

**APPENDIX I**  
**GEOTECHNICAL REPORT**



**Factual Geotechnical Report:**

Proposed Factual Geotechnical Evaluation  
CREP Wetland HUM932809D  
SE ¼ Sec. 9 – T93N – R28W  
Humboldt Twp., Humboldt Co., Iowa  
CVT# 17773.20.IAM

**Prepared for:**

Mr. Lou Wehrspann, PE  
WHKS & Co.

**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.
	
	_____ (signature)
	January 28, 2021 (date)
	Printed or typed name: <u>Matthew J. Reisdorfer, PE.</u> License number: <u>22234</u> My license renewal date is <u>December 31, 2021</u> Pages or sheets covered by this seal:

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Soil Boring Location Sketch

Log of Boring # 1-10

Legend to Soil Description

# Chosen Valley Testing, Inc.

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January 28, 2021

**Re: Proposal for Factual Geotechnical Evaluation  
CREP Wetland HUM932809D  
SE ¼ Sec. 9 – T93N – R28W  
Humboldt Twp., Humboldt Co., Iowa  
CVT# 17773.20.IAM**

Dear Mr. Wehrspann:

This factual report was prepared to assist planning for the proposed CREP Wetland in Humboldt Township, Humboldt County, Iowa. Our services were authorized by Mr. Lou Wehrspann, PE of WHKS & Co.

## 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 to assist planning for the proposed CREP Wetland in Humboldt Township, Humboldt County, Iowa. Our services were authorized by Mr. Lou Wehrspann, PE of WHKS & Co.

### A.2. Scope

To obtain data for analysis, our services included a total of 10 penetration test borings. The borings were drilled to depths of about 11 to 21 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 borings locations were indicated to Chosen Valley Testing on site plans provided by the client. The Boring Location Sketch in the Appendix shows the approximate locations drilled. Elevations were estimated using LiDAR from the Iowa DNR. These elevations should be considered approximate.

### **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 consist of glacial till deposits of clay, silt and sand mixtures. Bedrock is typically within 50 feet of the surface and commonly consists of sandstone and shale of the Dakota and Windrow Formations.

## **B. Subsurface Data**

**Methods:** All of the borings were performed using penetration test procedures (Method of Test D1586 of the American Society for Testing and Materials). This procedure allows for the extraction of intact soil specimen from deep in the ground. With this method, a hollow-stem auger is drilled to the desired sampling depth. A 2-inch OD sampling tube is then screwed onto the end of a sampling rod, inserted through the hole in the auger's tip, and then driven into the soil with a 140-pound hammer dropped repeatedly from a height of 30 inches above the sampling rod. The sampler is driven 18-inches into the soil, unless the material is too hard. The samples are generally taken at 2½ to 5-foot intervals. The core of soil obtained is classified and logged by the driller and a representative portion is then sealed in a jar and delivered to the soils engineer for review.

### **B.1. Stratification**

At the surface, the borings encountered about 1 to 2 feet of slightly organic lean clay with sand topsoil.

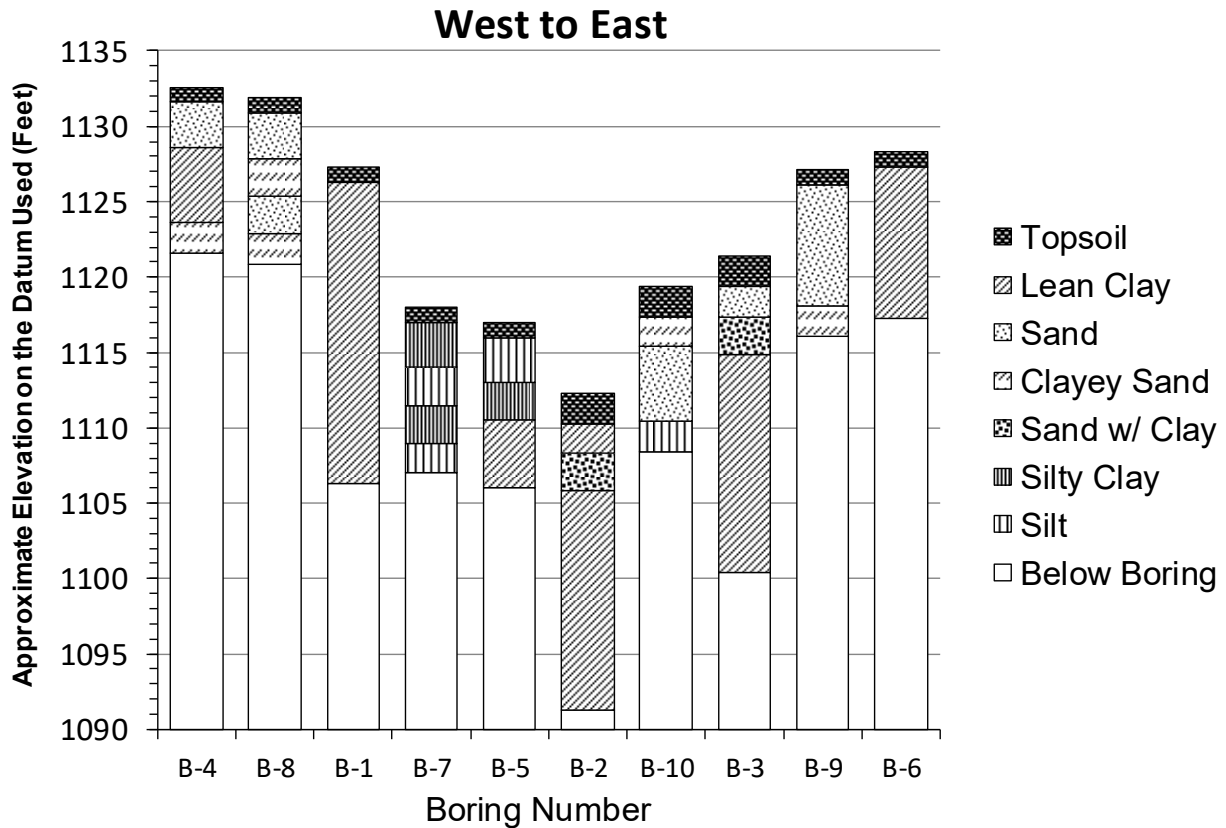
Clean sand, sand with clay and clayey sand was met below the topsoil in Borings B-3, B-4, B-8 through B-10. Borings B-8 and B-9 terminated in clayey sands at depths of about 11 feet below the surface, while the sandy layers were met to depths of about 4 to 9 feet.

Silt and silty clay was met below the topsoil in Borings B-5 and B-7 and also below the clean sand in Boring B-10. Borings B-7 and B-10 terminated in silt at depths of about 11 feet below the surface, while the silty clay was encountered to a depth of about 6 ½ feet in Boring B-5.

Lean clay was met below the topsoil in the remaining borings, as well as below the silty clay in Boring B-5 and the sand layers in Borings B-3 and B-4. A layer of sand with clay, about 2 feet thick, was encountered within the lean clay in Boring B-2, starting at a depth of about 4 feet. Clayey sand followed the lean clay in Boring B-4, starting at a depth of about 9 feet. This boring terminated in clayey sand at a depth of about 11 feet below the surface.

Borings B-1, B-2, B-3, B-5, and B-6 terminated in lean clays at depths of about 11 to 21 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 and Laboratory Test Data**

The number of blows needed for the hammer to advance the penetration test sampler is an indicator of soil characteristics. The number of blows to advance the sampler 1 foot is called the penetration resistance or “N”-value. The results tend to be more meaningful for natural mineral soils, than for fill soils. In fill soils, compaction tests are more meaningful.

Penetrations resistance values ("N" Values) of 0 to 25 blows per foot (BPF) were recorded in the sand and clayey sand, indicating they were very loose to medium dense. The glacial till lean clays, silty clay and silt returned penetration values of 3 to 20 BPF, indicating it was soft to very stiff, but was generally medium to rather stiff.

A key to the 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.

A pocket penetrometer was used to provide additional data on the compressive strength of cohesive soils. The clays and silts returned values of ½ to greater than 4 ½ tons per square foot (tsf).

### **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 encountered in Borings B-2, B-3, and B-10 during drilling, at depths of about 4 to 17 feet below the surface. The observed water levels correspond to elevations of about 1104 ½ to 1115 ½ feet on the datum used to measure the borings. Elevated moisture contents were noted in several of the clay samples. 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.

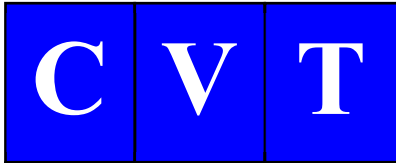
## **Appendix**

**Soil Boring Location Sketch**

**Log of Boring 1-10**


**Legend to Soil Description**





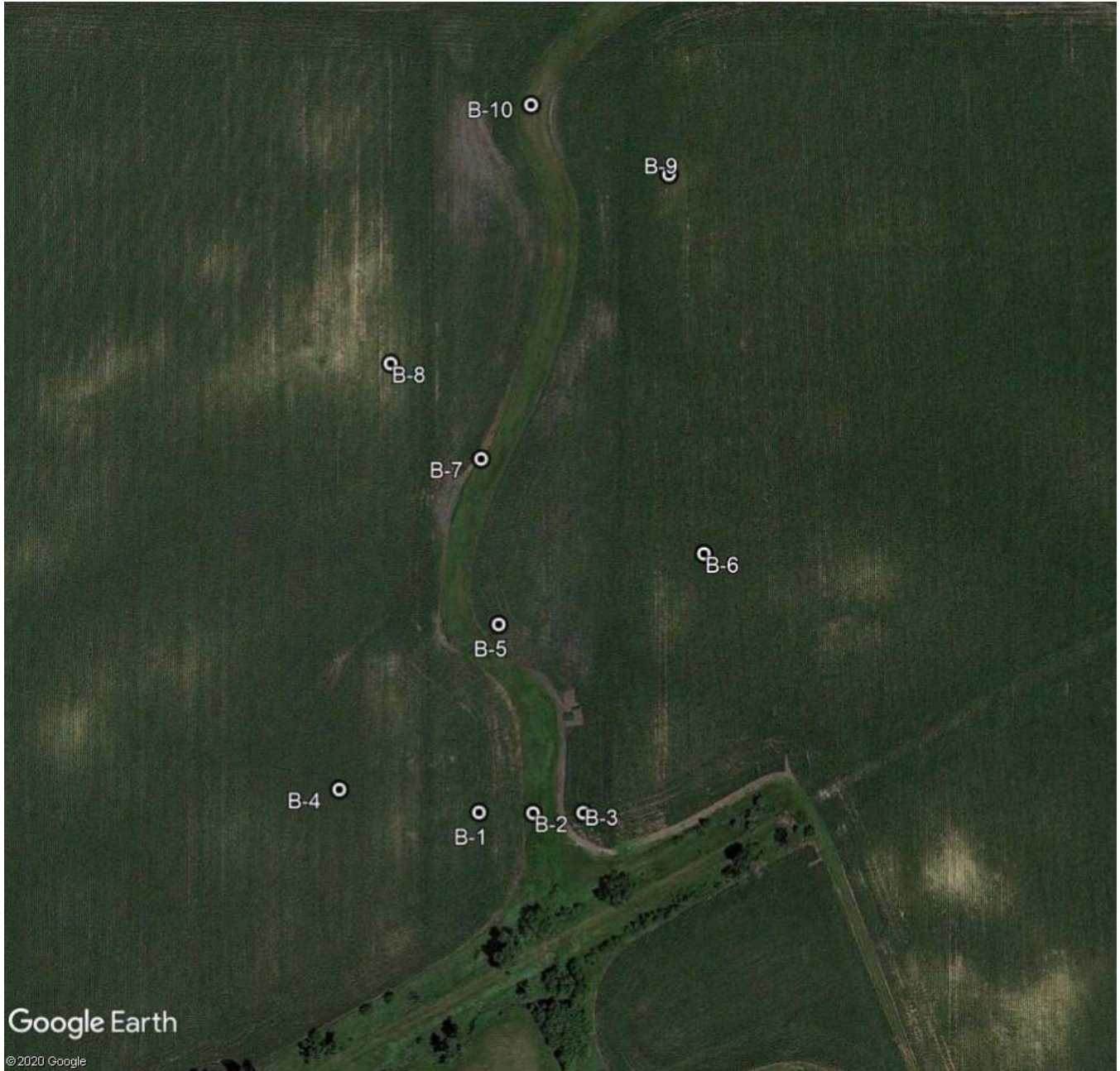
Chosen Valley Testing, Inc.

Legend

 Boring Locations



Soil Boring Location Sketch  
Proposed CREP Wetland HUM932809D  
SE ¼ Sec. 9-T93N-R28W  
Humboldt Twp., Humboldt Co., Iowa  
17773.20.IAM



# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-01</b>	
	LOCATION: See attached sketch	
	DATE: 1/20/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1127.3	0.0					
1126.3	1.0	CL OL CL	<p><b>Slightly Organic LEAN CLAY with SAND</b> black, wet.</p> <p>(Topsoil)</p> <p><b>LEAN CLAY</b> trace of sand, brown, wet, rather soft to very stiff.</p> <p>(Glacial Till)</p>			Elevations estimated using Iowa DNR LiDAR.
				6		PP = 2.25 tsf
				5		PP = 1.75 tsf MC = 20.4%
				12		PP = 2.5 tsf
				9		PP = 1.75 tsf MC = 19.3%
				9		PP = 1.75 tsf
				10		PP = 1.25 tsf MC = 18.9%
1106.3	21.0		Trace of gravel to 17 1/2 feet. Becoming gray to about 11 1/2 feet.	19		PP > 4.5 tsf MC = 11.6%
			End of boring. Boring sealed upon completion.			

CVT STANDARD 17773.20.IAM (HUMBOLDT CO. WETLAND). GP J LOG A GNN06.GDT 1/28/21

# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-02</b>	
	LOCATION: See attached sketch	
	DATE: 1/20/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1112.3	0.0	CL OL	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet. (Topsoil)			Elevations estimated using Iowa DNR LiDAR.
1110.3	2.0	CL	<b>LEAN CLAY</b> trace of sand, trace organics, brown, wet, soft. (Glacial Till)	3		PP = 0.75 tsf
1108.3	4.0	SP SC	<b>POORLY GRADED SAND with CLAY</b> mostly medium grained, dark brown, water bearing. (Glacial Outwash)	0	▽	Water encountered at about 5 feet during drilling. MC = 40.6% P200 = 11.5%
1105.8	6.5	CL	<b>LEAN CLAY</b> trace of sand, trace of gravel, grey, wet, medium to very stiff. (Glacial Till)	8		PP = 1.75 tsf
				12		PP = 2.0 tsf MC = 16.0%
				10		PP = 1.5 tsf
			Becoming brown to about 21 feet.	17		PP >4.5 tsf MC = 12.8%
1091.3	21.0			20		PP > 4.5 tsf MC = 11.1%
			End of boring. Boring sealed upon completion.			

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# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-03</b>	
	LOCATION: See attached sketch	
	DATE: 1/20/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1121.4	0.0	CL OL	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet. (Topsoil)			Elevations estimated using Iowa DNR LiDAR.
1119.4	2.0	SP	<b>POORLY GRADED SAND</b> trace of clay, mostly fine grained, brown, moist, loose. (Glacial Outwash)	8		
1117.4	4.0	SP SC	<b>POORLY GRADED SAND with CLAY</b> trace of gravel, mostly medium grained, brown, moist, loose. (Glacial Outwash)	5		MC = 16.0% P200 = 9.1%
1114.9	6.5	CL	<b>LEAN CLAY</b> trace of sand, trace of gravel, brown, wet, medium to rather stiff. (Glacial Till)	7		PP = 2.0 tsf
			Becoming grey to about 17 1/2 feet.	10		PP = 1.0 tsf MC = 17.7%
				7		PP = 0.75 tsf
				7		PP = 2.25 tsf MC = 17.4%
					▽	Water encountered at about 17 feet during drilling.
1100.4	21.0		End of boring. Boring sealed upon completion.	7		PP = 4.5 tsf MC = 16.3%

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# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-04</b>	
	LOCATION: See attached sketch	
	DATE: 1/21/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1132.6	0.0					
1131.6	1.0	CL OL SP	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet. (Topsoil)			Elevations estimated using Iowa DNR LiDAR.  PP = 0.5 tsf MC = 27.9% P200 = 50.5%  PP = 0.75 tsf  PP = 0.75 tsf MC = 19.8% P200 = 19.2%
			<b>POORLY GRADED SAND</b> trace of clay, mostly medium grained, brown, moist, loose. (Glacial Till)	4		
1128.6	4.0	CL	<b>SANDY LEAN CLAY</b> trace of gravel, brown, wet, medium to rather stiff. (Glacial Till)	6		
				7		
1123.6	9.0	SC	<b>CLAYEY SAND</b> trace of gravel, mostly medium grained, brown, moist, medium dense. (Glacial Till)	11		
1121.6	11.0		End of boring. Boring sealed upon completion.			

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# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-05</b>	
	LOCATION: See attached sketch	
	DATE: 1/21/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1117.0	0.0	CL OL	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet.			Elevations estimated using Iowa DNR LiDAR.  PP = 1.0 tsf MC = 30.4%  PP = 1.25 tsf MC = 38.2%  PP = 3.5 tsf MC = 14.0%
1116.0	1.0	ML	(Topsoil) <b>SILT</b> trace of gravel, brown and grey, wet, soft. (Glacial Till)	3		
1113.0	4.0	CL ML	<b>SILTY CLAY</b> traces of sand, grey, wet, soft. (Glacial Till)	3		
1110.5	6.5	CL	<b>LEAN CLAY</b> trace of sand, brown and grey, wet to very wet, rather soft to stiff. (Glacial Till)	4		
1106.0	11.0		End of boring. Boring sealed upon completion.	16		

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# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-06</b>	
	LOCATION: See attached sketch	
	DATE: 1/21/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1128.3	0.0					
1127.3	1.0	CL OL CL	<p><b>Slightly Organic LEAN CLAY with SAND</b> black, wet.</p> <p>(Topsoil)</p> <p><b>LEAN CLAY</b> trace of sand, trace of gravel, brown, wet, medium to stiff.</p> <p>(Glacial Till)</p>			Elevations estimated using Iowa DNR LiDAR.
				7		PP = 3.75 tsf
				6		PP = 1.0 tsf MC = 28.7%
				9		PP = 0.5 tsf
1117.3	11.0			16		PP = 1.0 tsf MC = 22.8%
			End of boring. Boring sealed upon completion.			

CVT STANDARD 17773.20.IAM (HUMBOLDT CO. WETLAND). GP J LOG A GNN06.GDT 1/28/21



# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-07</b>	
	LOCATION: See attached sketch	
	DATE: 1/21/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1118.0	0.0					
1117.0	1.0	CL OL	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet. (Topsoil)			Elevations estimated using Iowa DNR LiDAR.
		CL ML	<b>SILTY CLAY</b> trace of gravel, grey, wet, soft. (Glacial Till)	3		PP = 0.75 tsf MC = 24.3%
1114.0	4.0	ML	<b>SILT</b> trace of sand, brown and grey, wet, rather soft. (Glacial Till)	4		PP = 0.5 tsf MC = 28.7%
1111.5	6.5	CL ML	<b>SILTY CLAY</b> trace of sand, brown and grey, wet, medium. (Glacial Till)	7		PP = 0.5 tsf MC = 26.7%
1109.0	9.0	ML	<b>SILT</b> grey, wet, medium. (Glacial Till)	8		PP = 0.75 tsf MC = 25.2%
1107.0	11.0		End of boring. Boring sealed upon completion.			

CVT STANDARD 17773.20.IAM (HUMBOLDT CO. WETLAND). GP J LOG A GNN06.GDT 1/28/21



# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-08</b>	
	LOCATION: See attached sketch	
	DATE: 1/21/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1131.9	0.0					
-1130.9	1.0	CL OL SP	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet. (Topsoil)			Elevations estimated using Iowa DNR LiDAR.  PP = 2.75 tsf MC = 16.5% P200 = 37.2%  PP = 1.5 tsf MC = 5.4% P200 = 14.9%
			<b>POORLY GRADED SAND</b> trace of gravel, mostly medium grained, brown, moist, loose. (Glacial Outwash)	9		
-1127.9	4.0	SC	<b>CLAYEY SAND</b> trace of gravel, mostly medium grained, brown, moist, loose. (Glacial Till)	9		
1125.4	6.5	SP	<b>POORLY GRADED SAND</b> trace of gravel, mostly medium grained, brown, moist, medium dense. (Glacial Outwash)	19		
-1122.9	9.0	SC	<b>CLAYEY SAND</b> trace of gravel, mostly medium grained, brown, moist, medium dense. (Glacial Till)	25		
-1120.9	11.0		End of boring. Boring sealed upon completion.			

CVT STANDARD 17773.20.IAM (HUMBOLDT CO. WETLAND). GP J LOG A GNN06.GDT 1/28/21

# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-09</b>	
	LOCATION: See attached sketch	
	DATE: 1/21/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1127.1	0.0					
1126.1	1.0	CL OL SP	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet. (Topsoil)			Elevations estimated using Iowa DNR LiDAR.
			<b>POORLY GRADED SAND</b> trace of gravel, trace of clay, mostly medium grained, brown, moist, loose to medium dense. (Glacial Outwash)	8		
				7		
1118.1	9.0			18		
		SC	<b>CLAYEY SAND</b> trace of gravel, mostly medium grained, brown, moist, medium dense (Glacial Till)	12		MC = 20.0% P200 = 32.5%
1116.1	11.0		End of boring. Boring sealed upon completion.			

CVT STANDARD 17773.20.IAM (HUMBOLDT CO. WETLAND). GP J LOG A GNN06.GDT. 1/28/21

# LOG OF BORING

CHOSEN VALLEY TESTING



PROJECT: 17773.20.IAM Factual Geotechnical Evaluation CREP Wetland HUM932809D SE 1/4 Sec. 9 - T93N - R28W Humboldt Twp., Humboldt Co., Iowa	BORING: <b>B-10</b>	
	LOCATION: See attached sketch	
	DATE: 1/21/2021	SCALE: 1" = 3'

Elev.	Depth	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1119.4	0.0	CL OL	<b>Slightly Organic LEAN CLAY with SAND</b> black, wet. (Topsoil)			Elevations estimated using Iowa DNR LiDAR.  MC = 23.8%  Water encountered at about 4 feet during drilling.  PP = 0.75 tsf MC = 26.4%
1117.4	2.0	SC	<b>CLAYEY SAND</b> mostly medium grained, grey, moist, loose. (Glacial Till)	4		
1115.4	4.0	SP SC	<b>POORLY GRADED SAND with CLAY</b> trace gravel, mostly medium grained, grey, moist, loose. (Glacial Outwash)	8	▽	
				9		
1110.4	9.0	ML	<b>SILT</b> with clay, grey, wet, rather soft. (Glacial Till)	5		
1108.4	11.0		End of boring. Boring sealed upon completion.			

CVT STANDARD 17773.20.IAM (HUMBOLDT CO. WETLAND). GP J LOG A GNN06.GDT 1/28/21

# 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			
		GRAVELS WITH FINES >12% FINES	$Cu > 4$ AND $1 > Cc > 3$	GP	POORLY-GRADED GRAVEL			
		SANDS >50% OF COARSE FRACTION PASSES ON NO. 4. SIEVE	CLEAN SANDS <5% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL		
			SANDS AND FINES >12% FINES	FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL		
	FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS  LIQUID LIMIT < 50	INORGANIC	$Pi > 7$ AND PLOTS > "A" LINE	CL	LEAN CLAY		
			ORGANIC	$Pi > 4$ AND PLOTS < "A" LINE	ML	SILT		
			SILTS AND CLAYS  LIQUID LIMIT > 50	INORGANIC	PI PLOTS > "A" LINE	CH	FAT CLAY	
				ORGANIC	PI PLOTS < "A" LINE	MH	ELASTIC 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

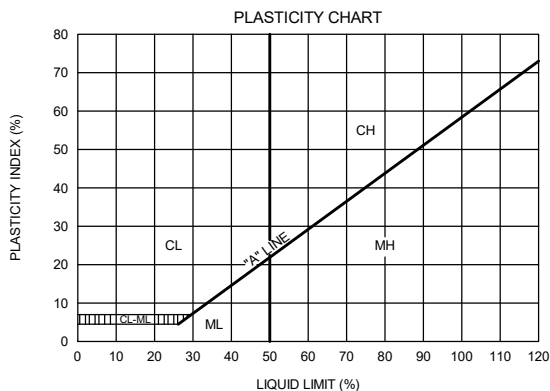
### SAMPLE TYPES

- Hollow Stem
- Standard Penetration Test

### 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)



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	1.0 - 2.0
VERY DENSE	OVER 50	RATHER STIFF	9 - 12	2.0 - 4.0
		STIFF	13 - 16	4.0 - 8.0
		VERY STIFF	17 - 30	8.0 - 15.0
		HARD	OVER 30	OVER 15.0

\* 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).

CVT-177.20.IAM (HUMBOLDT CO WETLAND).GRJ 1/22/21

## Chosen Valley Testing

Job No. 17773.20.IAM

## LEGEND TO SOIL DESCRIPTIONS

