Chosen Valley Testing, Inc.

Design Phase Geotechnical Report:

Proposed Wetland
SE ¼ Sec. 24 – T98N – R10W
Lincoln Township, Winneshiek County, Iowa
CVT# 24386.24.IAM

Prepared for:

Mr. Brandon Short
Bolton & Menk, Inc.

Certification:

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

November 25, 2024

(signature) (date)

Printed or typed name: Matthew J. Reisdorfer, PE.

License number: 22234 .

My license renewal date is December 31, 2025 .

Pages or sheets covered by this seal:

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Chosen Valley Testing, Inc.

Geotechnical Engineering and Testing • 421 N Georgia Avenue • Mason City, IA 50401 • Telephone (641) 201-1050 • masoncity@cvtesting.com

Mr. Brandon Short
Design Engineer
Bolton & Menk, Inc.
1519 Baltimore Drive
Ames, Iowa 50010
Brandon.short@bolton-menk.com

November 25, 2024

Re: Factual Geotechnical Evaluation
Proposed Wetland
SE ¼ Sec. 24 – T98N – R10W
Lincoln Township, Winneshiek County, Iowa
CVT Proposal Number: 24386.24.IAM

Dear Mr. Short:

This factual report was prepared for the proposed wetland located in Lincoln Township, Winneshiek County, Iowa. Our services were authorized by Mr. Brandon Short, Design Engineer for Bolton & Menk, Inc.

A. Introduction

The intent of this report is to present our results to the client in the same logical sequence that led us to arrive at the opinions and recommendations expressed. Since our services must often be completed before the design, assumptions are sometimes needed to prepare a proper evaluation and to analyze the data. A complete and thorough review of this entire document, including the assumptions and the appendices, should be undertaken immediately upon receipt.

A.1. Purpose

This factual report was prepared for the proposed wetland located in Lincoln Township, Winneshiek County, Iowa. Our services were authorized by Mr. Brandon Short, Design Engineer for Bolton & Menk, Inc.

A.2. Scope

To obtain data for analysis, our services included eight penetration test borings. The borings were drilled to auger refusal depths of about 5 to 10 feet below the surface. Our engineering scope consisted of providing a factual discussion of the soils and materials encountered during our exploration.

A.3. Boring Locations and Elevation

The desired boring locations were indicated to Chosen Valley Testing based on on-site staking provided by the client. The Boring Location Sketch in the Appendix shows the approximate location drilled. Elevations at the borings were provided by the client.

A.4. Geologic Background

A geotechnical report is based on subsurface data collected for the specific structure or problem. Available geologic data from the region can help interpretation of the data and is briefly summarized in this section.

Area geologic maps indicate that the natural upper soils are primarily alluvium (water deposited) consisting of clay, silt, sand and gravel mixtures as well as glacial till mixtures of clay, silt, and sand. Bedrock was expected to be within 25 to 50 feet below the surface and consists of limestone, dolomite, and shale of the Maquoketa Formation and limestone and dolomite of the Wapsipinicon Group.

B. Subsurface Data

B.1. Stratification

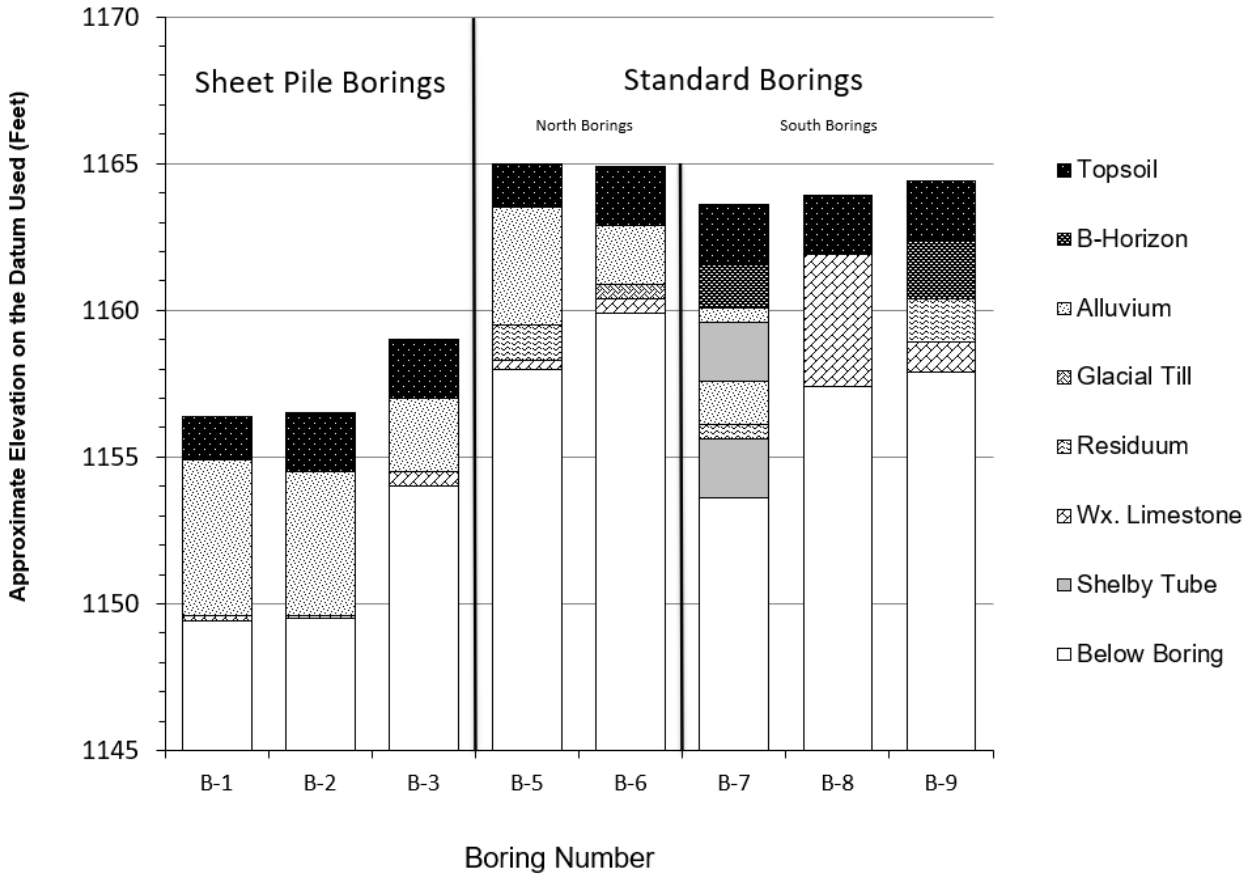
At the surface, the borings met about 1 ½ to 2 feet of slightly organic lean clay topsoil. Below the topsoil in Borings B-7 and B-9, B-Horizon consisting of lean clay and sandy lean clay was met to depths of about 3 ½ to 4 feet below the surface. B-Horizon soils are similar in color and characteristics to that of topsoil but are less organic.

Below the B-Horizon, and below the topsoil in Borings B-1, B-2, B-3, B-5, and B-6, alluvium consisting of lean clay, sandy lean clay, and clayey sand was encountered to depths of about 4 to 7 ½ feet below the surface. Glacial till consisting of mostly sandy lean clay was met below the alluvium in Boring B-6 to a depth of about 4 ½ feet below the surface.

Below the B-Horizon clay in Borings B-7 and B-9 and below the alluvium in Boring B-5, residuum consisting of silty sand with gravel, gravel with silty sand, and lean clay was met to depths of about 5 ½ to 10 feet below the surface.

Weathered limestone was met in all of the borings except for Boring B-7, to about 5 to 7 feet. Termination due to auger refusal, presumably on slightly weathered limestone was met in all borings at depths of about 5 to 10 feet below the surface.

The following simplified cross-section summarizes the boring data. For more detailed information, please refer to the Log of Boring sheets in the Appendix.



B.2. Penetration Test Results

The number of blows needed for the hammer to advance the penetration test sampler is an indicator of soil characteristics. The results tend to be more meaningful for natural mineral soils, than for fill soils. In fill soils, compaction tests are more meaningful.

Penetration resistance values ("N" Values) of 3 to 14 Blows per Foot (BPF) were recorded in the alluvial clays, indicating they were soft to stiff. The alluvial clayey sands returned N-Values of 2 to 3 BPF, indicating they were very loose. The B-Horizon clays returned a N-Value of 6 BPF, indicating they were medium. A N-Value of 18 was recorded in the glacial till clay, indicating it was very stiff.

N-Values of 11 BPF to 50 hammer blows for one to four inches of sampler advancement were recorded in the weathered limestone, indicating it was medium dense to very dense, but was generally very dense.

A pocket penetrometer was used to provide additional data on the compressive strength of cohesive soils. The alluvial clays returned values of ¾ to greater than 4 ½ tons per square foot (tsf). The B-Horizon clays returned a value of 3 ½ tsf. The glacial till clay returned a value of greater than 4 ½ tsf.

A key to descriptors used to qualify the relative density of soil (such as *soft, stiff, loose,* and *dense*) can be found on the Legend to Soil Description in the Appendix.

B.3. Groundwater Data

During the drilling operation, the drillers may note the presence of moisture on the sampling instrument, in the cuttings, or within the borehole. These observations are recorded on the boring logs. The water level may vary with weather; time of year and other factors and the presence or absence of water during the drilling is subject to interpretation and is not always conclusive.

Water was not encountered the borings during drilling. Groundwater levels at the site are expected to fluctuate seasonally with nearby creeks and rivers, as well as with local weather patterns.

C. Level of Care

The services provided for this project have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area, under similar budget and time constraints. This is our professional responsibility. No other warranty, expressed or implied, is made.

Appendix

Soil Boring Location Sketch

Log of Boring 1-3 & 5-9

Direct Shear Test Results

Legend to Soil Description

Chosen Valley Testing, Inc.

Boring Location Sketch

Proposed Street and Utility Reconstruction
SE ¼ Sec. 24 – T98N – R10W
Lincoln Township, Winneshiek County, Iowa
24386.24.IAM

Legend
- Boring Location

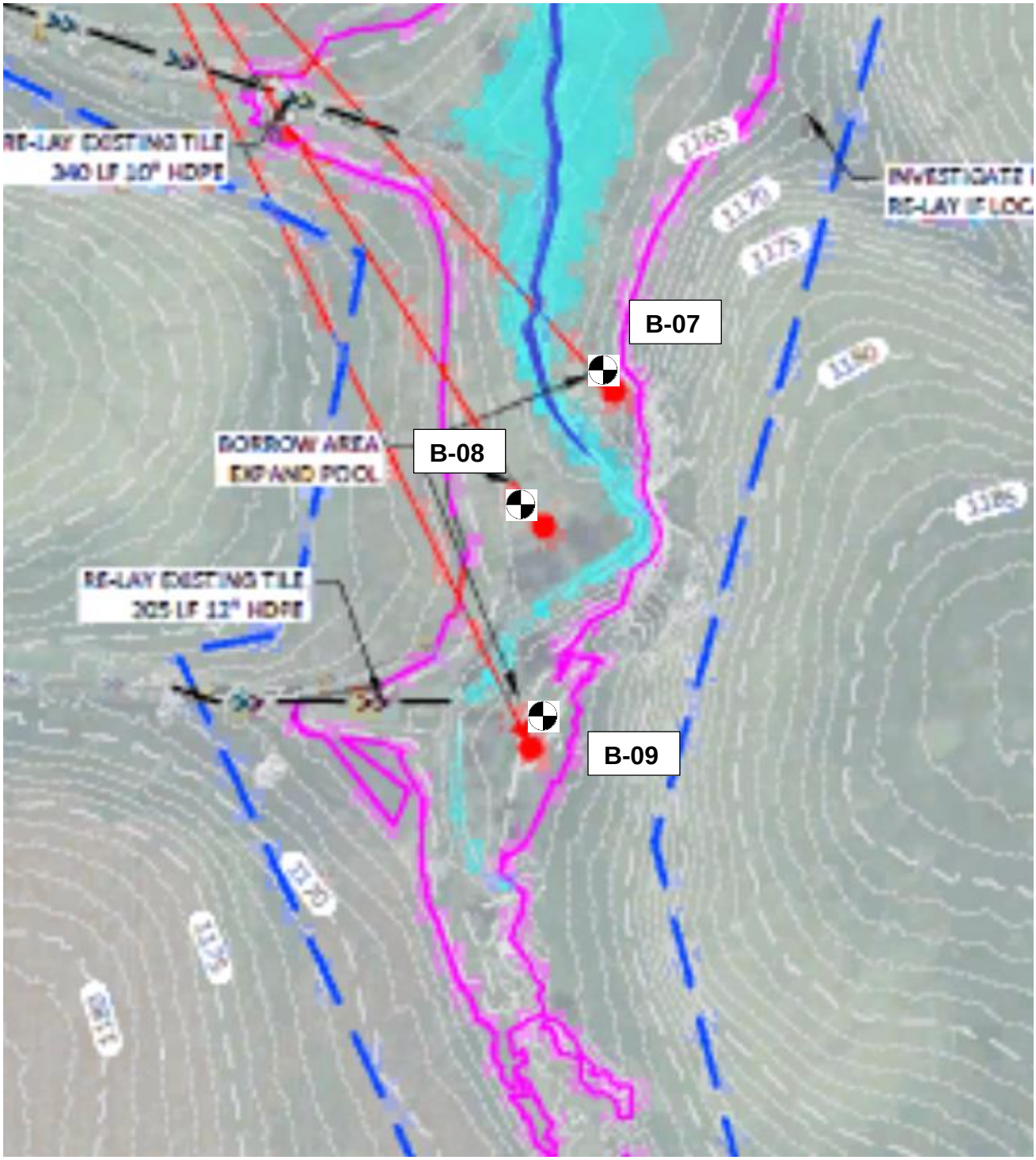
Chosen Valley Testing, Inc.

N

Boring Location Sketch

Proposed Street and Utility Reconstruction
SE ¼ Sec. 24 – T98N – R10W
Lincoln Township, Winneshiek County, Iowa
24386.24.IAM

Legend
- Boring Location



LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-01** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1156.4	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1154.9	1.5	SC CL	**CLAYEY SAND to SANDY LEAN CLAY** mostly medium grained, trace of gravel, dark grey to black, moist, very loose. (Alluvium)	2		
1152.4	4.0	CL	**LEAN CLAY** trace of organics, trace of sand, black, wet, soft. (Alluvium)	3		PP = 1.25 tsf, MC = 36.6%
1150.4	6.0	CL	**SANDY LEAN CLAY** trace of gravel, brown, very wet, rather stiff. (Alluvium)	*		* 12 / 50 = 2" PP = 0.75 tsf
1149.6	6.8	SM	**SILTY SAND with GRAVEL** mostly fine grained, light brown, moist, very dense. (Weathered Limestone)			
1149.4	7.0		Auger refusal at about 7 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

CVT STANDARD 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ LOG A GNNN06.GDT 11/25/24

LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-02** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1156.5	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1154.5	2.0	SC CL	**CLAYEY SAND to SANDY LEAN CLAY** mostly medium grained, trace of gravel, grey to brown, moist, very loose. (Alluvium)	3		
1152.5	4.0	CL	**SANDY LEAN CLAY** trace of gravel, trace of silt to about 6.5 feet, grey to light brown to brown, wet, soft to stiff. (Alluvium)	3		MC = 21.6%
1149.6	6.9			*		* 14 / 50 = 2" PP = 2.25 tsf
1149.5	7.0	SM	**SILTY SAND with GRAVEL** mostly fine grained, light brown, moist, very dense. (Weathered Limestone) Auger refusal at about 7 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

CVT STANDARD 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ LOG A GNNN06.GDT 11/25/24

LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-03** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1159.0	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1157.0	2.0	CL	**SANDY LEAN CLAY** trace of gravel, brown to black, wet, rather stiff. (Alluvium)	11		MC = 25.9%
1155.0	4.0					
1154.5	4.5	CL	**LEAN CLAY** trace of gravel, trace of roots, black, wet, medium. (Alluvium)			
1154.0	5.0	SP SC	**POORLY-GRADED SAND to CLAYEY SAND with GRAVEL** mostly medium grained, brown, moist, very dense. (Weathered Limestone)	*		* 4 / 4 / 50 = 2"
			Auger refusal at about 5 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

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LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-05** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1165.0	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1163.5	1.5	CL	**LEAN CLAY** trace of gravel, brown, wet, rather stiff to stiff. (Alluvium)	14		PP = 2.75 tsf, MC = 24.9%
1159.5	5.5	SM	**SILTY SAND with GRAVEL** mostly fine grained, light brown, moist, loose. (Residuum)	10		PP = 2.5 tsf, MC = 26.2%
1158.5	6.5	CL	**LEAN CLAY** trace of gravel, brown, wet, hard. (Residuum)	*		* 50 = 4" PP = 3.5 tsf
1158.3	6.7	SM	
1158.0	7.0		**SILTY SAND with GRAVEL** mostly fine grained, light brown, moist, very dense. (Weathered Limestone) Auger refusal at about 7 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

CVT STANDARD 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ LOG A GNNN06.GDT 11/25/24

LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-06** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1164.9	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1162.9	2.0	CL	**SANDY LEAN CLAY** trace of gravel, brown, wet, medium. (Alluvium)	8		PP > 4.5 tsf, MC = 10.5%
1160.9	4.0	CL	**SANDY LEAN CLAY** trace of gravel, brown, wet, very stiff. (Glacial Till)			
1160.4	4.5	SM	**SILTY SAND with GRAVEL** mostly fine grained, light brown, moist, very dense. (Weathered Limestone)	*		* 8 / 10 / 50 = 4" PP > 4.5 tsf
1159.9	5.0		Auger refusal at about 5 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

CVT STANDARD 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ LOG A GNNN06.GDT 11/25/24

LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-07** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1163.6	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1161.6	2.0	CL	**SANDY LEAN CLAY** trace of gravel, black, wet, medium. (B-Horizon)	6		PP = 3.5 tsf, MC = 29.2%
1160.1	3.5	CL	**LEAN CLAY** dark brown, wet, medium. (Alluvium)			
1159.6	4.0	ML	**SANDY SILT** trace of gravel, light grey and brown, wet. (Alluvium)	*		DD = 115.5 pcf, MC = 14.0% Friction Angle = 39.7 deg. Cohesion = 72 psf
1157.6	6.0	CL	**SANDY LEAN CLAY** trace of gravel, black, wet, hard. (Alluvium)			
1156.1	7.5	GP	**POORLY-GRADED GRAVEL with SILTY SAND** mostly fine grained, light brown, moist, very dense. (Residuum)	*		* 50 = 1"
1155.6	8.0	ML	**SANDY SILT** trace of gravel, light grey and brown, wet. (Residuum)	*		DD = 113.4 pcf, MC = 15.9% Friction Angle = 35.7 deg. Cohesion = 48 psf
1153.6	10.0		Auger refusal at about 10 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

CVT STANDARD 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ LOG A GNNN06.GDT 11/25/24

LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-08** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1163.9	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1161.9	2.0	SM	**SILTY SAND with GRAVEL** mostly fine grained, trace of clay, light brown, moist, loose to medium dense. (Weathered Limestone)	7 27		
1157.4	6.5		Auger refusal at about 6.5 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

CVT STANDARD 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ LOG A GNNN06.GDT 11/25/24

LOG OF BORING

CHOSEN VALLEY TESTING

Chosen Valley Testing, Inc.

PROJECT: 24386.24.IAM Design Phase Geotechnical Evaluation Proposed Wetland SE 1/4 Sec. 24 - T98N - R10W Lincoln Township, Winneshiek County, Iowa	BORING: **B-09** LOCATION: See attached sketch DATE: 11/7/2024 SCALE: 1" = 1'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1164.4	0.0	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			Elevations provided by Bolton & Menk, Inc.
1162.4	2.0	CL	**LEAN CLAY with Organics** black, wet, medium. (B-Horizon)	6		MC = 49.6%
1160.4	4.0	SM	**SILTY SAND** mostly fine grained, white, moist, medium dense. (Residuum)	11		
1158.9	5.5	SM	**SILTY SAND with GRAEVL** mostly fine grained, light brown, moist, medium dense. (Weathered Limestone)			
1157.9	6.5		Auger refusal at about 6.5 feet during drilling, presumably on bedrock. Boring sealed upon completion.			

CVT STANDARD 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ LOG A GNNN06.GDT 11/25/24

Direct Shear Test

ASTM D3080

Job No.: 15509

Project/Client: **Winneshiek County Wetland / Chosen Valley Testing, Inc.**

Boring No.: **B7** Sample No. Depth: **5**

Location: Sample Type: **TWT**

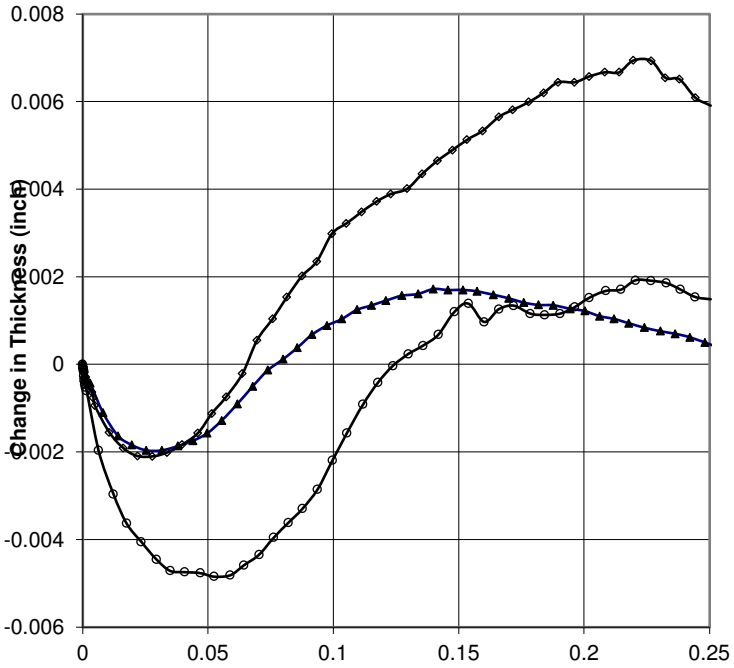
Soil Type: **Sandy Silt with pieces of hardend Silt, light gray and brown (ML)**

Test Date:	**11/15/2024**
Date Reported:	**11/21/2024**
Shear Rate	
0.001 (in/min)	

Remarks: Specimens trimmed to given sizes; Inundated after applying normal load. Consolidated and sheared to given displacements at constant rate of 0.001 inches/minute.

Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
Specific Gravity (*):	**2.68**

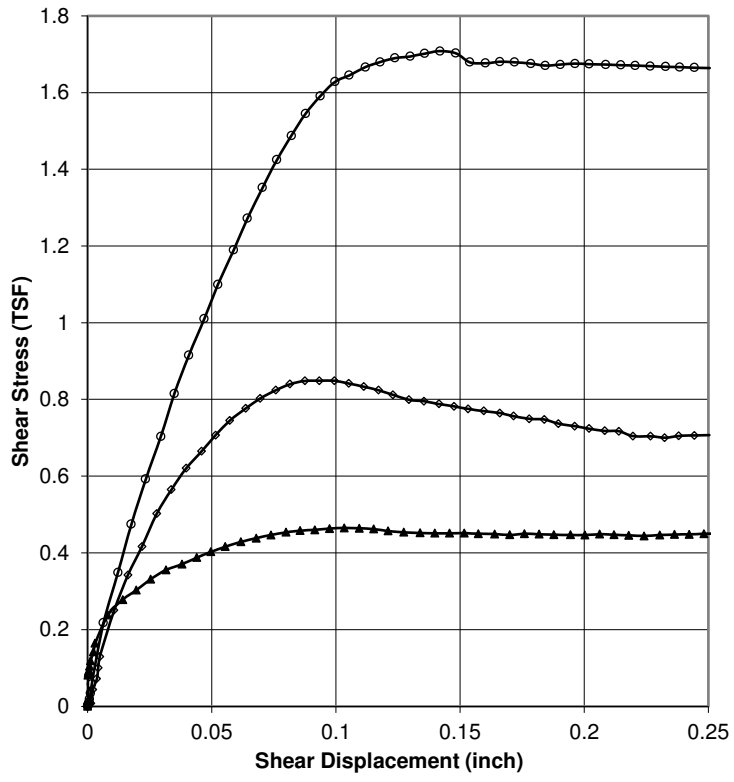
(*) = Assumed Specific Gravity

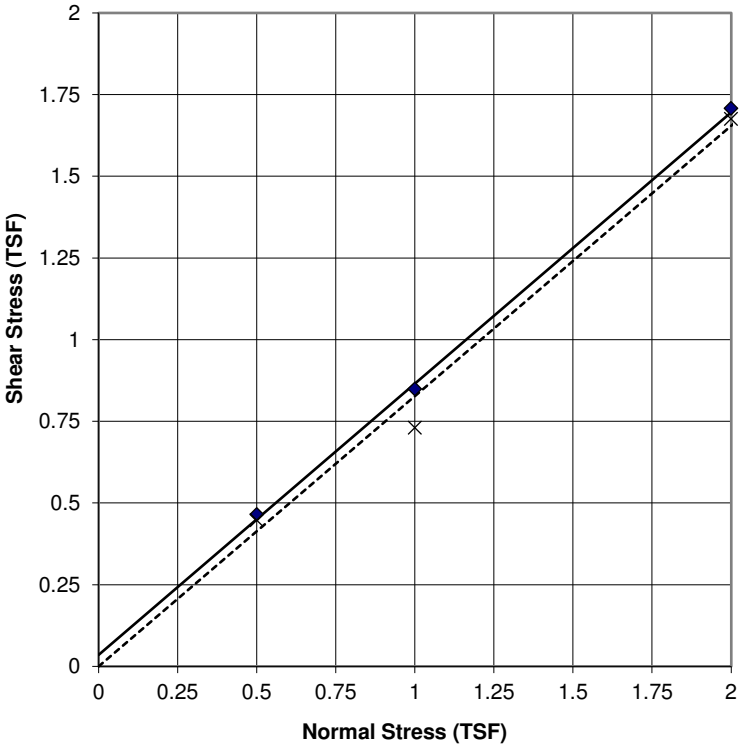


Failure Criterion:				
Max Stress	A	B	C	D
Initial	▲	◇	○	X
Diameter (In.)	2.50	2.50	2.50	
Thickness (In.)	0.97	0.97	0.97	
Water Content (%)	14.0	16.2	14.5	
Dry Density (pcf)	115.5	112.6	112.1	
Before Shear				
Thickness (In.)	0.95	0.94	0.93	
Water Content (%)	15.5	16.6	16.0	
Dry Density (pcf)	118.1	115.7	117.2	
Normal Stress	0.50	1.00	2.00	
Shear Stress	0.47	0.85	1.71	

"These tests are for informational purposes only and must be reviewed by a qualified professional engineer to verify that the test parameters shown are appropriate for any particular design."

Peak Conditions		At Given Shear Disp. Of:	0.2
Friction Angle:	ϕ= **39.7 deg.**	Friction Angle:	ϕ= **39.6 deg.**
Apparent Cohesion	**0.036 TSF**	Apparent Cohesion	**0.000 TSF**





9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Direct Shear Test

ASTM D3080

Job No.: 15509

Project/Client: **Winneshiek County Wetland / Chosen Valley Testing, Inc.**

Boring No.: **B8** Sample No. Depth: **3**

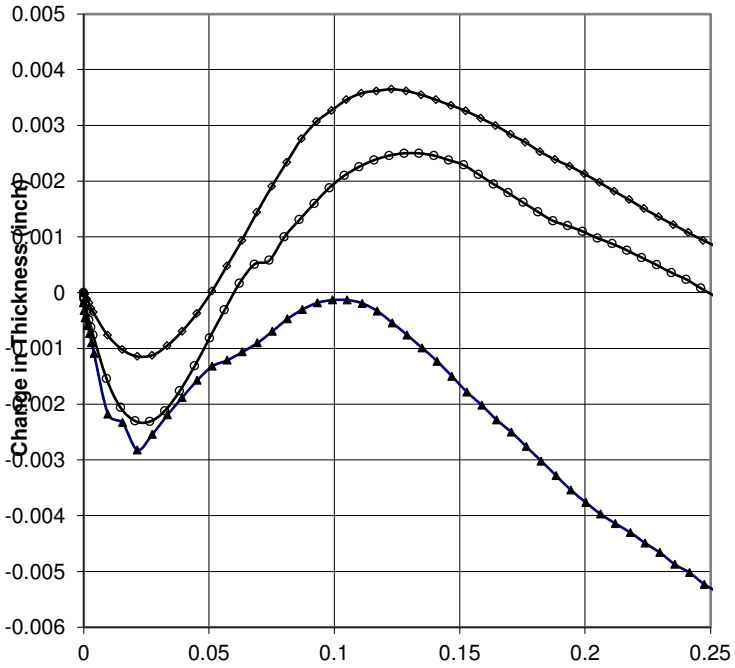
Location: Sample Type: **TWT**

Soil Type: **Sandy Silt with pieces of hardend Silt, light gray and brown (ML)**

Test Date:	**11/15/2024**
Date Reported:	**11/21/2024**
Shear Rate	
0.001 (in/min)	
Liquid Limit:	
Plastic Limit:	
Plasticity Index:	
Specific Gravity (*):	**2.68**

Remarks: Specimens trimmed to given sizes; Inundated after applying normal load. Consolidated and sheared to given displacements at constant rate of 0.001 inches/minute.

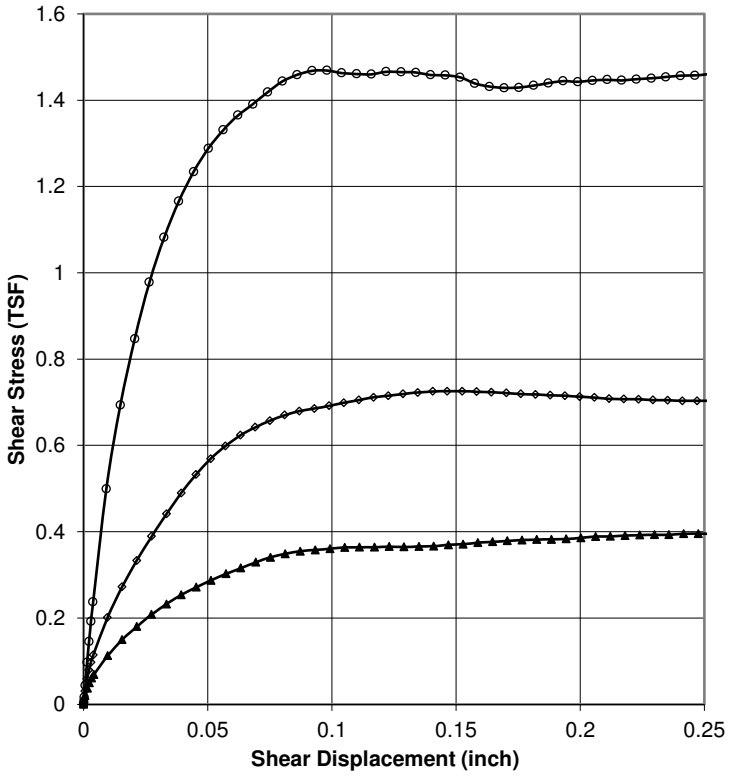
(*) = Assumed Specific Gravity

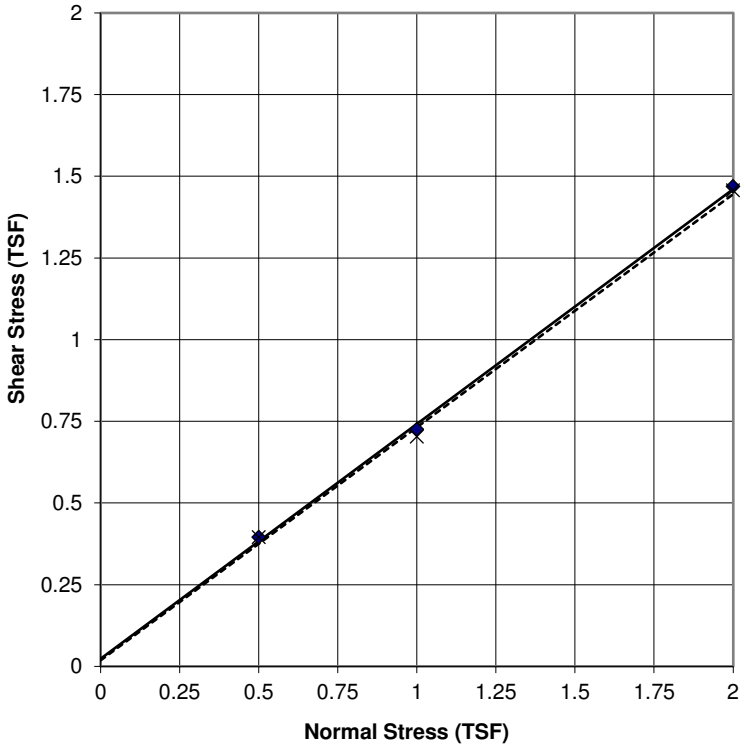


Failure Criterion:				
Max Stress	A	B	C	D
Initial	▲	◇	○	X
Diameter (In.)	2.50	2.50	2.50	
Thickness (In.)	0.97	0.97	0.97	
Water Content (%)	15.9	17.9	17.8	
Dry Density (pcf)	113.4	111.6	111.4	
Before Shear				
Thickness (In.)	0.95	0.95	0.94	
Water Content (%)	16.7	17.4	17.1	
Dry Density (pcf)	115.5	114.0	114.7	
Normal Stress	0.50	1.00	2.00	
Shear Stress	0.40	0.73	1.47	

"These tests are for informational purposes only and must be reviewed by a qualified professional engineer to verify that the test parameters shown are appropriate for any particular design."

Peak Conditions		At Given Shear Disp. Of:	0.25
Friction Angle:	ϕ= **35.7 deg.**	Friction Angle:	ϕ= **35.5 deg.**
Apparent Cohesion	**0.024 TSF**	Apparent Cohesion	**0.019 TSF**





9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

UNIFIED SOIL CLASSIFICATION (ASTM D-2487/2488)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

Relative Proportions of Sand and Gravel

TERM	PERCENT
Trace	< 15
With	15 - 29
Modifier	> 30

Relative Proportions of Fines

TERM	PERCENT
Trace	< 5
With	5 - 12
Modifier	> 12

Grain Size Terminology

TERM	SIZE
Boulder	< 12 in.
Cobble	3 in. - 12 in.
Gravel	#4 sieve to 3 in.
Sand	#200 sieve to #4 sieve
Silt or Clay	Passing #200 sieve

SAMPLE TYPES

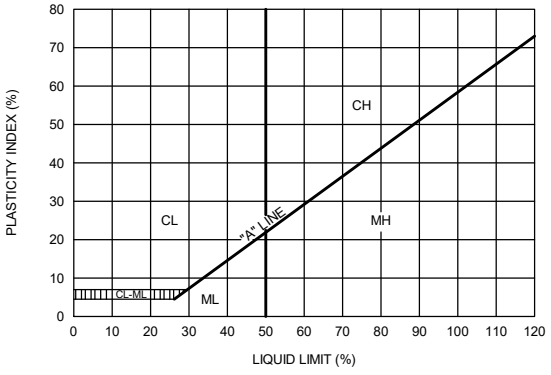
- Hollow Stem
- Standard Penetration Test
- Shelby Tube

TEST SYMBOLS

MC	-	MOISTURE CONTENT	LL	-	LIQUID LIMIT
OC	-	ORGANIC CONTENT	PI	-	PLASTISITY INDEX
CN	-	CONSOLIDATION	SW	-	SWELL TEST
DD	-	DRY DENSITY	UU		Unconsolidated Undrained triaxial
PP	-	POCKET PENETROMETER			
RV	-	R-VALUE			
SA	-	SIEVE ANALYSIS			
P200	-	% PASSING #200 SIEVE			

▽ - WATER LEVEL (WITH TIME OF) MEASUREMENT

PLASTICITY CHART



PENETRATION RESISTANCE
(RECORDED AS BLOWS / 0.5 FT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	COMPRESSIVE STRENGTH (TSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 1	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 3	0.25 - 0.50
MEDIUM DENSE	10 - 30	RATHER SOFT	4 - 5	0.50 - 1.0
DENSE	30 - 50	MEDIUM	6 - 8	
VERY DENSE	OVER 50	RATHER STIFF	9 - 12	1.0 - 2.0
		STIFF	13 - 16	
		VERY STIFF	17 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

Chosen Valley Testing

Job No. 24386.24.IAM

LEGEND TO SOIL DESCRIPTIONS

CVT Chosen Valley Testing, Inc.

CVT 24386.24.IAM (WINNESHIEK COUNTY WETLAND - RIDGEWAY).GPJ 11/25/24