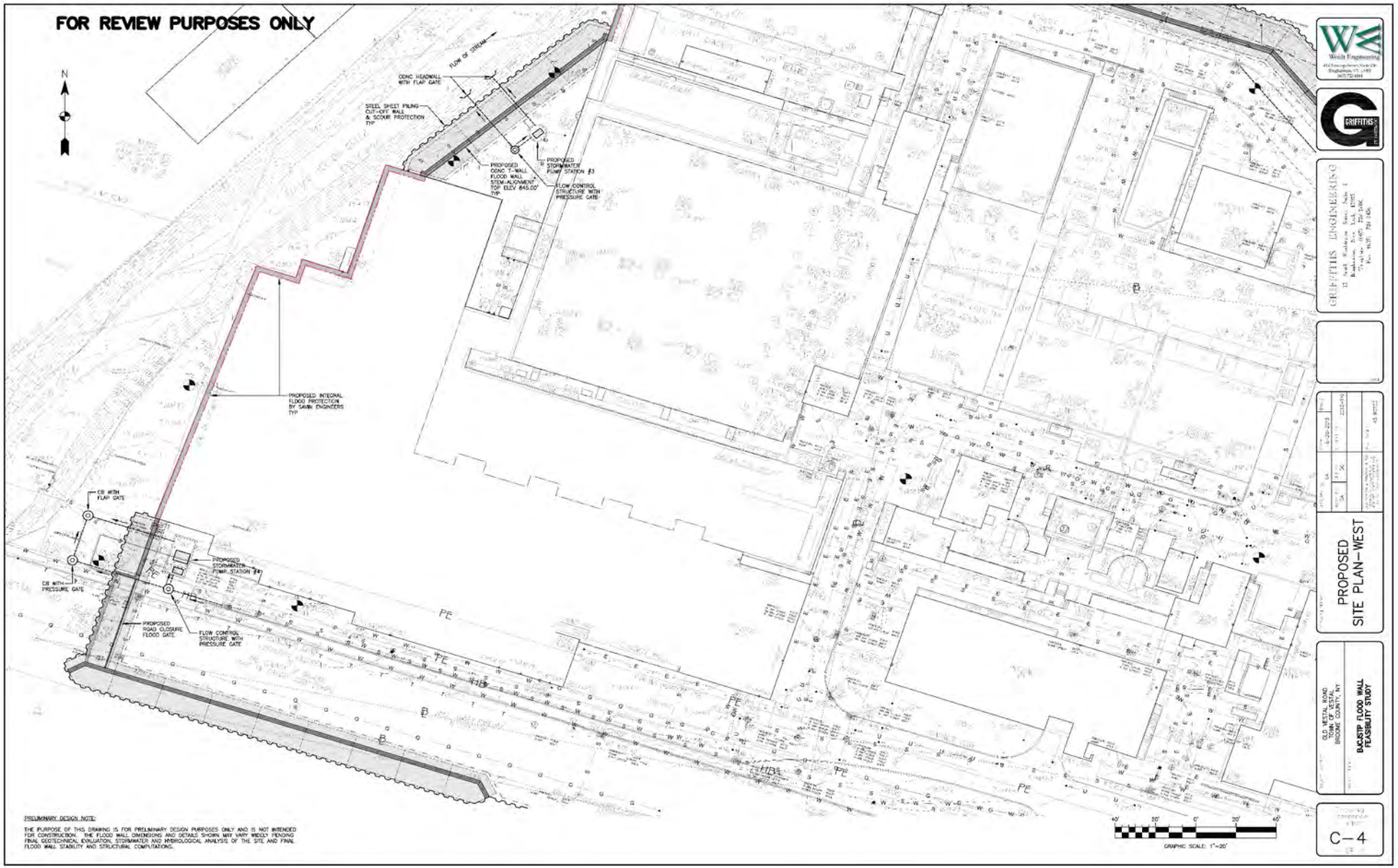
NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-25

HA-TEST BORING-07-1 HA-LIB07-REVISED 11-2012.GLB HA-TB+CORE+WELL-07-1.GDT G:\39155\FIELD\2013_06\07_BING-JOHNSON CITY TEST BORINGS.GPJ May 23, 13


FOR REVIEW PURPOSES ONLY
FLOW OF RIVER
APPROX. ESTIMATED FLOODWAY BOUNDARY
CONC. HEADWALL WITH FLAP GATE
CONC. HEADWALL WITH FLAP GATE
PROPOSED FLOOD WALL AT EXIST. SLUDGE THICKENER TYP.
PROPOSED STORMWATER PUMP STATION #2
FLOW CONTROL STRUCTURE WITH PRESSURE GATE
STEEL SHEET PILING CUT-OFF WALL & SCOUR PROTECTION TYP.
PROPOSED CONC. T-WALL FLOOD WALL STEM ALIGNMENT TOP ELEV 845.00' TYP.
CONC. HEADWALL WITH FLAP GATE
FLOW CONTROL STRUCTURE WITH PRESSURE GATE
PROPOSED STORMWATER PUMP STATION #1
APPROX. ESTIMATED FLOODWAY BOUNDARY
POTENTIAL MITIGATION AREA
PROPOSED AUTOMATIC FLOOD GATE WITH CONC. WIPER WALLS
POTENTIAL MITIGATION AREA
N
40' 20' 0' 20' 40'
GRAPHIC SCALE: 1"=20'
PRELIMINARY DESIGN NOTE:
THE PURPOSE OF THIS DRAWING IS FOR PRELIMINARY DESIGN PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION. THE FLOOD WALL DIMENSIONS AND DETAILS SHOWN MAY VARY WIDELY PENDING FINAL GEOTECHNICAL EVALUATION, STORMWATER AND HYDROLOGICAL ANALYSIS OF THE SITE AND FINAL FLOOD WALL STABILITY AND STRUCTURAL COMPUTATIONS.
Weldy Engineering
GRIFFITHS ENGINEERING
PROPOSED SITE PLAN-EAST
OLD WESTAL ROAD
TOWN OF WESTAL
BROOME COUNTY, NY
B.C.S.T.P. FLOOD WALL FEASIBILITY STUDY
C-2


FOR REVIEW PURPOSES ONLY
N
PROPOSED AUTOMATIC FLOOD GATE AT OVERFLOW WEIR
PROPOSED INTEGRAL FLOOD PROTECTION BY SAVIN ENGINEERS TYP
FLOW OF STREAM
CONC HEADWALL WITH FLAP GATE
STEEL SHEET PILING CUT-OFF WALL & SCOUR PROTECTION TYP
PROPOSED CONC T-WALL FLOOD WALL STEM ALIGNMENT TOP ELEV 845.00' TYP
PROPOSED STORMWATER PUMP STATION #3
FLOW CONTROL STRUCTURE WITH PRESSURE GATE
APPROX ESTIMATED FLOODWAY BOUNDARY
FLOW OF RIVER
CONC HEADWALL WITH FLAP GATE
CONC HEADWALL WITH FLAP GATE
PROPOSED STORMWATER PUMP STATION #2
FLOW CONTROL STRUCTURE WITH PRESSURE GATE
GRAPHIC SCALE: 1"=20'
PRELIMINARY DESIGN NOTE:
THE PURPOSE OF THIS DRAWING IS FOR PRELIMINARY DESIGN PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION. THE FLOOD WALL DIMENSIONS AND DETAILS SHOWN MAY VARY WIDELY PENDING FINAL GEOTECHNICAL EVALUATION, STORMWATER AND HYDROLOGICAL ANALYSIS OF THE SITE AND FINAL FLOOD WALL STABILITY AND STRUCTURAL COMPUTATIONS.
Weldy Engineering
GRIFFITHS ENGINEERING
PROPOSED SITE PLAN-NORTH
OLD WESTAL ROAD
TOWN OF WESTAL
BROOME COUNTY, NY
B&STP FLOOD WALL FEASIBILITY STUDY
C-3


FOR REVIEW PURPOSES ONLY
N
FLOW OF STREAM
CDNC HEADWALL WITH FLAP GATE
STEEL SHEET PILING CUT-OFF WALL & SCOUR PROTECTION TYP
PROPOSED CDNC T-WALL FLOOD WALL STEM-ALIGNMENT TOP ELEV 845.00' TYP
PROPOSED STORMWATER PUMP STATION #3
FLOW CONTROL STRUCTURE WITH PRESSURE GATE
PROPOSED INTEGRAL FLOOD PROTECTION BY SAVIN ENGINEERS TYP
CB WITH FLAP GATE
CB WITH PRESSURE GATE
PROPOSED STORMWATER PUMP STATION #4
PROPOSED ROAD CLOSURE FLOOD GATE
FLOW CONTROL STRUCTURE WITH PRESSURE GATE
PE
HB
B
PRELIMINARY DESIGN NOTE:
THE PURPOSE OF THIS DRAWING IS FOR PRELIMINARY DESIGN PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION. THE FLOOD WALL DIMENSIONS AND DETAILS SHOWN MAY VARY WIDELY PENDING FINAL GEOTECHNICAL EVALUATION, STORMWATER AND HYDROLOGICAL ANALYSIS OF THE SITE AND FINAL FLOOD WALL STABILITY AND STRUCTURAL COMPUTATIONS.
40' 20' 0' 20' 40'
GRAPHIC SCALE: 1"=20'
Welsh Engineering
GRIFFITHS
GRIFFITHS ENGINEERING
PROPOSED
SITE PLAN-WEST
OLD VESTAL ROAD
TOWN OF VESTAL
BROOME COUNTY, NY
BJCJSTP FLOOD WALL
FEASIBILITY STUDY
C-4