Subsurface Investigation Report

Enbridge Line 5 Reroute
MP 19 HDD Crossing – Silver Creek
Location 42-1-C-1 and SC-1, West of County Road C, South of WI-13
Location 43-1-C-1, East of Ryefield Road, South of WI-13
Location 44-1-C-1, 45-2-C, SC-2, SC-3 and S C-4 West of Marita Road,
South of WI-13
Town of Ashland, Ashland County, Wisconsin

Prepared for

Lake Superior Consulting

Professional Certification:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

Joseph C. Butler, PE Senior Engineer

License Number: E-43286-6

September 30, 2021



Project B2004465

Braun Intertec Corporation





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September 30, 2021

Project B2104465

Mr. Scott McDonald Lake Superior Consulting 130 West Superior Street, Suite 500 Duluth, MN 55802

Re: Subsurface Investigation

Enbridge Line 5 Reroute

Location 42-1-C-1 and SC-1, West of County Road C, South of WI-13

Location 43-1-C-1, East of Ryefield Road, South of WI-13

Location 44-1-C-1, 45-2-C, SC-2, SC-3 and S C-4 West of Marita Road, South of WI-13

Town of Ashland, Ashland County, Wisconsin

Dear Mr. McDonald:

We are pleased to present this Subsurface Investigation Report for the Line 5 Reroute Project at the MP 19 HDD Crossing under Silver Creek in the Town of Ashland, Ashland County, Wisconsin.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact David Morrison (dmorrison@braunintertec.com) at 218.624.4967.

Sincerely,

BRAUN INTERTEC CORPORATION

David E. Morrison Project Consultant

Joseph C. Butler, PE

Business Unit Manager / Senior Engineer

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Appendix

Soil Boring Location Sketches: (8 pages)

Log of Boring Sheets: 42-1-C-1, 43-1-C-1, 44-1-C-1, 45-2-C, SC-1 through SC-4

Photo Log of Cores: SC-2 (7 pages), SC-3 (5 pages, SC-4 (4 pages), 43-1-C-1 (4 pages)

HDD Alignment Profile

Descriptive Terminology of Soil Descriptive Terminology of Rock

Geotechnical Testing Reports: 310567, 320970, 8441998, 8493787,

Sieve Analysis Test Reports: 310584 through 310591, 318263 through 318266, 318269, 318270, 318272,

318749, 318751 through 318754, 318756, 318758, 318760, 318762, 8441999, 8442001, 8442005,

8442007, 8442009, 8442012, 8494022.

Moisture Content Test Reports: 318263 through 318266, 318269, 318270, 318272, 318749, 318751

through 318754, 318756, 318758, 318760, 318762

Hydrometer with Sieve Analysis Test Reports: 310573, 320992, 320971, 320973, 8442014, 84402016,

8442017, 8494031,

Compressive Strength of Cores Test Reports: 43-1-C-1 (2 pages), SC-2 (2 pages), SC-3 (2 pages), and SC-4 (1 page)



A. Introduction

A.1. Project Description

Enbridge Energy plans to relocated Line 5 around the Bad River Indian Reservation, as part of that project, a geotechnical investigation and evaluation is being completed. We are providing subsurface investigation as part of this effort. This report addresses the HDD crossing under Silver Creek which is located at MP 19 in the proposed pipeline alignment in Ashland Town, Ashland County, Wisconsin.

We performed borings 42-1-C-1, 43-1-C-1, 44-1-C-1, and 45-2-C for the HDD Crossing under Silver Creek in the summer of 2020. Subsequently, a Subsurface Investigation Report for project B2001991, dated October 12, 2020, was provided. Additional geotechnical data has been requested for the crossing. We performed borings SC-1 through SC-4 in the summer of 2021. This report provides the factual data obtained in the initial investigation in 2020 (borings 42-1-C-1, 43-1-C-1, 44-1-C-1, and 45-2-C) as well as the additional borings in 2021 (SC-1 through SC-4).

Three of the borings performed in 2021 were performed approximately 10 feet from the borings performed in 2020. Borings SC-1, SC-2 and SC-3 were performed at boring locations 42-1-C-1, 44-1-C-1, and 45-2-C, respectively.

A.2. Purpose

The purpose of our subsurface investigation is to characterize subsurface geologic conditions at the selected exploration location.

A.3. Background Information and Reference Documents

We reviewed the following information:

- Wisconsin Geologic Map, "Soils of Wisconsin", prepared by F. D. Hole, M.T Beatty, C.J.
 Milfred, G.B. Lee, and A.J Klingelhoets, dated 1968.
- "Bedrock Geologic Map of Wisconsin", prepared by M.G. Mudrey, Jr., B.A. Brown, and J.K.
 Greenberg, dated 1982.

- "Rock Mechanics Properties of Typical Foundation Rock Types", prepared by J.R. Brandon, dated July 1974.
- "Geological Summary of the Ashland 2-Degree Quadrangle" prepared by M.G. Mudrey, Jr. dated January 2, 1979.
- Aerial photos from Google Earth Pro©.

A.4. Scope of Services

We performed our scope of services for the 2020 portion of this project in accordance with our quote to Mr. Jonathan Underland of Enbridge Energy, under the terms of the Work Order (132013839) provided by Enbridge Energy.

The additional scope of services (2021 portion) for the project was performed in accordance with our proposal QTB132915 to Mr. Scott McDonald of Lake Superior Consulting dated, May 28, 2021 and authorized under the Subcontractor Agreement 00919600782 between Lake Superior Consulting and Braun Intertec, dated June 17, 2021. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Lake Superior Consulting selected and staked the boring locations, and we cleared the
 exploration location of underground utilities. The Soil Boring Location Sketch included in the
 Appendix shows the approximate location of the boring.
- Performing four (4) standard penetration test (SPT) boring/corings in 2020 denoted as
 42-1-C-1, 43-1-C-1, 44-1-C-1, 45-2-C.
- Performing four (4) additional standard penetration test (SPT) boring/corings in 2021 denoted SC-1, SC-2, SC-3 and SC-4.
- Performing laboratory testing on select samples as selected by Lake Superior Consulting.



 Preparing this factual report containing a boring location sketch, exploration log, photo log of cores, laboratory tests, a summary of the geologic materials encountered and Estimated Soil Properties of the significant strata.

Our scope of services did not include environmental services or testing and our geotechnical personnel performing this evaluation are not trained to provide environmental services or testing. We can provide environmental services or testing at your request.

B. Results

B.1. Geologic Overview

Soil borings encountered soil to depths ranging from 46 to 97.5 feet below the ground surface. The soils consisted of (proceeding down from the ground surface) 1 to 2 1/2 feet of silty sand topsoil or fill, underlain by alternating layers of lacustrine (lake deposited) and glacial deposits. Below the glacial deposits, the borings encountered bedrock consisting of conglomerate associated with the Freda Sandstone formation, occasional sandstone, siltstone and claystone layers were at depths ranging from approximately 112 to 165 feet.

Subsurface bedrock geology at the investigation area is within the Oronto Group, a group of sandstone and shale in Northern Wisconsin. The group is composed of conglomerate, sandstone and shale typically, red with bands, streaks and spots of greenish-white, no more than a few inches thick. The group is divided into the Copper Harbor Conglomerate, Freda Sandstone and Nonesuch Shale formations.

We based the geologic origins used in this report on the soil types, in-situ and laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Geologic Materials

B.2.a. Soil Encountered

The general geologic profile of the soils encountered in the 2021 investigation were consistent with the soils encountered in the 2020 investigation and consisted of (proceeding down from the ground surface)



1 to 2 1/2 feet of silty sand topsoil or fill, underlain by alternating layers of lacustrine (lake deposited) and glacial deposits. The soils contained in the layers consisted of silty sands, poorly graded sands, Sandy lean clay and silts to either refusal or the termination depth of each boring, the encountered soils contained variable amounts of gravel. Table 1 in section B.3 contains more information on each material encountered.

B.2.b. Sampler Refusal

B.2.b.1. 2020 Investigation

In borings 42-1-C-1, 43-1-C-1 and 45-2-C our augers were able to be advanced in the Freda Sandstone however, due to the very dense soils, containing cobbles and boulders, the sampler encountered refusal during sampling and no sample was able to be collected.

Our field crew discussed the refusal with onsite Lake Superior Consulting (LSC) personnel. It was decided to monitor the bit pressure as the drill tooling was advanced. In order to obtain samples, it was intended that after a period of monitoring bit pressure and rate of advancement, rock coring would be conducted. However, there was a misinterpretation of this intent in the field and no rock coring was performed. Based on the consistent rate of advancement and bit pressures, it is our option the rock was consistent with the rock that was cored in adjacent holes.

B.2.b.2. 2021 Investigation

In borings SC-2, SC-3 and SC-4 our augers encountered refusal at depths ranging from 46 to 105 feet below the ground surface. "Refusal" means that the auger could not be advanced further without excessive effort. Refusal can be caused by hardpan, boulders, detached rock pieces ("floats") as well as bedrock. Based on our cores, the refusal occurred on bedrock. Based on coring activities, the refusal occurred on bedrock consisting of conglomerate, sandstone, siltstone and claystone associated with the Freda Sandstone formation.

B.2.c. Bedrock

Below the glacial deposits, the borings encountered bedrock extending from an approximate elevation ranging between of 1016 to 966 feet. The bedrock generally slopes downward from 1016 on the north side of Silver Creek to an elevation near 986 feet at the creek bottom before sloping upward to approximately 1010 1/2 feet on the south side of the creek.



B.2.c.1. 2020 Investigation

The observed bedrock consisted of reddish brown with gray conglomerate associated with the Freda Sandstone, occasional sandstone layers were observed in boring 43-C-1 at depths ranging from approximately 124 to 144 feet. The bedrock was generally classified as "moderately fractured" to "intensely fractured". The rock was deemed as "very soft" to "moderately hard" in terms of the rock hardness scale and ranged from "highly weathered" to "decomposed".

B.2.c.2. 2021 Investigation

The observed bedrock consisted of a reddish brown with gray conglomerate associated with the Freda Sandstone formation, occasional sandstone, siltstone and claystone layers were at depths ranging from approximately 112 to 165 feet. The sandstone, siltstone and claystone were generally classified as "soft" to "moderately hard". The conglomerate consisted of a Volcanic Clast within a matrix of sand, gravels and clays. The Clast sample size did not exceed 6 inches in length and generally was on the order of 2 to 4 inches in length. It should be noted that the sample may have been cored on the edge of a much larger aggregate, resulting in a smaller observed aggregate size then is actually present.

The Clast was deemed as "soft" to "very hard" in terms of the rock hardness scale. The matrix was deemed as "very soft" to "moderately hard".

C. Estimated Soil Properties

Estimated soil properties for each significant strata change are presented below in Table 1.



Table 1: Estimated Soil Properties

Soil Properties Prained Modulu											
Soil Strata and Elevatio ns (ft)	Soil Type	Blow Count per foot Range (BPF)	Dry Unit Weight Range (pcf)	Undrained Unit Weight Range (pcf)	Drained Friction Angle Range (degrees)	Undrained Friction Angle (degrees)	Undrained Cohesion Range (ksf)	Drained Cohesion Range (ksf)	Modulus of Elasticity Range* (tsf)		
	Silty Sand (SM)	12 - 48	114 - 127	117 - 130	30 - 37	15 - 25	1.0 – 2.5	0.9 - 4.1+	69 - 336		
Upper Soils (1105 1/2 to	Poorly Graded Sand (SP)	14 - 52	101 - 125	117 - 127	33 - 40	33 - 36	0	0	98 - 374		
1054 1/2)	Poorly Graded Sand with Silt (SP-SM)	3 - 25	82 - 115	100 - 122	28 - 38	29 - 35	0	0	21 - 180		
	Silty, Clayey Sand (SC-SM)	10 - 53	105 - 115	117 - 130	30 - 37	15 - 25	10 – 2.5	0.9 – 4.1+	40 - 229		
	Poorly Graded Sand with Silt (SP-SM)	20 – 50 blows per 2 inches of penetration	100 - 111	118 - 127	35 - 40	34 - 36	0	0	140 - 504		
Middle Soils (1053 to 1010)	Silty Sand (SM)	10 - 87 blows per 11 inches of penetration	98 - 109	117 - 130	30 - 37	15 - 25	1.0 – 2.5	0.9 - 4.1+	58 - 609		
	Silty, Clayey Sand (SC-SM)	19 - 30	107 - 115	120 - 125	32 - 34	25	1.5 – 2.0	2.0 – 4.0	76 - 130		
	Sandy Silt (ML)	9 - 18	93 - 108	112 - 120	28 - 30	29 - 30	0	0	36 - 78		
	Lean Clay (CL)	50 blows per 5 inches	119 - 121	133 - 135	33 - 35	10	10	6.1+	240 - 346		



Soil Strata and Elevatio ns (ft)	Soil Type	Blow Count per foot Range (BPF)	Dry Unit Weight Range (pcf)	Undrained Unit Weight Range (pcf)	Drained Friction Angle Range (degrees)	Undrained Friction Angle (degrees)	Undrained Cohesion Range (ksf)	Drained Cohesion Range (ksf)	Modulus of Elasticity Range* (tsf)
		of penetration							
	Poorly Graded Sand with Silt (SP-SM)	35 - 50 blows per 2 inches of penetration	105 - 113	120 - 127	36 - 40	35 - 36	0	0	245 - 504
	Sandy Silt (ML)	92 - 50 blows per 4 inches of penetration	113 - 114	125 - 127	34 - 36	35	0	0	368 - 397
Lower Soils (1016 -	Silty Sand (SM)	100 blows per 11 inches of penetration - 50 blows per 2 inches of penetration	111 - 115	125 - 130	35 - 37	25	2.5	4.1+	576 - 700
868)	Silty, Clayey Sand (SC-SM)	50 blows per 5 inches of penetration - 50 blows per 1 inches of penetration	105 - 125	125 - 130	35 - 37	25	2.5	4.1+	240 - 259
	Lean Clay (CL)	50 blows per 5 inches of penetration - 50 blows per 2 inches of penetration	115 - 123	133 - 135	33 - 35	10	10	6.1+	240 - 346



Soil Strata and Elevatio ns (ft)	Soil Type	Blow Count per foot Range (BPF)	Dry Unit Weight Range (pcf)	Undrained Unit Weight Range (pcf)	Drained Friction Angle Range (degrees)	Undrained Friction Angle (degrees)	Undrained Cohesion Range (ksf)	Drained Cohesion Range (ksf)	Modulus of Elasticity Range* (tsf)
	Clayey Sand (SC)	50 blows per 3 inches of penetration - 100 blows per 1 inches of penetration	107 - 111	125 - 130	35 - 37	25	2.5	4.1+	240 - 346
Bedrock (679 1/2 to 651)	Sandstone	N/A	120 - 130	130 - 135	42 - 45	43	0	0	93,600 - 100,800

^{*}Sustained Young's Modulus values

C.1. Groundwater

C.1.a. 2020 Investigation

We encountered groundwater at a depth of 12 feet below the ground surface in boring 43-1-C-1 while advancing the borings. The use of mud rotary drilling techniques prevents the observation of possible groundwater, while the borings were advanced. Groundwater is likely in the other boreholes.

C.1.b. 2021 Investigation

Hollow stem auger drilling techniques were generally terminated at depths ranging from 20 to 30 feet below the ground surface. Mud rotary drilling techniques were then utilized to the termination depth of the boring or refusal. The use of mud rotary drilling techniques prevents the observation of possible groundwater, while the borings were advanced.

Project planning should anticipate seasonal and annual fluctuations of groundwater. Mud-rotary drilling techniques were used to advance the borings, hindering the ability to observe groundwater.

C.2. Laboratory Test Results

We performed laboratory testing as selected by Lake Superior Consulting on soil and rock samples collected during the investigation. The boring logs show the results of the hydrometer with sieve



analysis, sieve analysis moisture testing, Atterberg limits, and unconfined compressive strength of soil that was requested. The Appendix contains the results of these tests.

Twelve (12) Unconfined Compressive Strength Tests (ASTM D422) were requested to be performed on rock coring samples from the 2021 investigation. Of those samples, five (5) samples were untestable and retesting was attempted. Ultimately 1 sample from SC-2 and 2 samples from SC-3 were untestable, as outlined in Table 2 below and the attached test results in the Appendix:

Table 2: Unconfined Compression Strength of Rock Test Summary:

Boring Number	Samples Requested	Samples Retested	Samples Reported
SC-1	0	0	0
SC-2	6	0	1
SC-3	5	5	3
SC-4	1	1	1

The Freda Sandstone Conglomerate, where Unconfined Compressive Strength testing (UCS testing) was selected and was untestable, consisted of hard volcanic clasts in a soft sand and gravel matrix. The soft sand and gravel matrix deteriorated during sample preparation for testing or did not have sufficient strength to allow for testing. Resulting in the samples being untestable.

D. Procedures

D.1. Penetration Test Borings

We drilled the penetration test borings with a floatation tire-mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2- or 5-foot intervals in general accordance to ASTM D1586. We collected thin-walled tube samples in general accordance with ASTM D1587 at selected depths. The boring logs show the actual sample intervals and corresponding depths.



D.2. Rock Cores

We performed rock cores with an NQ-3 core barrel. First, we lowered the bit and 4-inch casing to the bottom of the previously advanced borehole. Then we lowered the core barrel into the casing with a wire line, and locked into place. We advanced the bit and barrel by rotating the assembly while applying crowd pressure. We used bentonite-drilling mud to cool the bit and wash cuttings to the surface. Our drillers noted bit pressure, rate of advance, fluid pressure and fluid return as coring progressed. They also noted intervals with a rapid rate of advance, a sudden loss of fluid pressure or return and intervals with a loss of bit pressure.

Where core-hole stability was an issue, a 3-inch temporary steel casing was installed through the 4-inch casing and past the unstable portion of bedrock.

After completing each 5-foot core run, the drillers unlocked the core barrel from the bit and brought the barrel to the surface. They then extruded the split inner tube from the barrel and opened the tube to reveal the core sample. After field classification and logging, the drillers packed the core into a cardboard storage box, arranged into 2-foot long sections.

D.3. Exploration Logs

D.3.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials, and present the results of penetration resistance and other in-situ tests performed. The logs also present the results of laboratory tests performed on penetration test samples, and groundwater measurements. The Appendix also includes a Fence Diagram intended to provide a summarized cross-sectional view of the soil profile across the site.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

D.3.b. Logs of Coring

Log of Coring sheets follow the logs of the penetration test borings through which we performed rock coring. The logs identify and describe rock lithology, weathering, hardness, bedding and fracture



characteristics, and other features. The logs also report the bit pressure, rate of advance, and water pressure and return (if applicable) recorded during the coring process. The percent recovery and rock quality designation (RQD) for each 5-foot core run is also shown.

We inferred strata boundaries from changes in lithology along the length of the core sample. Due to natural and mechanical fractures, destruction of the rock fabric during coring, and limited recovery, it is difficult to place the core sample in the geologic profile; the strata boundary depths in the rock are also approximate, and likely vary from the core locations.

D.3.c. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance and other in-situ testing performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

D.4. Material Classification and Testing

D.4.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

D.4.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM or AASHTO procedures.

D.5. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes, as noted on the boring logs.



E. Qualifications

E.1. Variations in Subsurface Conditions

E.1.a. Material Strata

We developed our evaluation, analyses and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work, or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

E.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

E.2. Continuity of Professional Responsibility

E.2.a. Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.



E.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

E.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

E.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.



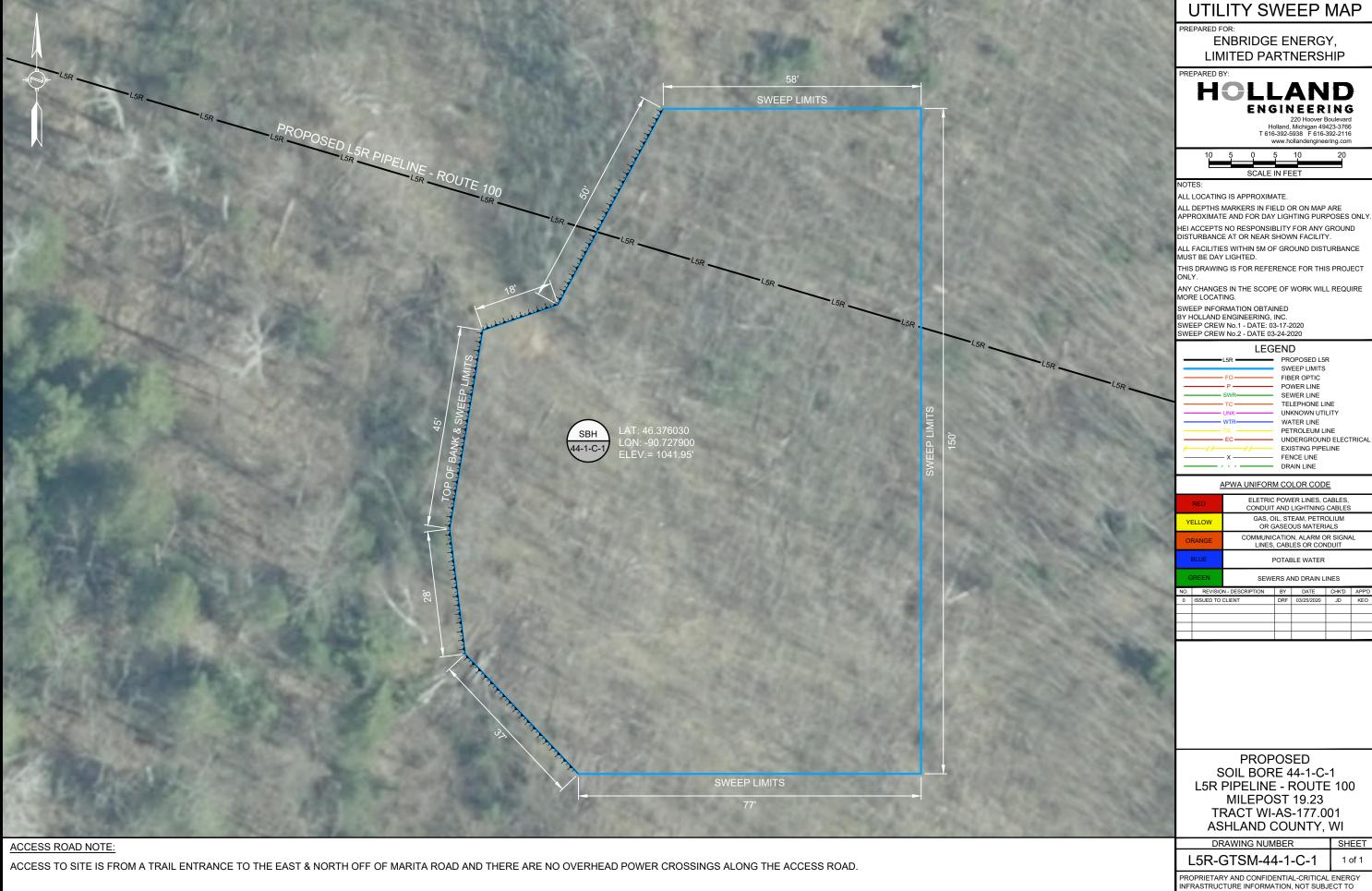




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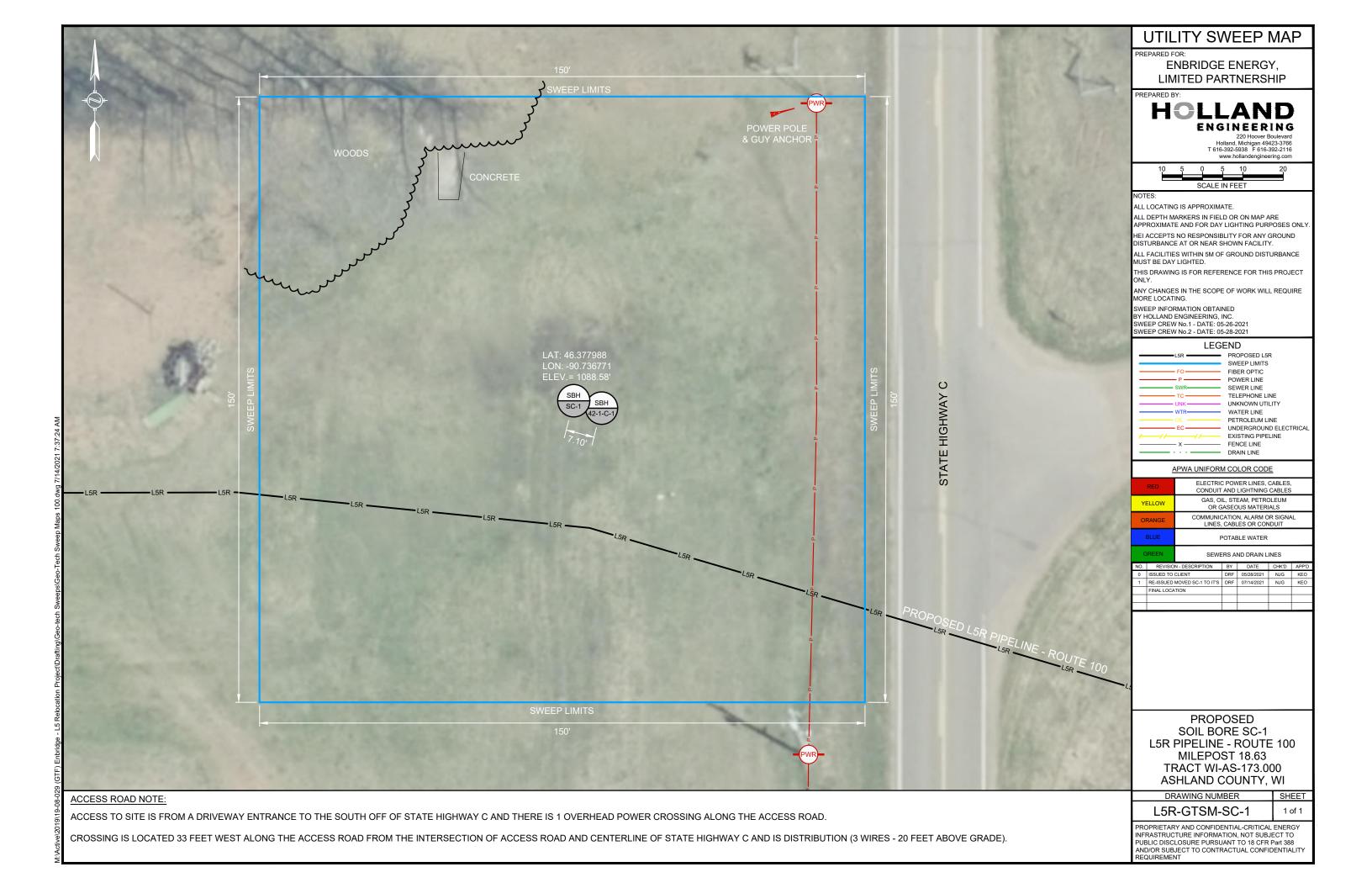


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PUBLIC DISCLOSURE PURSUANT TO 18 CFR Part 388 AND/OR SUBJECT TO CONTRACTUAL CONFIDENTIALITY REQUIREMENT







SURVEYOR'S NOTE:

LOCATION OF OLD SOIL BORE 44-1-C-1 IS APPROXIMATE, SOIL BORE WAS MOVED 2 FEET FROM THE STAKED LOCATION & SURVEY WAS NOT NOTIFIED OF THE NEW LOCATION, SOIL BORE IS STAKED WHERE GROUND WAS DISTURBED.

PROPRIETARY AND CONFIDENTIAL-CRITICAL ENERGY INFRASTRUCTURE INFORMATION, NOT SUBJECT TO PUBLIC DISCLOSURE PURSUANT TO 18 CFR Part 388 AND/OR SUBJECT TO CONTRACTUAL CONFIDENTIALITY

REQUIREMENT



PROPRIETARY AND CONFIDENTIAL-CRITICAL ENERGY INFRASTRUCTURE INFORMATION, NOT SUBJECT TO PUBLIC DISCLOSURE PURSUANT TO 18 CFR Part 388 AND/OR SUBJECT TO CONTRACTUAL CONFIDENTIALITY REQUIREMENT





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			es, Wiscon	nsin			LATITUDE:	46	3.37798	LONGITUDE:	-90.73674
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	Water Level		scription of Ma 2488 or 2487; 1110-1-2908	Rock-USAC	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or I	Remarks
_	ale ale r	SILTY SAND (moist (TOPSC	SM), with root	s, grass, bro	own,						
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 - - - -						25	7-8-9 (17) 14"		18	Test results ar attached lab re	
- - - - -							10-11-14				
- - - -		Col	ntinued on ne	ext page		30	(25) 13"				



Project	Numbe	er B200199	1				BORING:			42-1-C-1	
	ge Line	Evaluation 5 Re-Rout ions	e				LOCATION:	See atta	ached sketo	ch	
Ashlan	d and l	ron Counti	es, Wiscor	ısin			LATITUDE:	46	6.37798	LONGITUDE:	-90.73674
DRILLER:	М	I. Swenson	LOGGED BY:	S	S. Sullivan		START DAT	E:	03/31/20	END DATE:	04/09/20
SURFACE ELEVATION:	1088.	.0 ft RIG: 7	505	METHOD:	3 1/4" HSA		SURFACING	3 :		WEATHER:	40°, overcast
Elev./ Depth ft	Water		escription of Ma 2488 or 2487; 1110-1-2908	Rock-USAC	E EM RE S) (Blows (N-Value) Recovery	q _p tsf	MC %	Tests or	Remarks
1053.0 35.0 35.0		fine to mediur moist, loose to OUTWASH) POORLY GRA fine to coarse	ADED SAND wan-grained, with one medium dense ADED SAND wangrained, with 0 eto very dense	Gravel, brove e (GLACIAL with SILT (SP Gravel, brow	vn,	77 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	8-9-13 (22) 14" 12-12-13 (25) 13"		11	Test results ar attached lab r	
					45—X	,	42-50/2" (REF) 2"			Rock fragmen	ts
- - - - - - -					50	7 2	22-22-16 (38) 0"			No recovery	
- - - 1033.0 - 55.0 - - -		SILTY SAND trace Gravel,	(SM), fine to m brown, moist, s	edium-graino tiff (GLACIA	ed, L TILL)	7	4-4-6 (10) 14"				
- - - - - - - 1025.0		CII TV CAND	(SM) fine to	odium e	60 —		TW 12"			Thinwall Test results ar attached lab r	
63.0		brown, moist,	(SM), fine to m very dense (G intinued on ne	LACIAL TILL ext page	ed, .)				10/06/2020	42-1-C-	1 page 2 of



	You Build On.	or B200100	11				BORING:	Termino	logy sheet	for explanation of 42-1-C-1	of abbreviations
		er B200199 Evaluation					LOCATION:	See att	ached sket		
1	ge Line	5 Re-Rout					LOOATION.	JUE ALL	adricu skell	J. 1	
1		ron Counti	es, Wiscon	sin			LATITUDE:	46	6.37798	LONGITUDE:	-90.73674
DRILLER:	N	1. Swenson	LOGGED BY:	;	S. Sulliva	ın	START DAT	E:	03/31/20	END DATE:	04/09/20
SURFACE ELEVATION:	1088	.0 ft RIG: 75	505	METHOD:	3 1/4	I" HSA	SURFACINO	3:		WEATHER:	40°, overcast
Elev./ Depth ft	Water		escription of Ma 02488 or 2487; 1110-1-2908	Rock-USAC	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or I	Remarks
- - - -		SILTY SAND brown, moist,	(SM), fine to movery dense (G	edium-grair LACIAL TIL	ned, L)	65	18-24-27 (51) 15"				
						70 —	20-26-25 (51) 15"				
72.0 		moist, very de	th Cobbles, and ense, (POORLY DSTONE, CON	DEVELOP	PED	75 —	36-44-50/4" (REF) 12"		11	Test results ar attached lab re	
-						80 -	36-44-48 (92) 15"				
						85—X	42-50/4" (REF) 10"				
						90 — X	49-50/5" (REF) 9"				
		medium-grain brown, moist, SANDSTONE	with GRAVEL (ned, with Cobble very dense, (F E, CONGLOME ontinued on ne	es, and Bou REDA RATE)		95	44-50/4" (REF) 10"		11	Test results ar attached lab re	



The Science S		1			S	BORING:	Ierminol	ogy sheet	for explanation of 42-1-C-1	of abbreviations
	t Number B200199 chnical Evaluation	1				LOCATION:	See atta	ched sket		
Enbride	ge Line 5 Re-Rout	е				LOCATION.	oce alla	GIEG SKELL	JI 1	
	s Locations	oo Wiees:	oin							
	d and Iron Counti	1				LATITUDE:		.37798	LONGITUDE:	-90.73674
DRILLER:	M. Swenson	LOGGED BY:	S	. Sullivan		START DATE	≣:	03/31/20	END DATE:	04/09/20
SURFACE ELEVATION:			METHOD:	3 1/4" HSA		SURFACING	i:		WEATHER:	40°, overcast
Elev./ Depth ft		escription of Ma 2488 or 2487; 1110-1-2908	Rock-USACE	E EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
	SANDY LEAN Cobbles, and	with GRAVEL (ed, with Cobble very dense, (Find Conglome) N CLAY with GRESTON SANDSTON RATE)	es, and Bould REDA RATE)	ders,		30-50-50/5" (REF) 14" 50/3" (REF) 3" 50/2" (REF) 2" 49-50/3" (REF) 9" 46-50/4" (REF) 8"		10	Test results ar attached lab re	
_		ntinued on ne	xt page	_				10/00/0000		



The Science You Bui					S		Terminol	ogy sheet	for explanation of	of abbreviations
	ımber B200199	1				BORING:			42-1-C-1	
	ical Evaluation	_				LOCATION:	See atta	ched sket	ch	
Enbridge Various Lo	Line 5 Re-Route ocations	9								
Ashland a	and Iron Countie	es, Wiscon	sin			LATITUDE:	46	.37798	LONGITUDE:	-90.73674
DRILLER:	M. Swenson	LOGGED BY:		S. Sullivan		START DAT	E:	03/31/20	END DATE:	04/09/20
SURFACE ELEVATION:	1088.0 ft RIG: 75	505	METHOD:	3 1/4" H	SA	SURFACINO	3:		WEATHER:	40°, overcast
Elev./ Jagger 1970 1970 1970 1970 1970 1970 1970 1970	De (Soil-ASTM D	escription of Ma 2488 or 2487; 1110-1-2908	Rock-USA	CE EM	Sample	Blows (N-Value) Recovery	q _₽ tsf	MC %	Tests or I	Remarks
- - - - - -	/// Cobbles, and	CLAY with GR Boulders, brow A SANDSTON RATE)	n, moist, v		_ _ _ _	26-50/4" (REF) 10"				
- - - - - - - -				135		36-50/4" (REF) 4"				
				140		50/2" (REF) 7"				
				145	_ _ _ _	30-50/2" (REF) 7"		15	Test results ar attached lab re	
- - - - - - - - -				150	_ _ _ _ _	50/5" (REF) 5"				
- - - - - - - -				155		50/2" (REF) 2"				
- - - -	Col	ntinued on ne	xt page			50-50/1"				



Project	: Number B200199	 1		BORING:	Termino	logy sneet	for explanation of 42-1-C-1	or appreviations		
Geotec Enbrid	hnical Evaluation ge Line 5 Re-Route Locations					LOCATION:	See atta	iched sketo		
Ashlan	d and Iron Countie	es, Wiscon	sin			LATITUDE:	46	3.37798	LONGITUDE:	-90.73674
DRILLER:	M. Swenson	LOGGED BY:		S. Sullivan		START DAT	E:	03/31/20	END DATE:	04/09/20
SURFACE ELEVATION:	1088.0 ft RIG: 75	505	METHOD:	3 1/4"	HSA	SURFACING	3 :		WEATHER:	40°, overcast
		escription of Ma 2488 or 2487; 1110-1-2908	Rock-USA	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or I	Remarks
	dense, (FRED CONGLOMER CLAYEY SANI medium-graine	Boulders, brown A SANDSTON RATE) D with GRAVE ed, with Cobblevery dense, (F	L (SC), fine es, and Bou	16 17 17 18 18	5	(REF) 7" 50/5" (REF) 5" 50/2" (REF) 2" 50/3" (REF) 3" 50/3" (REF) 3"		17	Test results ar attached lab re	
	Cor	ntinued on ne	ext page							



Project	Number B20019	91		BORING:	TOTTILIO	logy shoot	for explanation of 42-1-C-1	or approviations	
Geotech	nnical Evaluatio	n			LOCATION:	See atta	ched sket		
	je Line 5 Re-Roເ Locations	ate							
Ashland	d and Iron Coun	ties, Wiscon	sin		LATITUDE:	46	.37798	LONGITUDE:	-90.73674
DRILLER:	M. Swenson	LOGGED BY:	S. S	ullivan	START DATE	≣:	03/31/20	END DATE:	04/09/20
SURFACE ELEVATION:	1088.0 ft RIG:	7505	METHOD:	3 1/4" HSA	SURFACING):		WEATHER:	40°, overcast
Elev./ Depth		Description of Ma D2488 or 2487; 1110-1-2908	Rock-USACE E	Sample	Blows (N-Value) Recovery	q _₽ tsf	MC %	Tests or I	Remarks
-	//// medium-gra	AND with GRAVE hined, with Cobble st, very dense, (F NE, CONGLOME	es, and Boulder REDA	195 — — — — — — — — — — — — — — — — — — —	50/2" (REF) 0" 100/1" (REF) 1"			No recovery	
- - - - - - - -				205 —	100/1" (REF) 1"				
- - - - - -				210 —	100/1" (REF) 1"				
- - - - - - - - -				215—	100/1" (REF) 1"				
- - - - - - - - - - - - -	Boring ther	END OF BOF backfilled with grout		220 — onite	100/1" (REF) 1"			Water not obs drilling.	erved while
- - - -				_					



See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2001991								BORING: 43-1-C-1							
	Geotechnical Evaluation									LOCATION: See attached sketch					
Enbridge Line 5 Re-Route															
	Various Locations								LATITUDE		07700	LONGITUDE:	00 7000 (
	and and Iron Counties, Wisconsin									LATITUDE: 46.37706			-90.73294		
DRILLER:						START DATE: 05/27/20				06/06/20					
SURFACE ELEVATION:	1	1075.1 ft RIG: 8502 METHOD: 4 1/4" HSA							SURFACING:			WEATHER: overcast, rain			
Elev./ Depth ft	Water Level		Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)					Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks				
- 1074.1 - 1.0 - 1.0 	¥	SMC SMC	SILTY, 0 medium	roots Y GRA nediur se to ASH)	EY SAND (SC-led, trace Graves TRINE)	(TOPSÖIL vith SILT (S vn, moist t (GLACIAI	o		2-2-3 (5) 13" 7-8-12 (20) 20" 3-4-4 (8) 14" 2-5-2 (7) 13" 3-5-4 (9) 15" 2-2-1 (3) 14" 1-2-2 (4) 20"		7 22	Test results ar attached lab results ar attached lab results ar attached lab results are attached lab results. No samples to 20-30 feet	eport re in the eport		
				Co	ontinued on n	ext page									

B2001991 Braun Intertec Corporation Print Date:10/06/2020 43-1-C-1 page 1 of 7



		See Descriptive Terminology sheet for explanation of abbreviations					
	Number B2001991	BORING: 43-1-C-1					
Enbrido Various	hnical Evaluation ge Line 5 Re-Route s Locations	LOCATION: See attached sketch					
Ashlan	d and Iron Counties, Wisconsin	LATITUDE: 46.37706 LONGITUDE: -90.73294					
DRILLER:	C. Coffindaffer LOGGED BY: K. Warmuth	START DATE: 05/27/20 END DATE: 06/06/20					
SURFACE ELEVATION:	1075.1 ft RIG: 8502 METHOD: 4 1/4" HSA	SURFACING: WEATHER: overcast, rain					
Elev./ Depth ft	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Blows (N-Value) Recovery q _p tsf MC % Tests or Remarks					
1042.6 - 32.5 - - - - - - -	SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, trace Gravel, brown, wet, loose (LACUSTRINE) POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, brown, moist, medium dense (GLACIAL TILL)	8-10-10 (20) 14 Test results are in the attached lab report					
- - - - - -	40	10-10-15 (25) 8"					
	45	8-9-12 (21) 10" Test results are in the attached lab report					
47.5 - - - - - - -	SILTY, CLAYEY SAND with GRAVEL (SC-SM), brown, moist, very stiff to hard (GLACIAL TILL)	7-11-16 (27) 18"					
	55—	TW Test results are in the attached lab report					
- - - - - - - - - 1012.1	POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, little Gravel, brown, moist to wet, dense to very dense (GLACIAL	7-10-14 (24) 6"					
_ 63.0 —	TILL) Continued on next page						
B2001991	Braun Intertec Corporation	Print Date:10/06/2020 43-1-C-1 page 2 of 7					



See Descriptive Terminology sheet for explanation of abbreviations

Project	roject Number B2001991								BORING: 43-1-C-1					
Geotechnical Evaluation									LOCATION: See attached sketch					
Enbridge Line 5 Re-Route Various Locations														
Ashlan	d a	nd I	ron Coun	ities, Wisco	nsin	LATITUDE: 46.37706			LONGITUDE: -90.73294					
DRILLER:		C.	Coffindaffer	LOGGED B	/ :	K. Warmuth		START DATE: 05		05/27/20	END DATE:	06/06/20		
SURFACE ELEVATION:	1075.1 ft RIG: 8502 METHOD: 4 1/4				4" HSA	SURFACING:			WEATHER:	overcast, rain				
Elev./ Depth ft	Water	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)						Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks			
- - - - - -			fine to med	GRADED SAND dium-grained, litt et, dense to very	le Gravel, bro	own,	65	8-15-20 (35) 14"		14	Test results ar attached lab re			
- - - - - - -							70 —	19-27-37 (64) 20"						
 1001.1							-							
74.0 - 74.0 			brown, wet	LT (ML), with Co t, hard to very do NE, CONGLOM	ense, (FRED		75 —	50/5" (REF) 4"		11	Test results ar attached lab re			
- - - - - -							80 —	50/4" (REF) 4"						
_														
991.1 84.0 - - - -			fine to med fragments,	GRADED SAND dium-grained, wi with Cobbles at lense, (FREDAS MERATE)	th Gravel, wit nd Boulders,	th rock brown,	85—	50/4" (REF) 4"		12	Test results ar attached lab re			
- - - - - - -							90-	50/3" (REF) 3"						
- - - - - -				Continued on	next page		95—	50/3" (REF) 3"						

B2001991 Braun Intertec Corporation Print Date:10/06/2020 43-1-C-1 page 3 of 7



Project N	Build On.	er B20019	91				BOR		TOTTIMIO	ogy siled	43-1-		of abbreviations
Geotechr	nical E Line	Evaluatior 5 Re-Rou	n				LOCA	ATION:	See atta	ched sketo			
			ties, Wiscon	sin			LATI	TUDE:	46	.37706	LONGI	TUDE:	-90.73294
DRILLER:	C.	Coffindaffer	LOGGED BY:	K	. Warm	uth	STAF	RT DATI	E:	05/27/20	END D	ATE:	06/06/20
SURFACE ELEVATION:	1075.	1 ft RIG:	8502	METHOD:	4 1/	4" HSA	SUR	FACING			WEATH	IER:	overcast, rain
	Level		Description of Ma D2488 or 2487; I 1110-1-2908	Rock-USAC	EEM	Sample	Blov (N-Va Reco	lue)	q _p tsf	MC %	Te	ests or	Remarks
		fine to medion fragments, v	RADED SAND witum-grained, with with Cobbles and ense, (FREDA SAERATE)	Gravel, with Boulders, b	rock rown,	100 —	50/3 (RE 3" 50/3 (RE 2"	F) ' 2" F)					
967.1		Gravel, rock Boulders, br	O (SM), fine to me fragments, with (rown, moist, very NE, CONGLOMER	Cobbles and dense, (FRE	t	110 —	50/: (RE 2" 50/: (RE 2"	F) ' 2" F)					
- - - - - - - - - - - - - - - - - - -		FREDA SAN	NDSTONE, SAND	OSTONE re		120 -	50/: (RE 2"	F) ' 2"				ring at	d switched to 124.6 feet Run 1
— 950.5 124.6 		brown with g	NDSTONE, SANL gray, decomposed oarse-grained, m	d, very soft,	fine-	125 — I	(RE 2" 0	F) ' 40	4	2320	20		Run 1 MOHs 2
		C	Continued on ne	xt page			RQD % R	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks



The Science Y	ou Build	On.							Se	e De	scriptive	e Terminol	ogy shee	t for exp	anation	of abbreviations
Project										BOF	RING:			43-1	-C-1	
Geotec		-		_						LOC	CATION:	See attac	ched sket	ch		
Enbridg				ou	ite											
Various						_										
Ashland	d ar	nd Ir	on Cou	ınt	ies, Wiscon	sin				LAT	ITUDE:	46	.37706	LONG	TUDE:	-90.73294
DRILLER:		C. (Coffindaffe	-	LOGGED BY:		K. Warm	uth		STA	RT DAT	E:	05/27/20	END D	ATE:	06/06/20
SURFACE ELEVATION:		1075.	1 ft RIC	 }:	8502	METHOD:	4 1	/4" HSA		SUF	RFACING	 Э:		WEATI	HER:	overcast, rain
					Description of Ma	terials			T^{L}		>		0	0		
Elev./ Depth ft	Water Level		·	TM	D2488 or 2487; 1110-1-2908	Rock-USA 3)		Samues	ROD	%	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
_					NDSTONE, SAND											
-					oarse-grained, m			130 —								Run 2
_			fractured					130 —								MOHs 2
_																
- -									(0	35	3	3260	20	100	
_																
_								135—								Run 3 MOHs 2
_								-	(0	25	4	1860	100	100	WOT TO Z
-								-								
_																Run 4
<u> </u>								_	(0	25	5	1860	100	100	MOHs 2
_								140 —								Run 5
-								_								MOHs 2
<u>-</u>									,	0	20	6	1860	120	100	
_									•		20	U	1000	120	100	
L																
930.5 144.6		<u>::::::</u>	EBEDA	241	NDSTONE, SAND	OSTONE r	addich	115								Run 6
- 144.0					gray, decompose			145								MOHs 2
_			grained fractured		nedium-grained, t	hick bedde	ed, highly	y —								
-			1		s are in the attach	ned lab rep	ort		3	30	80	5	2790	160	100	
 -						,		-								
 _ 925.5																
149.6					NDSTONE, SAND			150 —								Run 7 MOHs 2
-					gray, decomposed oarse-grained, th			-	(0	100	7	3720	150	100	IVIOTIS Z
 922.5			intensely													
<u> 152.6</u>	ĺ				NDSTONE, SANE gray, decomposed											Run 8
<u>-</u>			grained	ОС	oarse-grained, m			_	,	0	100	4	3720	150	100	MOHs 2
L 040 5			fractured		NDSTONE, SAND	STONE r	eddich	7 ,55—			- •	•				
919.5 155.6			brown w	ith (gray, decomposed	d, very sof	t, fine-									Run 9
L					nedium-grained, r	massive, in	itensely									MOHs 2
L			fractured FREDA		NDSTONE, SAND	OSTONE, r	eddish		(0	60	6	3720	150	100	
F			brown w	ith (gray, decomposed	d, very sof	t, fine-									
915.5		<u>:::::</u>	grained intensely		nedium-grained, t ctured	nick bedde	ea,		(0	60	4	3720	300	100	Run 10
- 159.6					Continued on ne	xt page										MOHs 2



The Science Y	ou Build	l On.					See D	escriptive	e Termino	logy shee	t for expl	anation	of abbreviations
			er B2001				ВС	RING:			43-1	-C-1	
			Evaluatio				LO	CATION	See atta	ched sket	ch		
			5 Re-Ro	ute									
Various				ution Winner	oin								00 =0004
	u ai			ities, Wiscon	SIII			ΓΙΤUDE:		.37706	LONGI		-90.73294
DRILLER:		C.	Coffindaffer	LOGGED BY:	K. Warm	nuth	ST	ART DAT	E:	05/27/20	END D	DATE: 06/06/20	
SURFACE ELEVATION:		1075.	1 ft RIG:	8502	METHOD: 4 1	/4" HSA	SU	RFACIN	G:		WEATH	HER:	overcast, rain
Elev./ Depth ft	Water Level		(Soil-ASTI	Description of Ma M D2488 or 2487; 1110-1-2908	Rock-USACE EM	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
- - - - - - - - - - - - - - - - - - -			brown with	NDSTONE, SANI gray, decompose medium-grained, t actured	d, very soft, fine-	- I I	0	65	6	2790	150	80	Run 11 MOHs 2
164.6 			brown with grained to highly frac	NDSTONE, SANE gray, highly weath coarse-grained, mured	nered, soft, fine- edium bedded,	165 —	35	100	5	2790	150	80	Run 12 MOHs 2
905.5 — 169.6 — — — —			brown with	gray, highly weath	OSTONE, reddish nered, soft, fine- hick bedded, highl		55	100	4	3720	200	80	Run 13 MOHs 2
900.5 — 174.6 — — — — — — — — — — — — —			brown with grained to fractured	NDSTONE, SANE gray, highly weath coarse-grained, m	nered, soft, fine- assive, highly	175 — — — — — — — — — — — — — — — — — — —	55	100	4	3720	200	80	Run 14 MOHs 3
179.6 			brown with hard, fine- moderately	gray, highly weath grained to coarse-	grained, massive,	180 —	80	100	4	3720	180	80	Run 15 MOHs 3
- - - - - - - -			Test resu	its are in the attach	ned lab report	185 —	60	100	4	4180	130	90	Run 16 MOHs 3
- - - - -				ts are in the attach	·	190 —							Run 17 MOHs 3
				Continued on ne	ext page								



See Descriptive Terminology sheet for explanation of abbreviations

D : (1	ou Build On.	D00046	204						e Terminol	logy sheet			of abbreviations
		er B20019						RING:	<u> </u>		43-1-	-C-1	
	e Line	Evaluatio 5 Re-Rοι ons					LOC	CATION:	See attac	ched sketo	ch		
Ashland	l and li	on Coun	ties, Wiscon	sin			LAT	ITUDE:	46	.37706	LONGI	TUDE:	-90.73294
DRILLER:	C.	Coffindaffer	LOGGED BY:	K. '	Warmut	th	STA	RT DAT	E:	05/27/20	END D	ATE:	06/06/20
SURFACE ELEVATION:	1075.	1 ft RIG:	8502	METHOD:	4 1/4	" HSA	SUF	RFACING	G:		WEATH	HER:	overcast, rain
Elev./ Depth	water Level		Description of Ma 1 D2488 or 2487; 1110-1-2908	Rock-USACE	EM	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
- - - -		brown with	NDSTONE, SANE gray, highly weath rained to coarse-ç fractured	nered, modera	ately		60	100	5	4180	150	90	
- - - - - -		Test result	s are in the attach	ned lab report	1	95 —	90	100	4	4180	200	90	Run 18 MOHs 3
- - - - - - - - - - - -					2	000-	80	100	4	4180	200	90	Run 19 MOHs 3
870.5 - 204.6 - - - - - 867.1		brown with hard, fine-ghighly fractu	NDSTONE, SANE gray, highly weath rained to coarse- ured s are in the attach	nered, modera grained, mass	ately sive,	05 — 1	85	100	4	4180	200	85	Run 20 MOHs 3
208.0		Boring then	END OF COF n backfilled with grout		2	110 — — — — — — — — — — — — — — — — — —							Water observed at 12.0 feet while drilling.

B2001991 Braun Intertec Corporation Print Date: 10/06/2020 43-1-C-1 page 7 of 7



Geotechnical Evaluation Enbridge Line 5 Re-Route Various Locations Ashland and Iron Counties, Wisconsin DRILLER: C. Coffindaffer LOGGED BY: K. Warmuth START DATE: 05/07/20 END DATE: 05. SURFACE ELEVATION: 1042.0 ft RIG: 8502 METHOD: 4 1/4" HSA SURFACING: WEATHER: Elev./ Depth ft With Gravel, roots, brownish black, moist 1040.0 - 1040.0 - 2.0 DRILLER: C. Coffindaffer LOGGED BY: K. Warmuth START DATE: 05/07/20 END DATE: 05. METHOD: 4 1/4" HSA SURFACING: WEATHER: Blows (N-Value) qp MC (N-Value) tsf % Tests or Remarks (N-Value) tsf % 1110-1-2908) With Gravel, roots, brownish black, moist (7) 10" 10" 13" 13" 13" 13" 13" 13" 13" 13" 13" 13	The Science You B		200400	4		S		Termino	ology sheet	for explanation of	of abbreviations
Enbridge Line 5 Re-Route Various Locations Ashland and Iron Counties, Wisconsin DRILLER: C. Coffindaffer LOGGED BY: K. Warmuth START DATE: 05/07/20 END DATE: 05. SURFACE ELEVATION: 1042.0 ft RIG: 8502 METHOD: 4 1/4" HSA SURFACING: WEATHER: Elev./ Depth ft Wisconsin C. Coffindaffer LOGGED BY: K. Warmuth START DATE: 05/07/20 END DATE: 05. METHOD: 4 1/4" HSA SURFACING: WEATHER: Description of Materials (N-Value) Recovery tsf % MC Recovery tsf % Tests or Remarks (N-Value) Recovery tsf % With Gravel, roots, brownish black, moist (7) 10" 10" 10" 10" 13" 13" 13" 13" 13" 13" 13" 13" 13" 13				1			BORING:	C#		44-1-C-1	
Various Locations Ashland and Iron Counties, Wisconsin LATITUDE: 46.37603 LONGITUDE: -90.7				۵			LOCATION:	see atta	acned sket	UII	
Ashland and Iron Counties, Wisconsin CATITUDE: 46.37603 LONGITUDE: -90.7											
SURFACE ELEVATION: Depth Fit Depth Depth				es, Wiscon	sin		LATITUDE:	46	6.37603	LONGITUDE:	-90.72790
Description of Materials Soil-ASTM D2488 or 2487; Rock-USACE EM Blows (N-Value) Recovery tsf MC tsf MC with Gravel, roots, brown, and dry, loose (GLACIAL OUTWASH) SANDY SILT (ML), with Gravel, brown, moist to wet, loose to medium dense (LACUSTRINE) MC tsf MC MC MC MC MC MC MC M	DRILLER:	C. Coffir	ndaffer	LOGGED BY:	K. War	muth	START DATI	E:	05/07/20	END DATE:	05/14/20
Siltry Sand (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) Siltry Sand (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) Siltry Sand (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) Siltry Sand (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) Siltry Sand (Soil-ASTM D2488 or 2487; Rock-USACE EM (N-Value) Recovery tsf MC	SURFACE ELEVATION:	1042.0 ft	RIG: 85	502	METHOD: 4	1/4" HSA	SURFACING	3 :		WEATHER:	sunny
with Gravel, roots, brownish black, moist 1040.0 2.0 POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, with Gravel, brown, dry, loose (GLACIAL OUTWASH) 1035.0 SANDY SILT (ML), with Gravel, brown, moist to wet, loose to medium dense (LACUSTRINE) 18 Test results are in the attached lab report	Depth	e/e (Sc		2488 or 2487;	Rock-USACE EN	Sample	(N-Value)			Tests or F	Remarks
10—X (13) 12" 6-5-5 (10) 13" 	_ 2.0 _ - - - - - - - - - - - - - - - - - -	with sold with sold sold sold sold sold sold sold sold	n Gravel, ro DPSOIL) ORLY GRA e to medium , loose (GL	ADED SAND wn-grained, with ACIAL OUTWA	black, moist ith SILT (SP-SM) Gravel, brown, ASH) rel, brown, moist	5 — X to	(7) 10" 3-4-4 (8) 13" 3-3-5 (8) 9" 4-6-8 (14) 14" 5-5-8 (13) 12" 6-5-5 (10) 13" 5-4-5 (9) 13"		18		
10" 20					vel, brown, moist,	25 — ((9) 10" 4-5-4 (9) 12" 0-9-9 18) WOH/6" 13"		21	attached lab re	eport
12" 32.0 Continued on next page		///	Coi	ntinued on ne	ext page		12"				



Project	You Build On : Number E	200199)1			5	BORING:	iermino	logy sneet	for explanation of	T appreviations
	hnical Eva						LOCATION:	See atta	ached sket		
	ge Line 5 F										
	Locations										
Ashlan	d and Iron	Counti	es, Wiscon	sin			LATITUDE:	46	6.37603	LONGITUDE:	-90.72790
DRILLER:	C. Coffin	ndaffer	LOGGED BY:	k	K. Warmut	th	START DATE	≣:	05/07/20	END DATE:	05/14/20
SURFACE ELEVATION:	1042.0 ft	RIG: 8	502	METHOD:	4 1/4	" HSA	SURFACING):		WEATHER:	sunny
Elev./ Depth ft	Water Level		escription of Ma 02488 or 2487; 1110-1-2908	Rock-USAC	E EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
		avel, browr	(SM), fine to co		CIAL	35 — 🔀	32-50/5" (REF) 10" 50/4" (REF) 6"		12	Test results are attached lab re	eport
- - - - - - - - - - - - - - - - - - -		ODLY OD	ADED CAND			45 —	50/3" (REF) 2"				
_ 48.0 _ _ _ _ _ _ _ _	fine	e to coarse	ADED SAND w -grained, with G ense (GLACIAL	ravel, brow	/n, 1)	50 —	50/3" (REF) 2"		12	Test results are attached lab re	
987.4 54.5 986.0 56.0	witl COLOR COL	h Gravel, b _ACIAL TIL EDA SANI CIES	OSTONE, CON- vanced with mu	ry dense	ΤΕ hout	55 —	50/3" (REF) 4"		13	Test results are attached lab re Bit Pressure: n 700 psi: 2:16 700 psi: 2:52 700 psi: 2:37 700 psi: 2:38 700 psi: 2:06 700 psi: 2:14	port
	U+0.U	Co	ntinued on ne	xt page						700 psi: 2:04	



The Science		1004			Se		Termino	logy sheet	for explanation o	f abbreviations
	Number B2001					BORING:			44-1-C-1	
	hnical Evaluation					LOCATION:	See atta	ached sket	ch	
	ge Line 5 Re-Ro Locations	วนเ ย								
1	d and Iron Cou	nties. Wiscon	sin			LATITUDE:	40	6.37603	LONGITUDE:	-90.72790
DRILLER:	C. Coffindaffer	LOGGED BY:		/armuth		START DATE		05/07/20	END DATE:	05/14/20
SURFACE ELEVATION:	1042.0 ft RIG:	8502	METHOD:	4 1/4" HSA	4	SURFACING):		WEATHER:	sunny
	Wa	Description of Ma M D2488 or 2487; 1110-1-2908	Rock-USACE I 3)	EM		Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
_	ြိုင္ပိုင္ပိုင္ပိုင္ပြဲ FREDA SA	ANDSTONE, CON	GLOMERATE	65 —					700 psi: 3:28	
_				_					700 psi: 2:20	
_				_					700 psi: 1:56	
_				_					700 psi: 2:00	
_				_					700 psi: 1:52	
_				70 —					700 psi: 2:14	
_				_					700 psi: 3:33	
_				_					700 psi: 2:26	
_				_					700 psi: 3:20	
_				_					700 psi: 2:40	
				75 —					700 psi: 2:18	
L				_					700 psi: 2:14	
L				_					700 psi: 2:12	
_				_					700 psi: 2:21	
_				_					700 psi: 2:13	
_				80 —					700 psi: 6:23	
_				_					700 psi: 6:01	
_				_					700 psi: 2:52	
<u> </u>				_					700 psi: 2:37	
Ē.				_					700 psi: 2:47	
<u> </u>				85—					700 psi: 2:46	
_				_					700 psi: 3:20	
_									700 psi: 2:42	
_				_					700 psi: 3:28	
E				_					700 psi: 2:40	
F				90 —					700 psi: 2:21	
E				_					700 psi: 3:40	
E				_					700 psi: 2:30	
E				_					700 psi: 2:35	
F				_					700 psi: 2:50	
F				95 —					700 psi: 3:31	
F		Continued on ne	ext nane	_					700 psi: 3:29	
B2001001		Communica On He		ortoc Corpora	حلب				14.1.C.1	page 3 of 6



The Science Yo		70004				Si		ermino	logy sheet	for explanation of	abbreviations
Project							BORING:			44-1-C-1	
		Evaluatio					LOCATION: S	see atta	ached sket	ch	
Various	Locati										
Ashland	l and Ir	on Coun	nties, Wiscor	nsin			LATITUDE:	46	3.37603	LONGITUDE:	-90.72790
DRILLER:	C. (Coffindaffer	LOGGED BY:	K	(. Warmuth		START DATE	<u>:</u>	05/07/20	END DATE:	05/14/20
SURFACE ELEVATION:	1042.0) ft RIG:	8502	METHOD:	4 1/4" HSA	١.	SURFACING	:		WEATHER:	sunny
Elev./ Bepth to	water Level	(Soil-ASTN	Description of Ma	Rock-USAC	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or R	emarks
-		FREDA SA FACIES	NDSTONE, CON	GLOMERAT	ΓE					700 psi: 9:11	
_		17.0.20			_					700 psi: 4:24	
_					_					700 psi: 2:32	
_					100 —					700 psi: 3:08	
_					_					700 psi: 2:05	
_										700 psi: 1:51	
_					_					700 psi: 1:35	
_					_					700 psi: 1:49	
_					105 —					700 psi: 1:33	
_					_					700 psi: 3:30	
_					_					500 psi: 2:47	
_					_					500 psi: 2:37	
_					_					500 psi: 2:36	
_					110 —					500 psi: 2:37	
_					_					500 psi: 7:57	
_					_					500 psi: 5:11	
_					_					500 psi: 5:00	
_					_					500 psi: 6:25	
_					115 —					500 psi: 6:02	
_					_					500 psi: 5:46	
					_					500 psi: 3:54	
_					_					500 psi: 4:10	
_					_					500 psi: 4:19	
_					120 —					500 psi: 4:04	
_					_					500 psi: 7:32	
-					_					500 psi: 5:00	
-					_					500 psi: 4:38	
-					_					500 psi: 4:35	
_					125 —					500 psi: 4:22	
-					_					500 psi: 9:30	
-					_					500 psi: 3:34	
_	V., O'	(Continued on ne	ext page						700 psi: 4:10	



The Science Y					Se		Termino	ology sheet	for explanation o	f abbreviations
	Number B200					BORING:			44-1-C-1	
	hnical Evalua					LOCATION:	See att	ached sket	ch	
	ge Line 5 Re-F Locations	\oute								
		unties, Wiscor	sin			LATITUDE:	40	6.37603	LONGITUDE:	-90.72790
DRILLER:	C. Coffindaffe			Warmuth		START DATE		05/07/20	END DATE:	05/14/20
SURFACE ELEVATION:	1042.0 ft RIG	G: 8502	METHOD:	4 1/4" HS/	Α	SURFACING	3 :		WEATHER:	sunny
	Mater Cevel	Description of Ma STM D2488 or 2487; 1110-1-2908	Rock-USACI	E EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
_	ြင့္လုံး FREDA ကို နဲ့ FACIES	SANDSTONE, CON	GLOMERAT	E _					700 psi: 2:31	
_				130 —					700 psi: 2:54	
_				_					700 psi: 2:22	
<u>-</u>									700 psi: 2:38	
L				_					700 psi: 2:19	
_									700 psi: 3:00	
_				135 —					700 psi: 3:18	
<u>-</u>									700 psi: 3:25	
<u> </u>				_					700 psi: 3:12	
<u> </u>									700 psi: 3:23	
_									300 psi: 4:10	
_				140 —					300 psi: 2:10	
F				_					300 psi: 2:30	
F				_					300 psi: 1:58	
F				_					300 psi: 1:35	
E				_					700 psi: 2:10	
				145 —					700 psi: 2:25	
				_					700 psi: 2:30	
_									700 psi: 2:40	
_				_					700 psi: 2:40	
_				_					700 psi: 2:54	
L				150 —					700 psi: 2:55	
<u>-</u>									700 psi: 3:03	
 -				_					700 psi: 2:25	
 - -				_					700 psi: 2:19	
<u> </u>				_					700 psi: 2:28	
<u> -</u>				155 —					700 psi: 2:10	
<u> </u>				_					700 psi: 2:10	
<u> -</u>				_					700 psi: 3:04	
 				_					700 psi: 2:48	
<u> -</u>				_					700 psi: 2:56	
	0.00	Continued on ne		Intertoe Corpore					700 psi: 3:17	page 5 of 6



The Science You Ruild On	See Descriptive Terminology sheet for explanation of abbreviation
Project Number B2001991	BORING: 44-1-C-1
Geotechnical Evaluation	LOCATION: See attached sketch
Enbridge Line 5 Re-Route Various Locations	
Ashland and Iron Counties, Wisconsin	LATITUDE: 46.37603 LONGITUDE: -90.72790
DRILLER: C. Coffindaffer LOGGED BY: K. Warmuth	START DATE: 05/07/20 END DATE: 05/14/20
SURFACE ELEVATION: 1042.0 ft RIG: 8502 METHOD: 4 1/4" HSA	SURFACING: WEATHER: sunny
Elev./ Depth ft (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Blows (N-Value) Recovery tsf MC % Tests or Remarks
FREDA SANDSTONE, CONGLOMERATE FACIES	700 psi: 2:41 700 psi: 2:34 700 psi: 2:36 700 psi: 2:36 700 psi: 2:58 700 psi: 2:16 700 psi: 2:20 700 psi: 2:20 700 psi: 2:21 700 psi: 2:21 700 psi: 2:18 700 psi: 2:15 700 psi: 2:12 Water not observed while drilling.



The Science S		er B20019	<u> </u>			S	BORING:	Iermino	ogy sheet	for explanation of 45-2-C	of abbreviations
		Evaluation					LOCATION:	See atta	ched sket		
		5 Re-Rou					200/11/014	200 and			
Various	Locati	ions									
Ashlan	d and li	ron Count	ies, Wiscor	nsin			LATITUDE:	46	.37566	LONGITUDE:	-90.72582
DRILLER:	C.	Coffindaffer	LOGGED BY:		P. Moe		START DAT	E:	04/24/20	END DATE:	05/06/20
SURFACE ELEVATION:	1108.	0 ft RIG: 8	3502	METHOD:	4 1/4" H	SA	SURFACINO	3:		WEATHER:	sunny, overcast
Elev./ Depth ft	Water		Description of Ma D2488 or 2487; 1110-1-290	Rock-USAC	E EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
_			SAND (SM), fine roots, brown, n		-		1-3-2 (5)				
					-		16" 5-7-7				
2.5 - 			(SM), fine to m brown, moist, m				(14) 18"				
- - -		(GLAGIAL II	LL)		5		6-9-12 (21) 16"				
							8-7-10 (17) 15"				
 - -					10 ·		3-6-9 (15) 18"				
1096.0 12.0		fine to mediu	RADED SAND w im-grained, brov CIAL OUTWASH	vn, moist, m			5-6-11 (17) 14"		2	Test results ar attached lab re	
 		,		,	15 ·		5-6-8 (14) 16"				
- - - -							6-10-14 (24) 16"				
 - -					20		10-10-13 (23) 17"				
_ _ _ _											
					25 -		11-10-11 (21) 13"				
- - - -											
					30		11-13-15 (28) 6"				
_		<u>.</u>	ontinued on ne	ext page		+					
D0004004				pago		\bot			10/00/0000		



Project	Numb	er B2	00199	1				BORING:			45-2-C	
Geotec Enbrido Various	ge Line	5 Re		e				LOCATION	: See att	ached sketo	ch	
Ashlan	d and l	Iron C	ounti	es, Wiscor	ısin			LATITUDE:	4	6.37566	LONGITUDE:	-90.72582
DRILLER:	С	. Coffinda	affer	LOGGED BY:		P. Moe		START DAT	ΓE:	04/24/20	END DATE:	05/06/20
SURFACE ELEVATION:	1108	3.0 ft	RIG: 85	502	METHOD:	4 1/-	4" HSA	SURFACIN	G:		WEATHER:	sunny, overcast
Elev./ Depth ft	Water Level	(Soil-		escription of Ma 2488 or 2487; 1110-1-2908	Rock-USAC	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or	Remarks
1074.0 1074.0 34.0		fine to dense SILTY with 0	mediur e (GLAC / SAND	ADED SAND wn-grained, brown-grained, brown-grained, brown-grained, brown, fine to make to make the marown, moist, make the make t	vn, moist, m l) edium-grain	nedium ned,	35 —	12-12-15 (27) 9"		12	Test results ar attached lab r	
							40	39-27-21 (48) 4"				
42.5 - - - - - - -		fine-g	rained, b	ADED SAND worownish black			45	36-27-25 (52) 5"		16	Test results ar attached lab r	
		/ mediu		EY SAND (SC-sed, brown, mod L)		ise	50 —	25-26-27 (53) 17"				
		trace		(SM), fine to m brown, moist, v L)		ned,	55 —	22-30-34 (64) 16"				
- - - - - - - - 1045.5		SILTV	(CL AVE	EY SAND (SC-	SM) fine to		60	20-26-28 (54) 15"				
62.5 B2001991		mediu	um-grain um dens	ed, with Grave e (GLACIAL TI ntinued on ne	I, brown, mo LL) ext page		Corporation			:10/06/2020	45-2-	C page 2 of 8



Project	Numb	er B	20019	991				BORING:	e reminior	ogy sneet	45-2-C	or appreviations
Geotec								LOCATION	I: See atta	ched sket		
Enbridg				ute								
Various				nties, Wisc	conein			LATITUDE	. 46	.37566	LONGITUDE:	00.72592
DRILLER:		. Coffind		LOGGED		P. Mo	20	START DA		04/24/20	END DATE:	-90.72582 05/06/20
SURFACE		3.0 ft	RIG:	8502	METHOI		I/4" HSA	SURFACIN		04/24/20	WEATHER:	
ELEVATION:	1100	5.0 IL		Description o		D: 4		1	iG.		WEATHER.	sunny, overcast
Elev./ Depth ft	Water Level	(Soi		/ D2488 or 24 1110-1-2	87; Rock-U	SACE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or	Remarks
- - - - - -		/: med	ium-gr	AYEY SAND (ained, with Gr ense (GLACIA	avel, brown		65	, 6-8-11 (19) 1"				
- - - - - - - - -							70	8-11-14 (25) . 17"				
		(75	, 12-13-16 (29) , 18"		9	Test results a attached lab ı	
							80 —	9-13-17 (30) . 18"				
82.5 		with	Y SAN Grave ACIAL	ID (SM), fine t I, brown, mois TILL)	to medium-g	rained, very dense	85	, 10-15-18 (33) , 17"				
- - - - - - - -							90 —	26-37-50/5" (REF)				
L - 1014 0							\dashv					
1014.0 94.0 —			/n, moi	AN CLAY with	e (GLACIAL	TIĹL)	95 —	34-50/4" (REF) 10"		12	Test results a attached lab i	
B2001991				Continued or			: Corporatio		Print Date:1	10/06/2020	45-2	·C page 3 of 8



	You Build On.	1				e Iermino	logy sheet	for explanation of	of abbreviations
	t Number B2001991 chnical Evaluation	l			BORING:	l. Coo otto	abad alsat	45-2-C	
	ge Line 5 Re-Route	į			LOCATION	v. See atta	ached sket	UII	
	s Locations								
Ashlan	d and Iron Countie	s, Wiscon	sin		LATITUDE	: 46	6.37566	LONGITUDE:	-90.72582
DRILLER:	C. Coffindaffer	LOGGED BY:	F	P. Moe	START DA	TE:	04/24/20	END DATE:	05/06/20
SURFACE ELEVATION:	1108.0 ft RIG: 850	02	METHOD:	4 1/4" HSA	SURFACIN	NG:		WEATHER:	sunny, overcast
		scription of Ma 2488 or 2487; 1110-1-2908	Rock-USACE	EM Ma	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or I	Remarks
- 1010.5 - 97.5 	SANDY LEAN brown, moist, N SILTY, CLAYE' medium-graine and Boulders, dense, (FRED, CONGLOMER	very dense (Gi Y SAND (SC-Sed, with Grave brownish gray A SANDSTON	LACIAL TILL) SM), fine to I, with Cobbles , moist, very	_	50/5" (REF) 4" 50/3" (REF) 2" 50/2" (REF) 1" 50/1" (REF) 0"			No recovery	
	Cor	ntinued on ne	xt page				10/00/0000		



Project		or R	200199)1				BORING:	rermino	logy sneet	for explanation of 45-2-C	or appreviations
Geotec								LOCATION:	See atta	iched sketi		
Enbridg								200711011	355 and		=::	
Various												
Ashlan	d and	Iron	Counti	es, Wiscon	sin			LATITUDE:	46	3.37566	LONGITUDE:	-90.72582
DRILLER:	С	. Coffin	daffer	LOGGED BY:		P. Moe	Э	START DAT	E:	04/24/20	END DATE:	05/06/20
SURFACE ELEVATION:	1108	3.0 ft	RIG: 8	502	METHOD:	4 1/	/4" HSA	SURFACING	3:		WEATHER:	sunny, overcast
Elev./ Depth ft	Water Level	(Soi		escription of Ma 02488 or 2487; 1110-1-2908	Rock-USA	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or I	Remarks
-		med and dens	lium-grain Boulders	EY SAND (SC-s ned, with Grave , brownish gray DA SANDSTON RATE)	I, with Cobb , moist, ver	oles,	130 —	50/1" (REF) 0"			No recovery	
							140 —	(REF) 1" 50/1" (REF) 1"				
- - - - - - -		/ / /					145—	50/3" (REF) 5"			Bit Pressure: 1500 psi: 10:00 500 psi: 3:18 500 psi: 2:37 500 psi: 2:53	
- - - - - -			rehole ad mpling to	vanced with mu 240 feet	ıd rotary wit	thout	150 —	50/1" (REF) 0"			500 psi: 2:20 No recovery 500 psi: 2:00 500 psi: 2:08	
_											500 psi: 1:56	
		/									400 psi: 2:04	
_							155				400 psi: 1:56	
_		Y					155—				400 psi: 1:53	
-		<u>/</u>									500 psi: 6:30	
-											500 psi: 5:04	
 -											600 psi: 5:58	
											600 psi: 5:20	
	1 11-11-11		Co	ntinued on ne	ext page						600 psi: 3:00	



	uild On.		Se		Ierminol	ogy sheet	for explanation of	t abbreviations
	umber B2001991			BORING: 45-2-C LOCATION: See attached sketch				
	nical Evaluation Line 5 Re-Route			LOCATION:	See atta	cnea sketa	CN	
Various L								
	and Iron Counties, Wis	consin		LATITUDE:	46.	.37566	LONGITUDE:	-90.72582
DRILLER:	C. Coffindaffer LOGGEI	D BY: P. Moe		START DATE	E:	04/24/20	END DATE:	05/06/20
SURFACE ELEVATION:	1108.0 ft RIG: 8502	METHOD: 4 1/4" HSA	١	SURFACING	3 :		WEATHER:	sunny, overcast
Elev./ Je the fit of t	Description (Soil-ASTM D2488 or 2 1110-1	of Materials 487; Rock-USACE EM -2908)		Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
- - - - - - - - - - - - - - - - - - -	and Boulders, brownish dense, (FREDA SANDS CONGLOMERATE)						500 psi: 3:47 500 psi: 3:12 500 psi: 3:23 500 psi: 2:30 500 psi: 3:50 500 psi: 2:42 600 psi: 2:33 500 psi: 3:47 500 psi: 4:41 500 psi: 4:04	
- - - - - - - - - - -							500 psi: 3:30 500 psi: 3:25 500 psi: 3:00 500 psi: 2:45 500 psi: 3:07 600 psi: 3:32 700 psi: 9:07	
		180 — — — — — — — 185 —					700 psi: 9:00 700 psi: 6:00 750 psi: 17:00 750 psi: 9:00 750 psi: 7:13 750 psi: 5:37	
- - - - - - - - - - -	Continued	190 — 190 — on next page					500 psi: 5:45 500 psi: 2:53 500 psi: 2:57 500 psi: 2:45 500 psi: 2:50 500 psi: 5:04 500 psi: 3:31	



The Science Y		See Descriptive Terminology sheet for explanation of abbreviations				
	Number B2001991	BORING: 45-2-C				
	nnical Evaluation	LOCATION: See attached sketch				
	le Line 5 Re-Route Locations					
1	d and Iron Counties, Wisconsin	LATITUDE: 46.37566 LONGITUDE: -90.72582				
DRILLER:	C. Coffindaffer LOGGED BY: P. Moe	START DATE: 04/24/20 END DATE: 05/06/20				
SURFACE	1108.0 ft RIG: 8502 METHOD: 4 1/4" HSA	SURFACING: WEATHER: sunny, overcast				
ELEVATION:	Description of Materials					
Elev./ Depth ft	(Soil-ASTM D2488 or 2487; Rock-USACE EM	Blows (N-Value) q _p tsf MC % Tests or Remarks				
_	SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, with Gravel, with Cobbles,	500 psi: 3:55				
_	and Boulders, brownish gray, moist, very	500 psi: 3:34				
_	dense, (FREDA SANDSTONE, CONGLOMERATE) 195—	500 psi: 3:40				
<u> </u>		400 psi: 4:10				
L		400 psi: 3:32				
<u>-</u>		500 psi: 3:40				
_		500 psi: 3:34				
<u>-</u>	200—	500 psi: 3:15				
_		300 psi: 3:50				
_		400 psi: 2:52				
<u> </u>		400 psi: 2:45				
<u> </u>		600 psi: 3:00				
L	205—	600 psi: 2:38				
Ė.		500 psi: 3:10				
_		500 psi: 2:20				
_		500 psi: 2:27				
_		500 psi: 2:25				
F	210—	500 psi: 2:30				
<u> </u>		500 psi: 3:43				
Ē	<u> </u>	500 psi: 2:12				
F	 	500 psi: 3:31				
F	 	500 psi: 2:37				
Ē	215—	300 psi: 2:30				
F		300 psi: 3:08				
F		300 psi: 2:38				
F		300 psi: 2:42				
F		300 psi: 2:30				
E	220—	300 psi: 2:30				
F	$-\parallel\parallel\parallel\parallel$	300 psi: 2:57				
E		300 psi: 2:20				
E		300 psi: 2:18				
F	Continued on next page	300 psi: 2:30				
R2001001	Braun Intertee Corporation	Print Date:10/06/2020 45.2 C page 7 of 9				



BORNIG: 45-2-C	The Science You Build On.	Se		Terminol	ogy sheet	for explanation	of abbreviations	
Enbridge Line 5 Re-Route	Project Number B2001991		BORING:					
Various Locations			LOCATION:	See atta	ched sket	ch		
DRILLER:	Various Locations							
SILTY CLAVE SAND (SC-SM), fine to medium-grained, with Carely, most, very dense, (FREDA SANDSTONE). Signature Silty Clave Sand (Soli-ASTM D2488 or 2487 Rock-USACE EM Silty CLAVE SAND (SC-SM), fine to medium-grained, with Carely, with Cabbles, 225 dense, (FREDA SANDSTONE). Silty CLAVE (FREDA SANDSTONE) Sil	Ashland and Iron Counties, Wisconsin		LATITUDE:	46	.37566	LONGITUDE:	-90.72582	
Eleviron Description of Materials Description of Materials Solitary Description of Materials Description of Materials	DRILLER: C. Coffindaffer LOGGED BY: P. Moe		START DATE	E:	04/24/20	END DATE:	05/06/20	
Company Comp	SURFACE ELEVATION: 1108.0 ft RIG: 8502 METHOD: 4 1/4" HSA	A	SURFACING	S :		WEATHER:	sunny, overcast	
Medium-grained, with Gravel, with Cobbles, and Boulders, brownish gray, moist, very dense, (FREDA SANDSTONE, CONGLOMERATE)	Liev./	Sample	(N-Value)	q _₽ tsf		Tests or I	Remarks	
	SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, with Gravel, with Cobbles, and Boulders, brownish gray, moist, very dense, (FREDA SANDSTONE, CONGLOMERATE) 230 231 232 235 240.0 END OF BORING Boring then backfilled with cement/bentonite grout 245 245 245 250 250					300 psi: 5:40 400 psi: 3:20 400 psi: 3:05 400 psi: 3:03 400 psi: 3:00 500 psi: 3:15 500 psi: 2:40 500 psi: 2:40 500 psi: 2:50 500 psi: 5:32 500 psi: 2:50 500 psi: 2:50 500 psi: 2:50 500 psi: 2:50 500 psi: 2:50 500 psi: 2:50 500 psi: 2:50	erved while	
	R2001001 Proun Intertoc Corpora				10/06/2020	45.2	C page 8 of 8	



The Science You Build On.	Se		erminology shee	t for explanation o	f abbreviations
Project Number B2104465 Geotechnical Evaluation		BORING:	المام المام معام معام	SC-1	
Enbridge Line 5 Silver Creek Various Locations		LOCATION: Se	ee attached ske	tcn	
Near Mellen, Wisconsin		LATITUDE:	46.37799	LONGITUDE:	-90.73677
DRILLER: M. Heinzen LOGGED BY:	D. Morrison	START DATE:	07/07/21	END DATE:	07/13/21
SURFACE ELEVATION: 1088.6 ft RIG: 7505	METHOD: 3 1/4" HSA	SURFACING:		WEATHER:	60°, Rain
Elev./ Depth ft Description of Mate (Soil-ASTM D2488 or 2487; Ro 1110-1-2908)		Blows (N-Value) Recovery	q _p MC tsf %	Tests or F	Remarks
SILTY SAND (SM), with roots, moist (TOPSOIL) 1086.6 2.0 SILTY SAND (SM), fine to med					
with Gravel, trace roots, brown dense (GLACIAL TILL)	, moist, medium	7-6-7			
——————————————————————————————————————	5—	(13) 12"			
 6.5 POORLY GRADED SAND with fine to medium-grained, with G moist, loose to medium dense OUTWASH) 	iravel, brown,				
	10	5-6-5 (11) 10"			
	_				
	15	3-4-5 (9) 10"		Test results are	in attached
	20	5-7-7 (14) 14"			
T1066.1 22.5 POORLY GRADED SAND with fine to coarse-grained, with Gramoist to wet (GLACIAL OUTW.	avel, brown,				
-	25	6-6-6 (12) 12"			
	30 —	11-14-12 (26) 10"		Drilling method	
Continued on next	t page		st Data:00/21/2021	SC 1	



The Science Y		240442	· E			S		Ierminol	ogy sheet	for explanation o	t abbreviations
	Number E		5				BORING:	0		SC-1	
1	hnical Eva ge Line 5 S		rook				LOCATION:	See atta	cned sket	cn	
	Location		OUR								
1	ellen, Wisc						LATITUDE:	46	.37799	LONGITUDE:	-90.73677
DRILLER:	M. He	nzen	LOGGED BY:		D. Morriso	on	START DAT	E:	07/07/21	END DATE:	07/13/21
SURFACE ELEVATION:	1088.6 ft	RIG: 75	505	METHOD:	3 1/4	" HSA	SURFACING	3 :		WEATHER:	60°, Rain
Elev./ Depth ft	Water Level		escription of Ma 2488 or 2487; 1110-1-2908	Rock-USA	CE EM	Sample	Blows (N-Value) Recovery	q _₽ tsf	MC %	Tests or F	Remarks
- - - - - - - - - - - - - - - - - - -	fine	to coarse	ADED SAND w -grained, with (GLACIAL OUT	Gravel, brov		35 - 35 - 35 - 35 - 35 - 35 - 35 - 35 -	12-12-11 (23) 10" 11-13-15 (28) 8"			Test results are lab reports	e in attached
- - - - - - - - - - - - - - - - - - -	SIL trac TIL	ce Gravel,	CL-ML), fine to brown, wet, loo	medium-g se (GLACI	rained, AL	50	12-12-12 (24) 8" 4-4-5 (9)			Test results are	e in attached
- - - - - - - - - - - - - - - - - - -	SIL bro TIL	wn, wet, d	(SM), fine to mense to very de	nse (GLAC	ned, CIAL	60	16" 19-27-28 (55) 12"			lab reports	
		Со	ntinued on ne	xt page							



Project	Numb	er B	210446	55				BORING:		3, 3500	SC-1	
Geotec	hnical	Eval	uation					LOCATION	: See atta	ched sket		
Enbrido Various				reek								
Near M								LATITUDE:	46	.37799	LONGITUDE:	-90.73677
DRILLER:		И. Hein		LOGGED BY	<u> </u>	D. Morrison	<u> </u>	START DAT		07/07/21	END DATE:	07/13/21
SURFACE ELEVATION:	1088	.6 ft	RIG: 75	 505	METHOD:	3 1/4"	HSA	SURFACIN			WEATHER:	60°, Rain
			De	escription of N				Blows				•
Depth ft	Water Level	(Soi	I-ASTM D	2488 or 2487 1110-1-290		CE EM	Sample	(N-Value) Recovery	q _₽ tsf	MC %	Tests or F	Remarks
- - - -		SILT brow TILL	vn, wet, d	(SM), fine to r ense to very o	nedium-grair dense (GLAC	ned, CIAL 6	55	23-30-32 (62) 12"				
- - -												
						7	0 -	27-23-21 (44) 10"				
		and (PO	Boulders, ORLY DE	(SM), fine-gra , brown, mois VELOPED FF E, CONGLOM	t, very dense REDA	,		50/5" (REF) 5"				
- - - - - - - -						8	60 —	36-50/4" (REF) 10"			Test results are lab reports	e in attached
- - - - - - - -						8		45-50/5" (REF) 10"				
						9	00	34-46-50 (96) 14"				
92.5 - - - -		Cob	bles, and se, (POOI IDSTONE	ND (ML), with Boulders, bro RLY DEVELO E, CONGLOM	own, moist, vo PED FREDA ERATE)	\	 	50/5" (REF) 5"				
B2104465			Co	ntinued on r		n Intertec Co			Print Date:(20/04/2004	SC-1	page 3 of 5



The Science You Bu						Se		Terminol	ogy sheet	for explanation o	f abbreviations
Project No							BORING:			SC-1	
Geotechn Enbridge Various L	Line ocati	5 Silver Cons	reek				LOCATION: S	See atta	ched sket	ch	
Near Mello	en, W	/isconsin					LATITUDE:	46	.37799	LONGITUDE:	-90.73677
DRILLER:	M	I. Heinzen	LOGGED BY:	D. Mo	rrison		START DATE	<u>:</u>	07/07/21	END DATE:	07/13/21
SURFACE ELEVATION:	1088.0	6 ft RIG: 7	7505	METHOD: 3	1/4" HSA		SURFACING	:		WEATHER:	60°, Rain
Elev./ Nater 1	Level	(Soil-ASTM I	1110-1-2908	Rock-USACE Eľ 3)	M		Blows (N-Value) Recovery	q₅ tsf	MC %	Tests or F	Remarks
		Slightly weat (FREDA SAN Unweatherec SANDSTON	E, CLAYSTONE	orown, moist, RATE) orown, moist, IGLOMERATE) orown, moist, IGLOMERATE)	105 — — — — —— —— —— —— —— —— —— —— —— —— —		41-50/4" (REF) 8" 50/4" (REF) 3" 50/5" (REF) 2" 50/3" (REF) 3" 50/3" (REF) 3"			Test results are lab reports	e in attached
R2104465			<u>ontinued on ne</u>	Rraun Intert					00/21/2021	SC :	



Project Number B2104465 Geotechnical Evaluation Enbridge Line 5 Silver Creek Various Locations BORING: SC LOCATION: See attached sketch	C-1
Enbridge Line 5 Silver Creek	
A. A. II. SAP	GITUDE: -90.73677
DRILLER: M. Heinzen LOGGED BY: D. Morrison START DATE: 07/07/21 END D.	DATE: 07/13/21
SURFACE ELEVATION: 1088.6 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATH	ATHER: 60°, Rain
Elev./ Depth ft Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908) Blows (N-Value) (N-Value) Recovery	Tests or Remarks
Unweathered, reddish brown, moist, (FREDA SANDSTONE, CLAYSTONE)	



Proiect	Numb	er B210446	 55					BORING:		. 297 51100	t for explanation o	
		Evaluation						LOCATION:	See atta	ched sket		
Enbridg Various		e 5 Silver Citions	reek									
Near Me	ellen, V	Wisconsin						LATITUDE:	46	3.37604	LONGITUDE:	-90.72791
DRILLER:		M. Takada	LOGGED BY:		D. Morris	son		START DATI	E:	07/07/21	END DATE:	07/15/21
SURFACE ELEVATION:	104	0.4 ft RIG: 7	507	METHOD:	3 1/	/4" HSA		SURFACING	3 :	Weeds	WEATHER:	Cloudy
Elev./ Depth ft	Water Level		escription of Ma 02488 or 2487; 1110-1-2908	Rock-US/	ACE EM	Some	Sallple	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or R	Remarks
			(SM), fine to mo			١						
1038.4 2.0		POORLY GR	ADED SAND w	ith SILT (S	SP-SM),							
-			m-grained, with GLACIAL OUT		rown,							
_						5 —	7	5-6-4 (10)				
-						4	7	8"				
1032.9 7.5		SILTY SAND	(SM), fine to m	edium-ara	ined with							
- 7.0			n, moist, loose (
-						10-\	7	5-4-5 (9)			Test results are	in attached
-						4	7	16"			lab reports	
-												
_												
-						15	7	4-4-5 (9) 14"				
-						-	7	14"				
_												
-						4		5-5-4				
-						20 —	7	(9) 7"				
-								,				
			(CL), trace Grav		, moist to							
-		wet, very soft	(GLACIAL TILI	_)				0-0-0				
-						25 —		WOH/18" 18"			Test results are lab reports	in attached
											·	
27.5			H), with Sand, t ery soft (GLAC		vel,							
-		, ,,	, (= 15)	,		20					Challey Title	
_						30 —		SH			Shelby Tube Test results are	in attached
-			ontinued on se	avt nace				511			lab reports	
32104465			ontinued on ne		aun Intertec				wint Data	09/22/2021	SC-2	nage 1 of 6



Project N		r B210446	 55				RING:	e remino	logy sileei	SC-2	ation of abbreviations
Geotechn Enbridge	nical E Line	valuation 5 Silver C				LO	CATION:	See atta	ched sketo		
Various L Near Mell						1.47	TITUDE:	46	.37604	LONGITU	JDE: -90.72791
DRILLER:		1. Takada	LOGGED BY:	D !	Morrison	-	ART DAT		07/07/21	END DAT	
SURFACE											
ELEVATION:	1040.4		507	METHOD:	3 1/4" HSA	SU	RFACIN	G:	Weeds	WEATHE	R: Cloudy
Elev./ Jepth fr	Level		escription of Ma 02488 or 2487; 1110-1-2908	Rock-USACE	Sample	(N-\ Rec	ows /alue) overy	q _p tsf	MC %	Tes	ts or Remarks
1007.9 - 32.5 1006.4 - 34.0 	FAT CLAY (CH), with Sar brown, wet, very soft (GL		ery soft (GLACI (SM), fine to me n, wet, very den ND (SC), with Gi	AL TILL) edium-grained se (GLACIAL avel, gray, we	TILL)	(R 1	50/6" EF) 4" 0/4" EF) 6"			Test resu lab repor	llts are in attached ts
		and greenish	DSTONE, CON brown, volcanic	clast (hard), i)/2" EF) 4" 25	3	900		nethod switched to ng at 46 feet Run 1 MOHS
_		matrix recove	ered, washout du	uring coring				2	700	00	Clast: 4 Run 2
-					-[1	0	25	3	700	60	TGIT 2
					50 —			5	900	110	Dun 2
_						0	25	5	700	60	Run 3
_					_		20	5	700		Run 4
_					-[1			4	350		T GIT T
					_[]	0	17	5		160	
985.4					<u>55</u> _			5	520		
_ 55.0			DSTONE, CON , volcanic clast (6	020		
_			oft), poorly cem		iluy —			3	500	180	Run 5 MOHS
_		,	,			0	50				Clast: 8 Matrix: 1
980.4					-			3	750	180	
_ 60.0			DSTONE, CON		60			2	400	160	Run 6
<u> </u>			and red, volcar		to -	0	83	2	500	190	MOHS Clast: 8
_		mara), sanay well cemente	clay matrix (soft d), moderately	io _			8			Matrix: 1
_					-				700	200	Run 7
			antinuad as s	vt nogo		BOD 67	Dag	6 Drilling Rate	Bit Pressure	Water Wat	
B2104465		C	ontinued on ne		tertec Corporatio		Recovery %	Print Date:	(psi)	Pressure (psi)	Remarks SC-2 page 2 of 6



The Science Y	ou Build	l On.					See D	Descriptiv	e Termino	logy shee	t for expla	nation	of abbreviations
_			r B2104				ВС	ORING:			SC-	2	
	je L	ine:	Evaluation 5 Silver				LC	CATION	: See atta	ched sketo	ch		
	_		isconsir/	า			LA	TITUDE:	46	.37604	LONGIT	UDE:	-90.72791
DRILLER:		N	1. Takada	LOGGED BY:	D. Morri	son	ST	ART DAT	ΓE:	07/07/21	END DA	TE:	07/15/21
SURFACE ELEVATION:		1040.4	4 ft RIG:	7507	METHOD: 3 1	/4" HSA	SU	JRFACIN	G:	Weeds	WEATH	ER:	Cloudy
Elev./ Depth ft	Water Level		(Soil-ASTN	Description of Ma D2488 or 2487; 1110-1-2908	Rock-USACE EM	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	vater Return %	Remarks
975.4				NDSTONE, CON		05	0	42	7	700	200		
_ 65.0 -			hard), sand well cemer), moderately to	65			2	-			Run 8 MOHS Clast: 8
_				NDSTONE, CONG ray and red, volcar		-	28	100	2	450	160		Matrix: 2
				vel matrix (hard), w		-			2				
— - 970.4						-			2	1			
_ 70.0				NDSTONE, CON		70			2				Run 9
 _				ray and red, volcar vel matrix (soft), po		-11	39		2	420	190		MOHS Clast: 8.5
 -			cemented	or matrix (doit), pe	or to moderatory	-[]			2				Matrix: 2
_									6				Run 10
<u> </u>						1	78		2	500	190		
_			Test resul	ts are in attached i	lab reports	75 —			2				Run 11
_									2				MOHS Clast: 8.5
 -							53	100	2	380	120		Matrix: 2
- -						-11			2	1			
 960.4									3				
_ 80.0				NDSTONE, CON		80			2				Run 12
-				ray and red, volcar vel matrix (soft), po		-11			1				MOHS Clast: 8.5
 -			•	771		11	0	11	2	380	150		Matrix: 2
-									2				
 955.4						H	0	100	4 2	380	150		Run 13
_ 85.0				NDSTONE, CON		85	Ŭ	100	2	000	100		Run 14
-			greenish gi Sand, Grav	ray and red, volcar vel matrix (soft), m	nic clast (nard), oderately to well		00	400	2	320	150		MOHS Clast: 8
-			cemented	, ,	•		32	100	3				Matrix: 2
-									5	700	190		
 - 950.4							38	100	6	320	160		Run 15
_ 90.0				NDSTONE, CON		90			3				Run 16 MOHS
_				ray and red, volcar vel matrix (soft), po					3				Clast: 8.5
-				. , ,	-		27	89		380	160		Matrix: 2
F									4	1			
F							0	50	3 4	400	190		Run 17
-						95—			3				Run 18
				Continued on ne	xt page								



The Science You E	Build On.					See De	escriptive	e Termino	logy shee			of abbreviations
		r B210446	5			ВОІ	RING:			SC-	2	
	Line	Evaluation 5 Silver Crons	reek			LOG	CATION:	See attac	ched sketo	ch		
Near Mell	len, W	isconsin				LAT	TTUDE:	46	.37604	LONGIT	UDE:	-90.72791
DRILLER:	N	1. Takada	LOGGED BY:	D. Morri	son	STA	ART DAT	E:	07/07/21	END DA	TE:	07/15/21
SURFACE ELEVATION:	1040.4	4 ft RIG: 7	507	METHOD: 3 1	/4" HSA	SUI	RFACING	G:	Weeds	WEATH	ER:	Cloudy
Elev./ Mater	Level		escription of Ma 02488 or 2487; 1110-1-2908	Rock-USACE EM	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
- - - - - -		greenish gray	OSTONE, CONG and red, volcar matrix (soft), po	nic clast (hard),	_	0	100	2 2 3 12	350	170		MOHS Clast: 8.5 Matrix: 2
- - - - -					100 —	0	100	3 3 2 6	350	170		Run 19 MOHS Clast: 8.5 Matrix: 2
_						42	100	3	350	170		Run 20
					105 —	100	100	2 2 3 4	320	170		Run 21 MOHS Clast: 8.5 Matrix: 2
- - - - - -					110 —	0	100	3 3 3 3	320	170		Run 22 MOHS Clast: 8.5 Matrix: 2
_						0	100	3	380	170		Run 23
 921.4					115 —	0	100	3 3 3 6	320	180		Run 24 MOHS Clast: 8.5 Matrix: 2
_ 119.0			OSTONE, CON		400	34	50	3	250	180		Run 25 MOHS
 			and red, volcar matrix (soft), w		120	48	100	3 3 4 4 4	350	200		Clast: 7 Matrix: 2 Run 26
_ 125.0		green and red Sand, Gravel cemented	matrix (soft), m	canic clast (hard), oderately to well	125	57	100	3 3 3	350	180		Run 27 MOHS Clast: 6 Matrix: 2
P2104465		Co	ontinued on ne	xt page				Print Data:			90	

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The Science Y	ou Build	l On.							See [Descriptiv	e Termino	logy shee	t for exp	lanation	of abbreviations
Project					5				В	ORING:			SC	-2	
Geotecl					_				LC	CATION	: See atta	ched sket	ch		
Enbridg				r Cı	eek										
Various				. :											
Near Me	HIE	II, VV	riscons	5111						ATITUDE:		.37604	LONGI		-90.72791
DRILLER:		N	1. Takada		LOGGED BY:	D. M	orrisc	on	S	TART DA	ΓE:	07/07/21	END D	ATE:	07/15/21
SURFACE ELEVATION:		1040.4	4 ft RIG	S: 7	507	METHOD:	3 1/4	l" HSA	SI	JRFACIN	G:	Weeds	WEATH	HER:	Cloudy
Elev./ Depth ft	Water Level		(Soil-AS	D TM E	escription of Ma 02488 or 2487; 1110-1-2908	Rock-USACE E	M	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
_					OSTONE, CON						3				
_						lcanic clast (har oderately to we	II				4				
_			cemente		(//	,	1	130 —			3				Run 28
_								11			3				MOHS Clast: 6
-									48	100	3	350	160		Matrix: 2
-			Test res	sults	are in attached	lab reports					3	1			
_								-11			3				
_							1	135 —			3			-	Run 29
								-			3				MOHS Clast: 6
								-	32	100	4	380	170		Matrix: 2
901.9								-			5				
138.5					OSTONE, SILTS				0	95	3	350	170		Run 30 MOHS: 3
			thick bed		moderately na	rd, fine-grained,	, 1	140 —			-				Run 31
_								-			3	-			MOHS: 3
<u>-</u>			Tost res	culto :	are in attached	lah renorts		-[1			4				
_			1631163	suits (are iii allaciieu	iab reports		_[]	80	100	4	350	180		
<u>-</u>								_[]			5				
_							1	145—			4				Run 32
<u>-</u>								_[[4		190		Rull 32
893.4				~							4		150		MOUO
_ 147.0 _					DSTONE, CON- brown, volcanio	GLOMERATE, r c clast (hard).	red		100	100	3	450			MOHS Clast: 8
_						ery well cemente	ed				3		140		Matrix: 3
_							1	150 —			3				
							,				3				Run 33
E											3				
				•	of red SILTSTO	. ,			100	100	3	550	140		MOHS: 3
_			Test res	sults	are in attached	lab reports					3				
			6 inch l	ayer	of red SILTSTO	NE (hard)		,,, T			3				MOHS: 3
F							1	155 —			3]	Run 34 MOHS
F											3	1			Clast: 8
F									95	100	3	520	100	1	Matrix: 3
-								ij			2	1	160	1	
-											3	1	130	1	
				Сс	ntinued on ne	ext page									



See Descriptive Terminology sheet for explanation of abbreviations

The Science 3										e Terminol	ogy shee			of abbreviations
			r B21044						RING:			SC	-2	
	ge L	.ine	Evaluatio 5 Silver (ons					LOC	CATION:	See attac	ched sketo	ch		
Near M	elle	n, W	/isconsin	1				LAT	ITUDE:	46	.37604	LONGI	TUDE:	-90.72791
DRILLER:		N	1. Takada	LOGGED BY:	D. M	Morrison		STA	RT DAT	E:	07/07/21	END D	ATE:	07/15/21
SURFACE ELEVATION:		1040.4	4 ft RIG:	7507	METHOD:	3 1/4" HS/	4	SUF	RFACIN	G:	Weeds	WEATH	IER:	Cloudy
Elev./ Depth ft	Water			Description of Ma 1 D2488 or 2487; 1110-1-2908	Rock-USACE I	EM	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
_				NDSTONE, CON		red				3				Run 35 MOHS
				el matrix (soft), ve		ted _				3		150		Clast: 8
-						_		100	100	2	520	80		Matrix: 3
<u>-</u>			Test result	s are in attached	lab reports	_				2	-	100		
<u> </u>						165 —				2				Run 36
_						_				3	-			MOHS
<u> </u>						_		400	400	3	7040	400		Clast: 8 Matrix: 3
Ē						_		100	100	2	7610	100		
						_				2	_			
_						170 —	H			3				Run 37
-						_				3	7610	130		MOHS Clast: 8
-						_		100	100	3	7250	170		Matrix: 3
-						_				3	7250	100		
F						475				3	7250	120		
_			Test result	s are in attached	lab reports	175 —	П			3		130		Run 38 MOHS
E						_				4				Clast: 8
-						_		100	100	3	7250	150		Matrix: 3
_						_				3	-			
860.4 180.0				END OF COF	NNO	180	Ш			3		170		
_ 160.0 				END OF COP	KING	_								
F			Boring the	n backfilled with	cement/bent	onite _								
_				grout		_								
E						_								
_						185 —								
_						_								
 -						_								
F						_								
F						-								
F						190 —								
E														

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	You Build On.							e Termin	ology shee	t for explanation o	f abbreviations
		er B21044					BORING:			SC-3	
	ge Line	Evaluatio 5 Silver (ions					LOCATION:	See att	ached sket	ch	
Near M	ellen, V	Visconsir	1				LATITUDE:	4	6.37564	LONGITUDE:	-90.72576
DRILLER:	N	/I. Heinzen	LOGGED BY:	[D. Morrison		START DAT	E:	07/14/21	END DATE:	07/27/21
SURFACE ELEVATION:	1106.	2 ft RIG:	7505	METHOD:	3 1/4"	HSA	SURFACING	3 :		WEATHER:	
Elev./ Depth ft	Water	(Soil-ASTN	Description of Ma 1 D2488 or 2487; 1110-1-2908	Rock-USAC	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
ft		SILTY SAN Gravel, bro TILL)	Y SAND (SM), fine th roots, brown, m ID (SM), fine to me wn, moist, mediur GRADED SAND (Sained, with Gravel to medium dense	e to medium oist edium-grain n dense (Gl	ed, with _ACIAL	5	6-11-11 (22) 8" 4-6-7 (13) 12" 4-6-6 (12) 10" 8-8-10 (18) 12"			Test results are lab reports Drilling method mud rotary	
- - - - - -			Continued on ne	ext page	3	0 —	10-9-9 (18) 16"				



Project	Number	R21044	165			•	BORING:	e rermino	logy snee	t for explanation o	rappreviations
	hnical Ev						LOCATION:	See atta	ched sket		
	ge Line 5							250 4114	u onot		
	Location										
Near M	ellen, Wis	consin					LATITUDE:	46	.37564	LONGITUDE:	-90.72576
DRILLER:	M. H	leinzen	LOGGED BY:		D. Morrison		START DAT	E:	07/14/21	END DATE:	07/27/21
SURFACE ELEVATION:	1106.2 ft	RIG:	7505	METHOD:	3 1/4" F	ISA	SURFACING	 Э:		WEATHER:	
Elev./ Depth ft	Water Level		Description of Ma I D2488 or 2487; 1110-1-2908	Rock-USA0	CE EM	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
1073 7 - 32.5 - - - - - - -	m w O S	nedium-gra ret, loose t OUTWASH ILTY SAN	RADED SAND (Sained, with Gravel o medium dense) D (SM), fine to me wn, moist, mediur	, brown, mo (GLACIAL edium-grain	ned, with 35	5-\	10-11-11 (22) 10"				
					40		11-10-12 (22) 12"				
-1063.7 - 42.5 	G	iravel, darl	D (SM), fine to me k brown, moist, m DUTWASH)			5	11-12-15 (27) 16"			Test results are lab reports	in attached
47.5	m		YEY SAND (SC-S ained, brown, moi: IILL)		n se 50		22-30-32 (62) 12"				
- - - - - - - -					55	5-\	23-26-29 (55) 14"				
	tra		D (SM), fine to me ll, brown, moist, n IILL)				19-15-10 (25) 10"				
1043.7 62.5 	m	nedium-gra very stiff	YEY SAND (SC-Sained, with Gravel (GLACIAL TILL) Continued on ne	, brown, mo	pist, stiff						



The Science You B		210444	5			See Descriptiv	e Iermino	logy shee	t for explanation o	t abbreviations
Project N Geotechr						LOCATION	· See atta	ched sket		
Enbridge	Line 5 Si	ilver C				LOCATION	. 0 00 alla	oneu skell	J. 1	
Various L Near Mell						LATITUDE:	16	.37564	LONGITUDE:	-90.72576
DRILLER:	M. Heir		LOGGED BY:	D.	Morrison	START DAT		07/14/21		07/27/21
SURFACE								07/14/21		01/21/21
ELEVATION:	1106.2 ft		505	METHOD:	3 1/4" HSA	SURFACIN	G: T		WEATHER:	
Elev./ Depth to ft	(So		escription of Ma D2488 or 2487; 1110-1-2908	Rock-USACE	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or F	Remarks
- - - -	med	dium-grair	EY SAND (SC-S ned, with Gravel GLACIAL TILL)		t, stiff 65	3-5-6 (11) 14"				
- - - - - - - - - -					70	3-5-7 (12) 16"			Test results are lab reports	in attached
- - - - - - - - -					75	10-12-14 (26) 12"				
					80	11-7-9 (16) 8"				
82.5 			(SM), fine to men, moist, dense			15-17-28 (45) 6"				
- 1018.7 - 87.5 			(CL), with Grave , hard, (WEATHI			50/5" (REF) 5"			Test results are lab reports	e in attached
		Co	ontinued on ne		95 — X	31-50/4" (REF) 10"	Print Date:		SC5	s page 3 of 8



Project			r B21044						RING:	- Terrillion	logy silee	SC		of abbreviations
Geotec	hnic	al E	valuatio 5 Silver (n				LOC	CATION:	See attac	ched sket			
Various														
Near Me	ellen	, W	isconsin	1				LAT	ITUDE:	46	.37564	LONGI	TUDE:	-90.72576
DRILLER:		M.	Heinzen	LOGGED BY:	С). Morrison		STA	RT DAT	E:	07/14/21	END D	ATE:	07/27/21
SURFACE ELEVATION:	1	106.2	ft RIG:	7505	METHOD:	3 1/4" HS	Α	SUF	RFACING	3 :		WEATH	HER:	
Elev./ Depth ft	Water Level			Description of Ma I D2488 or 2487; 1110-1-2908	Rock-USAC	E EM	Sample	(N-V	ows alue) overy	q _₽ tsf	MC %	Te	ests or	Remarks
1008.7				/ (CL), with Grave st, hard, (WEATHI										
97.5 - - - - - - - - - - - - - - - - - - -			FREDA SAI gray, green hard), poorl	NDSTONE, CONG and brown, volca y to well cemente	GLOMERAT GLOMERAT nic clast (ve d in a Sand,	E - 100		(RI 3 50 (RI	/3" EF) " /1" EF) "	3	500			Run 1 MOHS Clast: 8.5
- - - - - - - -				Clay matrix (very		110		0	17	22	400	90		Matrix: 1 Run 2 MOHS Clast: 8.5 Matrix: 1
 - _ - _						115 – – –		0	44	32	400	60		Run 3 MOHS Clast: 8.5 Matrix: 1
 - _ -						_		0	25	6	500	60	100	Run 4
 - -						120 –		0	0	7	500	60	100	Run 5 - No
- - - - - - -								31	54	10 7 5 6	500	60	100	recovery Run 6 MOHS Clast: 8.5 Matrix: 1
- - - -						125 – – –		0	20	6 9 11	500	60	100	Run 7 MOHS Clast: 8.5 Matrix: 1
B2104465			(Continued on ne		Intertec Corpor		RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks



	NII		r B21044	165					escriptive RING:	e rermino	ogy snee	SC		of abbreviations
			valuatio							See atta	ched sketo			
			5 Silver											
Various														
Near M	elle	n, W	isconsir/	1				LAT	TTUDE:	46	.37564	LONGI	TUDE:	-90.72576
DRILLER:		М	. Heinzen	LOGGED BY:	D. Morr	ison		STA	ART DAT	E:	07/14/21	END D	ATE:	07/27/21
SURFACE ELEVATION:		1106.2	2 ft RIG:	7505	METHOD: 3	1/4" HSA		SUF	RFACING	 G:		WEATI	HER:	
				Description of Ma			Т				0)		1	
Elev./ Depth ft	Water Level			1 D2488 or 2487; 1110-1-2908	Rock-USACE EM 3)		Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
_				NDSTONE, CON and brown, volca						5				
-			hard), poor	ly to well cemente	d in a Sand,	120				6				
F			Gravel and	Clay matrix (very	soft)	130 —				4				Run 8 MOHS
F										4				Clast: 8.5
-								77	100	4	500	60	100	Matrix: 1
_										3	-			
_										6	-			
_						135 —				11				Run 9
_						_				5	-			MOHS Clast: 8.5
_						-		0	10	3	500	60	100	Matrix: 1
						-		Ü	10	3	- 000		100	
L						_				4	_			
L						140 —				4				Run 10
965.2 141.0			FRFDA SA	NDSTONE, SILTS	STONE.					5	-			MOHS: 1
_			unweathere	ed, soft, very fine-		_		42	60	4	500	60	100	
963.2 143.0			bedded FREDA SA	NDSTONE, CON	GLOMERATE			42	60	-	500	60	100	MOHS
<u> </u>			brown and	gray, volcanic clas	st (very hard), wel	ı —				4	-			Clast: 8 Matrix: 4
F			cemented (Clay, Sand and Gr	avel matrix (soft)	145 —	╂			3				Run 11
959.7						_				4				
146.5				NDSTONE, SILTS						5				MOHS: 1
958.2 148.0			unweatnere ∖bedded	ed, soft, very fine-	grained, thick			28	65	5	500	60	100	MOHS
_ 1 4 0.0				NDSTONE, CON						7				Clast: 8 Matrix: 4
956.2 150.0				gray, volcanic clas Clay, Sand and Gr		1,50				14				Run 12
_ 130.0 _			FREDA SA	NDSTONE, SILTS	STONE, red and					4	-			MOHS: 3
_				interlocked congle and Gravel, well c		_				4				
<u>-</u>			- •	•				93	100	4	-	60	100	
<u>-</u>										3				
L						155 —				3	_			D 40
<u> </u>										6	-			Run 13 MOHS: 3
_										6				
948.2			FREDA SA	NDSTONE, CON	GLOMERATE,			40	100	5				
_ 158.0			gray, green	and brown, volca	nic clast (very					5				
946.2			nard), poor matrix (soft	ly cemented with :)	Sand, Gravel					6				
160.0 B2104465				Continued on ne	ext page					Print Date:			SC	-3 page 5 of 8



See Descriptive Terminology sheet for explanation of abbreviations

Project	Nu	mbe	r B21044	l65					RING:	, icitillio	ogy sileei	SC		of abbreviations
			valuatio					LO	CATION:	See attac	ched sketo			
			5 Silver C	Creek										
Various														
	ene		isconsin						TTUDE:		.37564	LONGI	TUDE:	-90.72576
DRILLER:			. Heinzen	LOGGED BY		Norrison		STA	ART DAT	Έ:	07/14/21	END D	ATE:	07/27/21
SURFACE ELEVATION:		1106.2			METHOD:	3 1/4" HS	A	SUI	RFACING	G:		WEATI	HER:	1
Elev./ Depth ft	Water Level			Description of M I D2488 or 2487 1110-1-290	; Rock-USACE	EM	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
_				NDSTONE, SAN						6				Run 14
_				ntly weathered, s ained, massive	ιοπ, πne-grained	1 to –				11				MOHS: 3
-			J	·		_		50	50	9	500	60	100	
F						_				8				
941.2						405				19				
_ 165.0	1			NDSTONE, CON		165				6				Run 15 MOHS
F			hard), poorly	en and red, volca y to well cement	ed in Sand and	_				7				Clast: 8
F			Gravel matr	rix (soft)		_		0	27	18	500	60	100	Matrix: 3
-						_				11				
						170 –				7				
E						170-				4				Run 16 MOHS
E										4				Clast: 8
_								21	87	4	500	100	100	Matrix: 3
E										5				
E						175 –				12				
E						173				6				Run 17
E								20	100	4	500	100	100	
928.7 177.5	1		FREDA SAN	NDSTONE, CON	NGLOMERATE.		Н			10 3				Run 18
L			gray, brown	and red, volcan	ic clast (hard), S			40	100	4	500	100	100	MOHS Clast: 8.5
L			and Gravei	matrix (soft), mo	derately cemen	itea 180 –				5				Matrix: 7
E						100				7				Run 19 MOHS
L						_		0	83	13	500	100	100	Clast: 8.5
L						_				9				Matrix: 7
L						_		0	100	7	500	100	100	Run 20
L						185 –		0	100	10	300	100	100	
L						100				5				Run 21 MOHS
L						_				7				Clast: 8.5
						_		55	100	4	500	100	100	Matrix: 7
E										4				
Ł						190 –				4				
L						190 -	П			6				Run 22 MOHS
<u> </u>										6				Clast: 8.5
P2104465				Continued on n		orton Corner	Щ				0/22/2021		80	Matrix: 7

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See Descriptive Terminology sheet for explanation of abbreviations

Project			r B21	044	65						ING:	e termino	logy snee	SC		of abbreviations
Geotec												See attac	ched sket		-5	
Enbridg									ן ן		1014.	Joo alla	ca oncu			
Various	•				-											
Near Me	elle	n, W	/iscon	sin					L	_ATI	TUDE:	46	.37564	LONGI	TUDE:	-90.72576
DRILLER:		M	I. Heinzer	1	LOGGED BY:). Morris	on	5	STAF	RT DAT	E:	07/14/21	END D	ATE:	07/27/21
SURFACE		1106.2	2 ft R	G:	7505	METHOD:	3 1/4	4" HSA	5	SUR	FACING	3·		WEATH	HFR [.]	
ELEVATION:					Description of Ma				\vdash				0			
Elev./ Depth ft	Water Level		•	STM	D2488 or 2487; 1110-1-2908	Rock-USAC 3)		Sample	RQD	%	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks
_					NDSTONE, CON and red, volcanion							6				
_					matrix (soft), mod				33	3	67	9	450	100	100	
_						-						14				
-								195 —				9				Run 23
- -												6	-			MOHS Clast: 8.5
- -									13	3	100	6	380	100	100	Matrix: 7
_												6	-			
-												8	=			
_							;	200 —				5				Run 24
												6	-			MOHS Clast: 8.5
_								-	31	1	100	7	380	100	100	Matrix: 7
_								-				17	_			
_			1 foot	laye	of well cemented	d			10	0	92	6	380	100	100	Run 25
_					es (3) were untes b report	stable, see	:	205 —	Ť			6	000	100	100	Run 26
			allacii	c u ia	ъ героп			-				10	_			MOHS Clast: 8.5
_								-	33	3	60	5	380	100	100	Matrix: 7
_									30	,	00	12	_ 300	100	100	
_												11	=			
_							:	210 —				4				Run 27
_								-	58	3	100	6	380	100	100	
894.2 212.0			FREDA	SAI	NDSTONE, CON	GLOMERAT	E,					4				Run 28
_					and red, volcanio			-	64	1	100	4	380	100	100	MOHS Clast: 8.5
_			Sandy	Glav	el matrix (hard), v	wen cement	∌u	-		١	100	7	- 000	100	100	Matrix: 7
_			Test s	ampi	es (3) were untes	stable, see	:	215—		\dashv		6				Run 29
_					b report	•						8				MOHS Clast: 8.5
_									40	,	78	8	380	100	100	Matrix: 7
<u>L</u>								-	40		70	11		100	100	
<u> </u>												8	-			
886.2 220.0			FREDA	SAI	NDSTONE, CON	GLOMERAT	E.	220								Run 30
<u> </u>			gray, bı	own	and red, volcanio	clast (hard)),	-[4				MOHS
_			, ,		el matrix (hard), v e was untestable	•		-	88	3	100	4	380	100	100	Clast: 8.5 Matrix: 8
_			report	-			c u IaD	- ₿				5	-			
				sult	s in attached lab							5				
B2104465					Continued on ne			Corporatio				 Print Date:(0/00/0004		SC	-3 page 7 of 8

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LOG OF CORING

The Science Y	The Science You Build On.								e Termino	logy shee	t for exp	lanation	of abbreviations
			r B2104				В	BORING: SC-3					
Geotec	hni	cal E	Evaluatio	on			LC	CATION	: See atta	ched sket	ch		
			5 Silver	Creek									
Various													
Near Me	elle	n, W	isconsi	n			LA	LATITUDE: 46.37564 LONGITUDE: -90.7					-90.72576
DRILLER:		М	. Heinzen	LOGGED BY:	D. Mor	rison	S ⁻	TART DAT	Œ:	07/14/21	END D	ATE:	07/27/21
SURFACE ELEVATION:		1106.2	2 ft RIG:	SI	JRFACIN	G:		WEATI	HER:				
Elev./				Description of M		Φ		2	D 0	ē	. @		
Depth	Water Level		(Soil-AST	M D2488 or 2487; 1110-1-290		Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit ssul psi)	/ater sssul psi)	Water Return %	Remarks
ft	د ک		1110-1-2900)					Rec	اع ٣ ج	Bit Pressure (psi)	P. P.	≥ &	
				ANDSTONE, CON					4				
_			gray, brown and red, volcanic clast (hard), 225——Sandy Gravel matrix (hard), very well cemented						4				Run 31
_									4				MOHS Clast: 8.5
				-	90	100	4	380	90	100	Matrix: 8		
						-			5	-			
			Test resu	ılts in attached lab	reports	-			5				
E					230 —			5				Run 32	
_						-			6				MOHS
_						-	400	0.5		200	00	400	Clast: 8.5 Matrix: 8
_						-	100	95	5	380	90	100	
_					_			5	_				
_						235—			5				Run 33
						_			4				MOHS
- 						_			5				Clast: 8.5 Matrix: 8
_			- ,		,	_	92	100	6	380	90	100	Iviati ix. o
			lest resu	ılts in attached lab	reports	_			6				
866.2						240			6				
_ 240.0				END OF CO	RING								
_			Boring the	en backfilled with	n cement/benton	ite _							
-			3	grout									
_						045							
F						245—							
-													
_													
-													
						250 —							
_						\dashv							
_						\dashv							
F						\dashv							
-													
F						255—							
L													Į

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project		nor R21	10449	<u></u>					BORING:	e remino	лоду ѕпееі	stor explanation of SC-4	n appreviations	
Geotec								LOCATION: See attached sketch						
Enbridg									LOCATION.	Joe alla	iorioù anell			
Various				~ =										
Near M			nsin					L	LATITUDE:	46	3.37543	LONGITUDE:	-90.72338	
DRILLER:		M. Takad	la	LOGGED BY:		D. Morriso	on	5	START DAT	<u></u> Е:	07/16/21	END DATE:	07/23/21	
SURFACE ELEVATION:	109	2.5 ft F	RIG: 7	 '507	METHOD:	3 1/4	4" HSA	5	SURFACING: Mulch			WEATHER:	Cloudy	
				escription of Ma				\top						
Elev./ Depth ft	Water Level	(Soil-		D2488 or 2487; 1110-1-2908	Rock-USA	CE EM	Sample	(N	Blows N-Value) ecovery	q _p tsf	MC %	Tests or F	Remarks	
_ _ _ 1090.5				(SM), fine to me moist (TOPSOI		ned, with	_							
_ 2.0 _		fine to	mediu	ADED SAND w m-grained, with m dense (GLAC	Gravel, bro									
- - -							5	7	9-5-7 (12) 12"					
- - -														
-														
E							10	7	6-7-9					
_								7	(16) 16"					
- 1080.0														
12.5	<u> </u>			own, moist, loos	se (GLACI	٩L								
_		OUTV	VASH)				_		0.0.4					
							15-	7	2-2-4 (6) 12"			Test results are	e in attached	
E							- /	7	12"			lab reports		
1075.0														
17.5 -		SILTY mediu	′ SAND ım dens	(SM), fine-grain se to dense (GL	ned, brown ACIAL TILI	, moist, L)								
_				,		,		- 10	0-10-11					
-							20		(21) 12"					
F								1	12					
_														
_							25	7 1	10-10-8					
_								7	(18) 12"					
<u> </u>														
<u> </u>														
F							_		0.40.44					
F							30 —	7 16	6-16-14 (30)					
E							4	7	`16"					
Ē			C	ontinued on ne	ext page		\dashv							
D2104465					<u> </u>						00/22/2021	SC .		



LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Geotechnical Evaluation Enbridge Line 5 Silver Creek Various Locations Near Mellen, Wisconsin DRILLER: M. Takada LOGGED BY: D. Morrison LOCATION: See attached sketch LOCATION: See attached sketch LATITUDE: 46.37543 LONGITUDE: -90.72338 START DATE: 07/16/21 END DATE: 07/23/21	The Science			- D2404	166					e Termin	ology sheet	t for explanation o	f abbreviations		
Enbridge Line 5 Silver Creek Various Locations Latitude: 46.37543 Longitude: 90.72338 Longitude: 90.7238 Longitude: 90.9238 Longitude:									BORING: SC-4						
Near Mellen, Wisconsin Near Mellen, Wiscon									LOCATION:	see atta	acned sketo	ווכ			
DRILLER: M. Takada LOGGED BY: D. Morrison START DATE: 07/16/21 END DATE: 07/23/21															
Description of Materials Description of Mate	Near M	elle	n, W	isconsir	1				LATITUDE:	4	6.37543	LONGITUDE:	-90.72338		
Depth ft Description of Materials (Soil-ASTM D2489 or 7487; Rock-USACE EM 11101-12908) 1060.0 - 32.5 1065.0 - 37.5 1055.0 -	DRILLER:		M	1. Takada	LOGGED BY:		D. Morrison	า	START DAT	E:	07/16/21	END DATE:	07/23/21		
Continued on next page Continued on next p	SURFACE ELEVATION:		1092.5	oft RIG:	7507	METHOD:	3 1/4"	HSA	SURFACING	G:	Mulch	WEATHER:	Cloudy		
1055.0 SILTY SAND (SM), from to earse (GLACIAL TILL) SILTY SAND (SM), from the dium-grained, brown, moist to wet, medium dense (GLACIAL TILL) SILTY SAND (SC-SM), trace Gravel, brown, wet, very stiff (GLACIAL TILL) SILTY, CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff (GLACIAL TILL) SILTY, CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard (GLACIAL TILL) Silty CLAYEY SAND (SC-SM), trace Gravel, brown, wet, very stiff to hard	Depth	Water Level		(Soil-ASTN	/I D2488 or 2487;	Rock-USA	CE EM	Sample	(N-Value)			Tests or F	Remarks		
SILTY SAND (SM), fine to coarse-grained, with Gravel, brown, moist, medium dense (GLACIAL TILL) 9-9-9 (18) 13°															
POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, brown, moist to wet, medium dense (GLACIAL TILL) 40	- - - - -			SILTY SAN Gravel, bro	ID (SM), fine to co	arse-graine	ed, with LACIAL	35	(18)						
Test results are in attached lab reports 13"				fine to med	lium-grained, brow	∕n, moist to			0.00						
1045.0	- - - - -				`	,	4	40	(15)				in attached		
	- - - -						4	45 —	(13)						
50— 57-11 (18) 16" 1040.0 552.5 (GLACIAL TILL) 19-21-35 (56) 18" 20-24-28 (52) 16" Test results are in attached lab reports Continued on next page							Gravel,		14"						
LEAN CLAY (CL), brown, wet, very stiff to hard (GLACIAL TILL) 19-21-35 (56) 18" 20-24-28 (52) 16" Continued on next page	- - - - -			brown, wet	, very stiff (GLACI	AL TILL)	ţ	50							
55						t, very stiff	to hard		19-21-35						
Continued on next page (52) Test results are in attached lab reports Test results are in attached lab reports	- - - -						,	55	(56)						
Continued on next page							(60 —	(52)				in attached		
									16"			lab reports			
					Continued on ne	xt page									



LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project	Nun		B2104/	165					BORING:	e rermino	ology sneel	SC-4	tion of abbreviatio		
Geotec								L	LOCATION: See attached sketch						
Enbrido Various	-			Creek											
Near M	ellen	, Wis	sconsin	1					LATITUDE:	46	3.37543	LONGITUE	DE: -90.72338		
DRILLER:		М. 7	Takada	LOGGED BY:		D. Morris	on		START DATE: 07/16/21 END DATE:				:: 07/23/2		
SURFACE ELEVATION:	1	092.5 ft	RIG:	7507	METHOD:	3 1/-	4" HSA		SURFACING	3 :	Mulch	WEATHER: Clo			
Elev./ Depth ft	Water Level	(Description of Ma 1 D2488 or 2487; 1110-1-2908	Rock-USA	ACE EM	Sample	(I	Blows N-Value) Recovery	q _♭ tsf	MC %	Tests	s or Remarks		
- - - - - -			EAN CLA	Y (CL), brown, we TILL)	t, very stiff	to hard	65	7	17-8-12 (20) 18"						
- - - - - - - - - - - - - - - - - - -							70	7 1	4-11-11 (22) 12"						
		b		D (SM), fine to me , very dense, (WE)			75	37	7-43-50/5" (REF) 10"						
							80 —	5	50/4" (REF) 8"			Test result	ts are in attache		
 - - - - - -							85—		50/4" (REF) 6"						
1005.0 87.5 - 				NDSTONE, CONG wn, moist	GLOMERA	ATE,	90 —								
- -													ethod switched t g at 92 feet		
_ 1000.5 — 92.0 - —		b p	rown, gray	NDSTONE, CONG y and red, volcanion ented in a Clay, So y soft)	clast (ver	ry hard),		(50/2" (REF)) 2" 42	3	- 380	130	Run 1 MOHS Clast: 7.5 Matrix: 1		
<u> </u>							95 —			2			Run 2		
				Continued on ne	xt page			RQI	D % Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Return Remarks		



LOG OF CORING

The Science Y	Science You Build On.									See Descriptive Terminology sheet for explanation of abbreviations						
_			r B2104					ВОІ	BORING: SC-4							
			valuatio					LO	CATION:	See attac	ched sket	ch				
			5 Silver	Creek												
Various	_			•												
Near M	ene	n, w	isconsii					LAT	LATITUDE: 46.37543 LONGITUDE: -					-90.72338		
DRILLER:		N	1. Takada	LOGGED BY:	D. Morri	ison		STA	ART DAT	E:	07/16/21	END DA	ΓE:	07/23/21		
SURFACE ELEVATION:		1092.	5 ft RIG: 7507 METHOD: 3 1/4" HSA				SUI	RFACIN	G:	Mulch	WEATHE	R:	Cloudy			
Elev./ Depth ft	Water Level		(Soil-ASTI	Description of Ma M D2488 or 2487; 1110-1-2908	Rock-USACE EM		Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Return %	Remarks		
_			FREDA SANDSTONE, CONGLOMERATE,							2				MOHS		
-				y and red, volcanionented in a Clay, S		_		15	100	2	350	140		Clast: 7.5 Matrix: 1		
-			matrix (ver		and and Graver	_				4				Watix. 1		
_						_	Н			2				Run 3		
_			100 —							2				MOHS Clast: 7.5		
						26	96	2	200	140		Matrix: 1				
_																
989.5 103.0			FREDA SA		Н			4				Run 4				
988.0			brown, gra	_		51	100	5 2	350	120		MOHS				
104.5			well cemer matrix (ver	nted in a Sandy Cla	1/05 —	П			3				Clast: 7.5 Matrix: 4.5			
-				NDSTONE, CON	GLOMERATE,					2		200	Run 5			
<u>-</u>				y and red, volcanio		_		58	100	1	300			MOHS Clast: 7.5		
_			poorly to well cemented in a Sandy Clay and Gravel matrix (very soft)							1				Matrix: 1		
_				,						1						
_						110 —	Н			2				Run 6		
_						110				2						
980.8			EDED 4 0 4	NEOTONE OANE	OTONE III			C4	100		200	200		MOLIC: 2		
— 111.8 -				NDSTONE, SAND gray, unweathere		 d.		61	100	1	320	200		MOHS: 3		
- -				d to medium-grain		_, _				2						
978.0 114.5		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		NDSTONE, CON	CLOMEDATE area		Ц			2				Run 7		
- 977.5		V V.	and green,	volcanic clast (ve	эсомекате, gra y hard), well	У1 15 —				2				MOHS		
115.0				in a Sand matrix (r						2				Clast: 8 Matrix: 2.5		
_				NDSTONE, SAND		_		92	100	1	250	200		MOHS: 3		
_			moderately	/ hard, fine-grained		_				1						
_			grained, m	assive		_	Ш			1						
F			Test sami	ole untestable, see	attached lab	120 —				1				Run 8 MOHS: 3		
_			Test sample untestable, see attached lab report Test results are in attached lab reports							2						
								100	100	2	280	170				
<u> </u>			. 20. 10001				2									
- 968.0						_				2						
124.5				FREDA SANDSTONE, CONGLOMERATE,						3				Run 9		
- 			FREDA SANDSTONE, CONGLOMERATE, gray, green and brown, volcanic clast (very hard), poorly to well cemented in a Clay, Sand					44	400	2	000	470		MOHS Clast: 7.5		
_				ny to well cemente I matrix (moderate		_		11	100	3	280	170		Matrix: 1		
					· 											
	Continued on next page															

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LOG OF CORING

See Descriptive Terminology sheet for explanation of abbreviations

The Science Y											e Termino	logy shee			of abbreviations	
Project										BORING: SC-4						
Geotecl Enbridg									LC	CATION:	See atta	ched sketo	ch			
Various Near Me	Lo	cati	ons							TITLIDE	40	07540	LONG	TUDE	00.7000	
	HILE									TITUDE:		.37543	LONGI		-90.72338	
DRILLER:			M. Takada LOGGED BY: D. Morrison						ST	START DATE: 07/16/21 END DATE:				07/23/21		
SURFACE ELEVATION:		1092.5					SL	JRFACIN:	G:	Mulch			Cloudy			
Elev./ Depth ft	Water Level		(Soi		Description of Ma D2488 or 2487; 1110-1-2908	Rock-USA	ACE EM	Sample	RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks	
_			FREDA SANDSTONE, CONGLOMERATE,							<u>2</u> 4						
F			gray, green and brown, volcanic clast (very hard), poorly to well cemented in a Clay, Sand						0	100	2	280	170		Run 10	
-			and	Gravel r	natrix (moderate	ly hard)		130			2				Run 11 MOHS	
F											2				Clast: 7.5	
F			135 —						0	100	3	320	160		Matrix: 1	
F											3					
											6					
_											3				Run 12 MOHS	
											2				Clast: 7.5	
									33	100	2	350	170		Matrix: 1	
											2					
-											3					
_											3			Run 13 MOHS		
									0	100	3	320	170		Clast: 7.5	
									U	100	3	320	170		Matrix: 1	
-											8					
								145—	0	100	2	320	170		Run 14	
E								145	25	100	3	380	170		Run 15	
									23	100	2	300	170			
_											2				Run 16 MOHS	
L											3	380	170		Clast: 7.5	
_								150 —			3				Matrix: 1	
_								100			3				Run 17 MOHS	
_									0	100	2	380	140		Clast: 7.5	
939.5											2				Matrix: 1	
_ 153.0					END OF CO	RING										
L			Bori	ng then	backfilled with	cement/l	pentonit	ရ ₅₅ _								
L				-	grout											
L																
<u> </u>																
<u>L</u>																
<u> </u>																

B2104465 Braun Intertec Corporation Print Date:09/22/2021 SC-4 page 5 of 5



SC-2, 46-63'

Project No. B2104465





Photograph #2

SC-2, 63-73.5'





SC-2, 73.5-80'

Project No. B2104465





Photograph #4

SC-2, 80-85'





Photograph #5 SC-2, 85-94.5'

Project No. B2104465

BRAUN INTERTEC



Photograph #6

SC-2, 94.5-104'

Project No. B2104465

INTERTEC



Photograph #7 SC-2, 104-113.5'

Project No. B2104465





Photograph #8

SC-2, 113.5-120'





SC-2, 120-130'

Project No. B2104465





Photograph #8

SC-2, 130-140'





SC-2, 140-150'

Project No. B2104465





Photograph #8

SC-2, 150-160'





SC-2, 160-170'

Project No. B2104465





Photograph #8

SC-2, 170-180'





SC-3, 108-130'

Project No. B2104465

BRAUN INTERTEC



Photograph #2

SC-3, 130-150'

Project No. B2104465

INTERTEC



Photograph #3 SC-3, 150-160'

Project No. B2104465





Photograph #4

SC-3, 160-177'





SC-3, 177-187'

Project No. B2104465





Photograph #6

SC-3, 187-199'





SC-3, 199-210'

Project No. B2104465





Photograph #8

SC-3, 210-220'





SC-3, 220-240'





SC-4, 92-103'

Project No. B2104465





Photograph #2

SC-4, 103-109.5'

Project No. B2104465

INTERTEC



SC-4, 109.5-119.5'

Project No. B2104465

BRAUN INTERTEC



Photograph #4

SC-4, 119.5-129'

Project No. B2104465

INTERTEC



SC-4, 129-135'

Project No. B2104465





Photograph #6

SC-4, 135-145'





SC-4, 145-153'





Photograph #1 43-1-C-1, 124.6 to 144.6 feet

Project No. B2001991





Photograph #2

43-1-C-1, 155.6 to 169.6 feet





Photograph #3 43-1-C-1, 144.6 to 155.6 feet Project No. B2001991

BRAUN INTERTEC



Photograph #4 43-1-C-1, 169.6 to 174.6 feet





Photograph #5 43-1-C-1, 174.6 to 184.6 feet

Project No. B2001991





Photograph #6

43-1-C-1, 184.6 to 204.6 feet (2 of 2)





Photograph #7 43-1-C-1, 184.6 to 204.6 feet (1 of 2) Project No. B2001991





Photograph #8 43-1-C-1, 204.6 to 208.6 feet

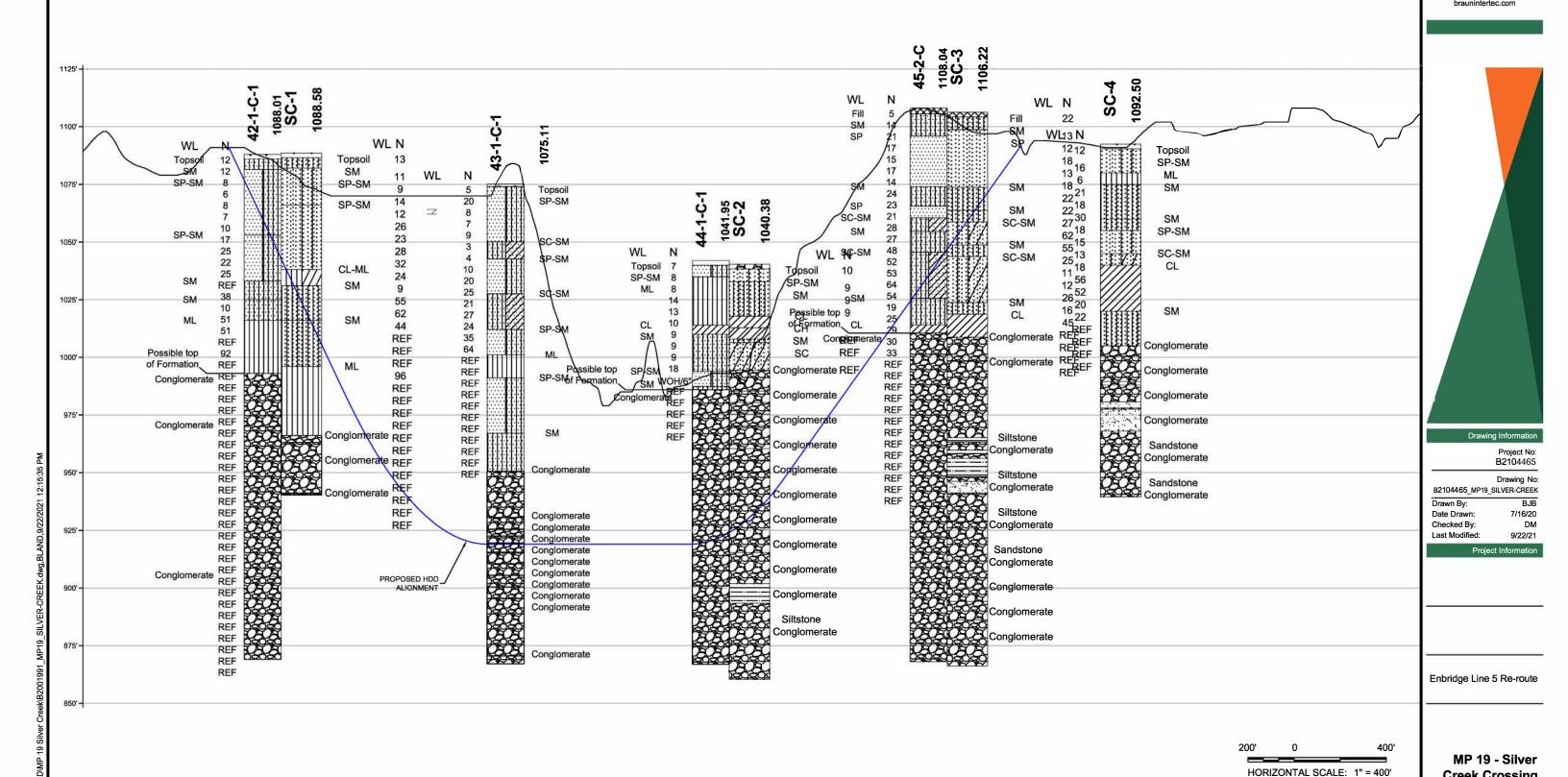




Creek Crossing

40'

VERTICAL SCALE: 1" = 40' **VERTICAL EXAGGERATION: 10x**





Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488 (Unified Soil Classification System)

	Criteria fo	or Assigning G	roup Symb	ols and		Soil Classification
		lames Using La			Group Symbol	Group Name ^B
Ē	Gravels	Clean Gravels (Less than 5% fines ^c)		$C_u \ge 4$ and $1 \le C_c \le 3^D$	GW	Well-graded gravel ^E
ed o	(More than 50% of coarse fraction			$C_u < 4 \text{ and/or } (C_c < 1 \text{ or } C_c > 3)^D$	GP	Poorly graded gravel ^E
ned Soi 6 retain sieve)	retained on No. 4	Gravels wit	th Fines	Fines classify as ML or MH	GM	Silty gravel ^{E F G}
ainec 3% re 3 siev	sieve)	(More than 1	2% fines ^c)	Fines Classify as CL or CH	GC	Clayey gravel ^{E F G}
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Sands	Clean Sa	ands	$C_u \ge 6$ and $1 \le C_c \le 3^D$	SW	Well-graded sand
oarse- e than No.	(50% or more coarse	(Less than 5	% fines ^H)	$C_u < 6 \text{ and/or } (C_c < 1 \text{ or } C_c > 3)^D$	SP	Poorly graded sand
o. Mor	fraction passes No. 4	Sands wit	h Fines	Fines classify as ML or MH	SM	Silty sand ^{FGI}
)	sieve)	(More than 12% fines ^H)		Fines classify as CL or CH	SC	Clayey sand ^{F G I}
				PI > 7 and plots on or above "A" line I		Lean clay ^{KLM}
the	Silts and Clays (Liquid limit less than	Inorganic	PI < 4 or p	olots below "A" line ^J	ML	Silt ^{KLM}
Fine-grained Soils 50% or more passes the No. 200 sieve)	50)	Organic		nit – oven dried nit – not dried <0.75	OL	Organic clay KLMN Organic silt KLMO
grail mor . 200		Inorganic	PI plots o	n or above "A" line	CH	Fat clay ^{KLM}
ine-g % or n No.:	Silts and Clays (Liquid limit 50 or	Inorganic	PI plots b	elow "A" line	MH	Elastic silt ^{K L M}
(50)	more)			nit – oven dried nit – not dried <0.75	ОН	Organic clay KLMP Organic silt KLMQ
Hig	Highly Organic Soils Primarily organ			, dark in color, and organic odor	PT	Peat

- A. Based on the material passing the 3-inch (75-mm) sieve.
- B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
- C. Gravels with 5 to 12% fines require dual symbols:

GW-GM well-graded gravel with silt

GW-GC well-graded gravel with clay

GP-GM poorly graded gravel with silt

GP-GC poorly graded gravel with clay

- D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
- E. If soil contains ≥ 15% sand, add "with sand" to group name.
- F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
- G. If fines are organic, add "with organic fines" to group name.
- H. Sands with 5 to 12% fines require dual symbols:

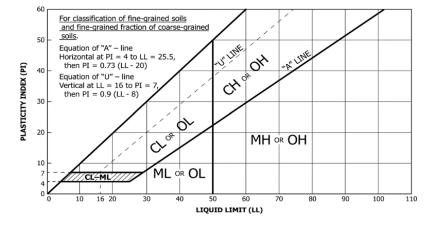
SW-SM well-graded sand with silt

SW-SC well-graded sand with clay

SP-SM poorly graded sand with silt

SP-SC poorly graded sand with clay

- If soil contains ≥ 15% gravel, add "with gravel" to group name.
- J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
- K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
- L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
- M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
- N. $PI \ge 4$ and plots on or above "A" line.
- O. PI < 4 or plots below "A" line.
- P. PI plots on or above "A" line.
- Q. PI plots below "A" line.



Laboratory Tests

DD Dry density, pcf Pocket penetrometer strength, tsf q_p WD Wet density, pcf Unconfined compression test, tsf \mathbf{q}_{υ} P200 % Passing #200 sieve Liquid limit MC Moisture content, % PL Plastic limit OC Organic content, % ы Plasticity index

Boulders	over 12"
Cobbles	. 3" to 12"
Gravel	
Coarse	3/4" to 3" (19.00 mm to 75.00 mm)
Fine	No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand	
Coarse	. No. 10 to No. 4 (2.00 mm to 4.75 mm)
Medium	. No. 40 to No. 10 (0.425 mm to 2.00 mm)
Fine	. No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt	. No. 200 (0.075 mm) to .005 mm
Clav	< 00E mm

Particle Size Identification

	Relative	$Proportions^{L,M}$
trace	0 to	5%
little	6 to	14%
with	> 15	%

Inclusion Thicknesses 0 to 1/8"

IEIIS	0 10 1/6
seam	1/8" to 1"
layer	over 1"

Apparent Relative Density of Cohesionless Soils

very loose	0 to 4 BPF
Loose	5 to 10 BPF
Medium dense	11 to 30 BPF
Dense	31 to 50 BPF
Very dense	over 50 BPF

Consistency of	Blows	Approximate Unconfined
Cohesive Soils	Per Foot	Compressive Strength
Very soft	. 0 to 1 BPF	< 0.25 tsf
Soft	. 2 to 4 BPF	0.25 to 0.5 tsf
Medium	. 5 to 8 BPF	0.5 to 1 tsf
Stiff	. 9 to 15 BPF	1 to 2 tsf
Very Stiff	. 16 to 30 BPF.	2 to 4 tsf
Hard	. over 30 BPF	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.

Moist: Damp but no visible water.

Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (\square), at the end of drilling (\square), or at some time after drilling (\square).

Sample Symbols

Standard Penetration Test

Modified California (MC)

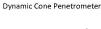


Thinwall (TW)/Shelby Tube (SH)

Texas Cone Penetrometer



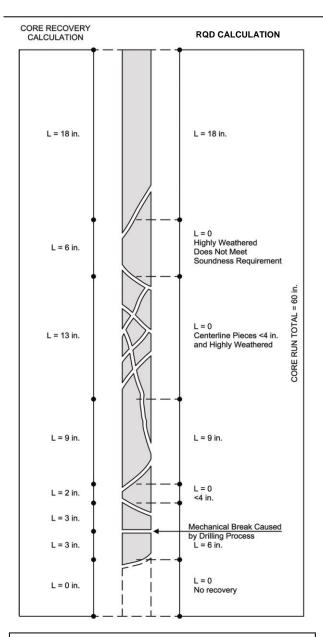
Grab Sample





Descriptive Terminology of Rock

Based on U.S. Army Corps of Engineers EM 1110-1-2908



Example Calculations

Core Recovery, CR = <u>Total length of rock recovered</u>
Total core run length

Example: CR = (18 + 6 + 13 + 9 + 2 + 3 + 3)(60)

CR = 90%

RQD = Sum of sound pieces 4 inches or larger
Total core run length

RQD Percent	Rock Quality
< 25	very poor
25 < 50	poor
50 < 75	fair
75 < 90	good
90 < 100	excellent

Example: RQD = (18 + 9 + 6)

RQD = 55%

Weathering

Unweathered: No evidence of chemical or mechanical alteration.

Slightly weathered: Slight discoloration on surface, slight alteration along discontinuities, less than 10% of rock volume altered.

Moderately Weathered: Discoloration evident, surface pitted and altered with alteration penetrating well below rock surfaces, weathering halos evident, 10% to 50% of the rock altered.

Highly Weathered: Entire mass discolored, alteration pervading nearly all of the rock, with some pockets of slightly weathered rock noticeable, some mineral leached away.

Decomposed: Rock reduced to a soil consistency with relict rock texture, generally molded and crumbled by hand.

Hardness

Very soft: Can be deformed by hand

Soft: Can be scratched with a fingernail Moderately hard: Can be scratched easily with a knife

Hard: Can be scratched with difficulty with a knife

Very hard: Cannot be scratched with a knife

Texture

Sedimentary Rocks: Grain Size
Coarse grained 2 – 5 mm
Medium grained 0.4 – 2 mm
Fine grained 0.1 – 0.4 mm
Very fine grained < 0.1 mm

Igneous and Metamorphic Rocks:

Thickness of Bedding

Massive: 3 ft. thick or greater
Thick bedded: 1 to 3 ft. thick
Medium bedded: 4 in. to 1 ft. thick
Thin bedded: 4 in. thick or less

Degree of Fracturing (Jointing)

Unfractured: Fracture spacing 6 ft. of more Slightly fractured: Fracture spacing 2 to 6 ft.

Moderately fractured: Fracture spacing 8 in. to 2 ft.

Highly fractured: Fracture spacing 2 in. to 8 in.

Intensely fractured: Fracture spacing 2 in. or less



Various ASTM

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056 B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Metafield ID: 310567

Completed Date: 05/29/2020 Prepared By: Streier, Jim

Laboratory Results Summary MC Wash Organic Dry Density Q_u (tsf) **Boring** Sample Depth LL PL Resistivity **Specific** Content (ohm-cm) **Gravity** (ft) (%) Loss (%) % (pcf) 42-1-C-5-6 9.5 6.3 42-1-C-9-10 25.0 18.1 1 42-1-C-11-12 35.0 10.8 1 42-1-C-60.0 19.3 NP 104.8 1 42-1-C-19-20 75.0 11.4 1 42-1-C-23-24 95.0 11.1 1 42-1-C-28-29 120.0 9.8 1 42-1-C-33-34 145.0 14.5 1 42-1-C-41-42 185.0 16.5

General



Various ASTM

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056 B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Metafield ID: 320970 Sampled By: Drill Crew

Sample Date: 06/23/2020

Received Date: 07/09/2020 Lab: 11001 Hampshire Ave S, Bloomington, MN

Completed Date: 07/10/2020 Tested By: Streier, Jim

Laboratory Results Summary

Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q _u (tsf)	Specific Gravity
45-2-C		75.0	8.8		19	14	5					
45-2-C		95.0	12.2		24	14	10					
2-C-2		20.0	21.6		23	19	4		106.1			
2-C-2		40.0	26.4		42	16	26		99.3			
13-C-2		12.5	22.7		55	18	37					
13-C-2		30.0	29.9		50	18	32		93.8			
13-C-2		40.0	32.5		52	17	35		91.0			
20-C-1		30.0	21.6		29	16	13					
84-C-2		15.0	19.0		37	14	23					
84-C-2		35.0	20.2		30	15	15					
28-WB- 1		15.0	40.8		74	21	53		81.3			
28-WB- 1		35.0	54.4		65	21	44		69.6			
22-C		12.5	50.7		56	18	38		71.0			
22-C		45.0	26.1		34	14	20					
43-1-C- 1		55.0	12.2		21	16	5		126.7			
17-C		15.0	42.8						78.9			
19-C		12.5	40.6						81.2			

General

Sillin



Various ASTM

4511 West First Street Suite 4 Duluth MN 55807

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

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Sample Information

Metafield ID: 395886

Completed Date: 08/11/2021 Prepared By: Streier, Jim

	Laboratory Results Summary											
Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q _u (tsf)	Specific Gravity
SC-1	3	15.0	7.6									
SC-1	7	35.0	14.8									
SC-1	11	55.0	20.7		25	18	7					
SC-1	16	80.0	10.9									
SC-1	20	100.0	10.6									
SC-2	3	10.0	9.7									
SC-2	6	25.0	39.1		47	20	27					
SC-2	TW	30.0	43.1		50	19	31					
SC-2	9	40.0	7.3									

General

Results: The test is for informational purposes.



Various ASTM

4511 West First Street Suite 4 Duluth MN 55807

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

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Sample Information

Metafield ID: 398014

Completed Date: 08/19/2021 Prepared By: Streier, Jim

	Laboratory Results Summary											
Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q _u (tsf)	Specific Gravity
SC-3	3	15.0	2.5	4.2								
SC-3	9	45.0	18.9	27								
SC-3	14	70.0	12.2		23	15	8					
SC-3	19	90.0	12.3	55								
SC-4	14	15.0	18.8	85								
SC-4	19	40.0	17.8	5.8								
SC-4	23	60.0	22.5									
SC-4	27	80.0	11.3	33								

General

Results: The test is for informational purposes.



Sieve Analysis Of Soil

ASTM D6913

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 310584 Depth (ft): 9.5-12 **Boring Number:** 42-1-C-1 Sampled By: **Drill Crew**

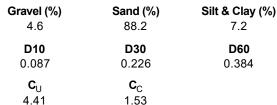
Sample Date: 05/18/2020

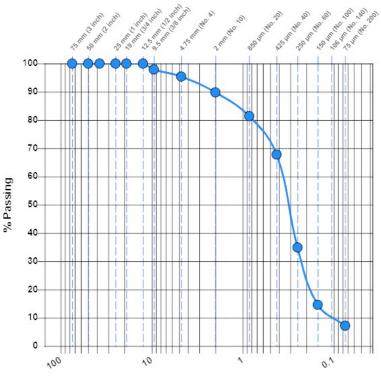
Received Date: Lab: 05/26/2020 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 05/26/2020 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
12.5 mm (1/2 inch)	100.0	
9.5 mm (3/8 inch)	97.9	
4.75 mm (No. 4)	95.4	
2 mm (No. 10)	89.8	
850 µm (No. 20)	81.4	
425 μm (No. 40)	67.8	
250 μm (No. 60)	34.9	
150 μm (No. 100)	14.6	
75 μm (No. 200)	7.2	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt

General

Results: The test is for informational purposes.



Sieve Analysis Of Soil

ASTM D6913

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

B2001991

Sample Information

Sample Number: 310585 Depth (ft): 25-30 **Boring Number:** 42-1-C-1 Sampled By: **Drill Crew**

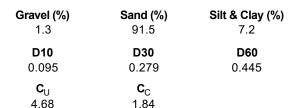
Sample Date: 05/18/2020

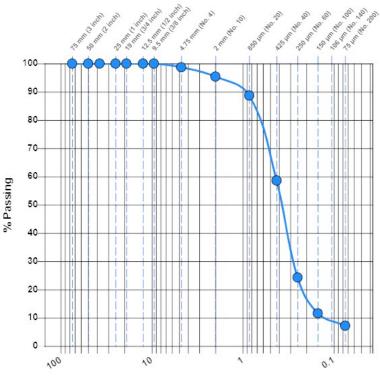
Received Date: Lab: 11001 Hampshire Ave S, Bloomington, MN 05/26/2020

Tested Date: 05/26/2020 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
9.5 mm (3/8 inch)	100.0	
4.75 mm (No. 4)	98.7	
2 mm (No. 10)	95.4	
850 µm (No. 20)	88.7	
425 µm (No. 40)	58.6	
250 µm (No. 60)	24.3	
150 µm (No. 100)	11.6	
75 µm (No. 200)	7.2	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt

General

Results: The test is for informational purposes.



Sieve Analysis Of Soil

ASTM D6913

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 310586 Depth (ft): 35-40 **Boring Number:** 42-1-C-1 Sampled By: **Drill Crew**

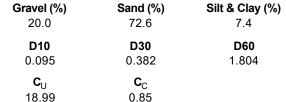
Sample Date: 05/18/2020

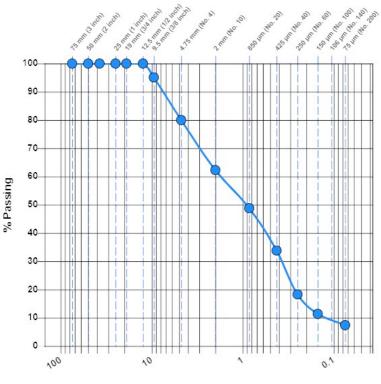
Received Date: Lab: 11001 Hampshire Ave S, Bloomington, MN 05/26/2020

Tested Date: 05/26/2020 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
12.5 mm (1/2 inch)	100.0	
9.5 mm (3/8 inch)	95.1	
4.75 mm (No. 4)	80.0	
2 mm (No. 10)	62.3	
850 µm (No. 20)	48.8	
425 μm (No. 40)	33.8	
250 µm (No. 60)	18.3	
150 µm (No. 100)	11.4	
75 μm (No. 200)	7.4	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt and gravel

General

Results: The test is for informational purposes.



Sieve Analysis Of Soil ASTM D6913

11001 Hampshire Avenue S

Client:

Project:B2001991

Minneapolis, MN 55438 Phone: 952-995-2000

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number:310587Depth (ft):75-80Boring Number:42-1-C-1Sampled By:Drill Crew

Sample Date: 05/18/2020

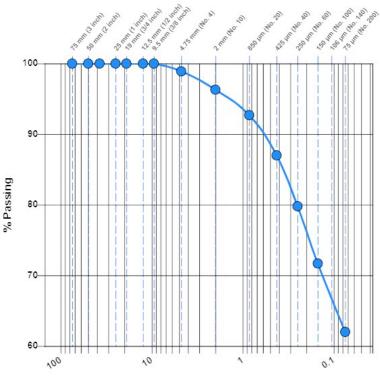
Received Date: 05/26/2020 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 05/26/2020 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
9.5 mm (3/8 inch)	100.0	
4.75 mm (No. 4)	98.9	
2 mm (No. 10)	96.3	
850 µm (No. 20)	92.7	
425 µm (No. 40)	87.0	
250 µm (No. 60)	79.8	
150 µm (No. 100)	71.7	
75 μm (No. 200)	62.0	

Gravel (%)Sand (%)
Silt & Clay (%)
36.9
62.0



Particle Size (mm)

Classification: ML Sandy silt

General

Results: The test is for informational purposes.

Stom



ASTM D6913

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

B2001991

Sample Information

Sample Number: 310588 Depth (ft): 95-100 **Boring Number:** 42-1-C-1 Sampled By: **Drill Crew**

Sample Date: 05/18/2020

Received Date: Lab: 11001 Hampshire Ave S, Bloomington, MN 05/26/2020

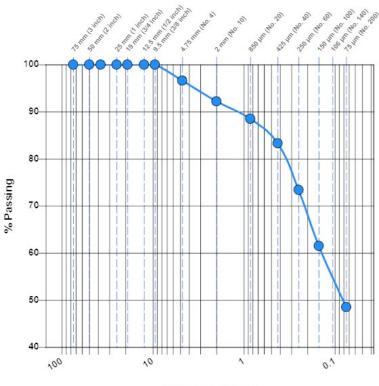
Tested Date: Streier, Jim 05/26/2020 Tested By:

Laboratory Data

Sieve Size	Passing (%)	Specification
9.5 mm (3/8 inch)	100.0	
4.75 mm (No. 4)	96.6	
2 mm (No. 10)	92.2	
850 µm (No. 20)	88.5	
425 µm (No. 40)	83.3	
250 µm (No. 60)	73.4	
150 µm (No. 100)	61.5	
75 μm (No. 200)	48.5	

Silt & Clay (%) Gravel (%) **Sand (%)** 48.5 3.4 48.1

D60 0.102



Particle Size (mm)

Classification: SM Silty sand

General



Sieve Analysis Of Soil **ASTM D6913**

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 310589 Depth (ft): 120-125 **Boring Number:** 42-1-C-1 Sampled By: **Drill Crew**

Sample Date: 05/18/2020

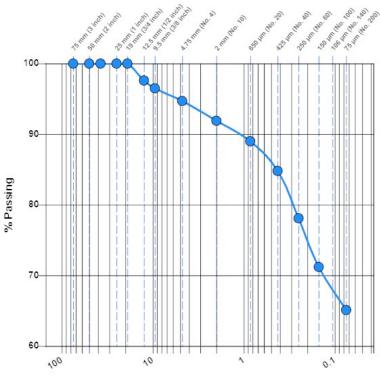
Received Date: Lab: 11001 Hampshire Ave S, Bloomington, MN 05/26/2020

Tested Date: Streier, Jim 05/26/2020 Tested By:

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	97.6	
9.5 mm (3/8 inch)	96.5	
4.75 mm (No. 4)	94.7	
2 mm (No. 10)	91.9	
850 µm (No. 20)	89.0	
425 µm (No. 40)	84.8	
250 µm (No. 60)	78.1	
150 µm (No. 100)	71.2	
75 μm (No. 200)	65.1	

Gravel (%) Sand (%) Silt & Clay (%) 5.3 29.6 65.1



Particle Size (mm)

Classification: CL Sandy lean clay

General



Sieve Analysis Of Soil **ASTM D6913**

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 310590 Depth (ft): 145-150 **Boring Number:** 42-1-C-1 Sampled By: **Drill Crew**

Sample Date: 05/18/2020

Received Date: Lab: 11001 Hampshire Ave S, Bloomington, MN 05/26/2020

Tested Date: 05/26/2020 Tested By: Streier, Jim

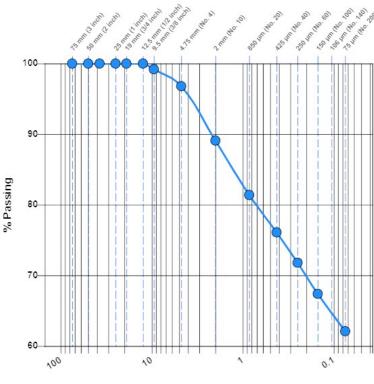
Laboratory Data

Sieve Size	Passing (%)	Specification
12.5 mm (1/2 inch)	100.0	
9.5 mm (3/8 inch)	99.2	
4.75 mm (No. 4)	96.8	
2 mm (No. 10)	89.1	
850 µm (No. 20)	81.4	
425 µm (No. 40)	76.1	
250 µm (No. 60)	71.8	
150 µm (No. 100)	67.4	
75 μm (No. 200)	62.1	

Gravel (%) 3.2

Sand (%) 34.7

Silt & Clay (%) 62.1



Particle Size (mm)

Classification: CL Sandy lean clay

General



ASTM D6913

11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 310591 Depth (ft): 185-190 **Boring Number:** 42-1-C-1 Sampled By: **Drill Crew**

Sample Date: 05/18/2020

Received Date: Lab: 11001 Hampshire Ave S, Bloomington, MN 05/26/2020

% Passing

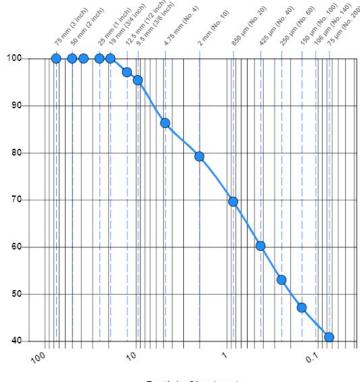
Tested Date: 05/26/2020 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	97.1	
9.5 mm (3/8 inch)	95.4	
4.75 mm (No. 4)	86.3	
2 mm (No. 10)	79.2	
850 μm (No. 20)	69.6	
425 µm (No. 40)	60.2	
250 µm (No. 60)	53.0	
150 µm (No. 100)	47.1	
75 μm (No. 200)	40.8	

Gravel (%) Sand (%) Silt & Clay (%) 40.8 13.7 45.5

D60 0.420



Particle Size (mm)

Classification: SC Clayey sand

General



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056 Enbridge Li

Sampled By:

Enbridge Line 5 near Mellen, WI

Enbridge Line 5 Re-route

B2001991

Drill Crew

Sample Information

Sample Number: 318263 **Alternate ID:** 43-1-C-1 4 7.5'

Sampling Method:Auger Boring ASTM D1452Depth (ft):7.5

Boring Number: 43-1-C-1 Location: In-place

Location Details: Boring 43-1-C-1 4 7.5

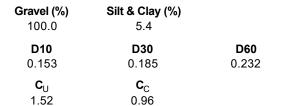
Sample Date: 05/27/2020

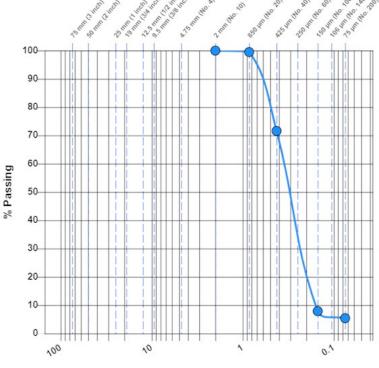
Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
2 mm (No. 10)	100.0	
850 µm (No. 20)	99.5	
425 μm (No. 40)	71.6	
150 µm (No. 100)	7.9	
75 μm (No. 200)	5.4	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt

Specimen Obtained: Oven Dry Test Method: Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes.

Silm



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Sampled By:

Drill Crew

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318264 **Alternate ID:** 43-1-C-1 7 15'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 15

Boring Number: 43-1-C-1 **Location:** In-place

Location Details: Boring 43-1-C-1 7 15'

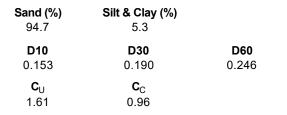
Sample Date: 05/27/2020

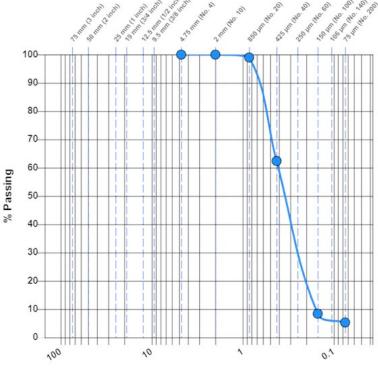
Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
4.75 mm (No. 4)	100.0	
2 mm (No. 10)	100.0	
850 µm (No. 20)	99.0	
425 μm (No. 40)	62.4	
150 µm (No. 100)	8.4	
75 μm (No. 200)	5.3	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt

Specimen Obtained: Oven Dry Test Method: Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. **Remarks:** Total dry weight of sample 191.6 grams

Ilm



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Sampled By:

Drill Crew

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318265 Alternate ID: 43-1-C-1 9 35'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 35

Boring Number: 43-1-C-1 Location: In-place

Location Details: Boring 43-1-C-1 9 35'

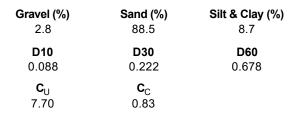
Sample Date: 05/27/2020

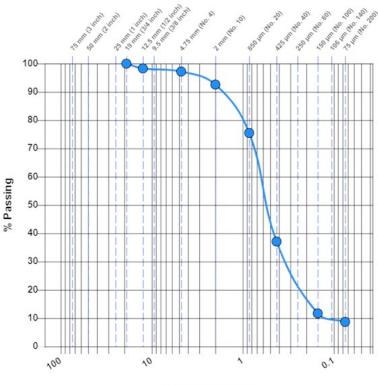
Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	98.3	
4.75 mm (No. 4)	97.2	
2 mm (No. 10)	92.6	
850 µm (No. 20)	75.5	
425 μm (No. 40)	37.1	
150 µm (No. 100)	11.7	
75 μm (No. 200)	8.7	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 290.9 grams



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4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Sampled By:

Drill Crew

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318266 Alternate ID: 43-1-C-1 11 45'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 45

Boring Number: 43-1-C-1 Location: In-place

Location Details: Boring 43-1-C-1 11 45'

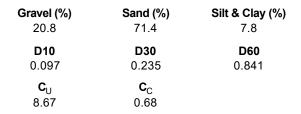
Sample Date: 05/27/2020

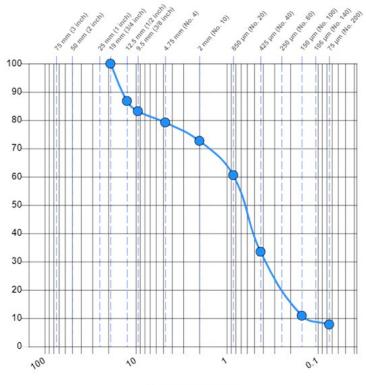
Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
12.5 mm (1/2 inch)	86.8	
9.5 mm (3/8 inch)	83.2	
4.75 mm (No. 4)	79.2	
2 mm (No. 10)	72.7	
850 µm (No. 20)	60.6	
425 μm (No. 40)	33.5	
150 µm (No. 100)	10.9	
75 μm (No. 200)	7.8	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt and gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

% Passing

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 252.3 grams



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4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

Enbridge Line 5 near Mellen, WI

Enbridge Line 5 Re-route

B2001991

Drill Crew

Sample Information

Sample Number: 318269 Alternate ID: 43-1-C-1 15 65'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 65

Boring Number: 43-1-C-1 Sampled By:

Location: In-place

Location Details: Boring 43-1-C-1 15 65'

Sample Date: 05/28/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/26/2020 Tested By: Nelson, Brennan

Laboratory Data

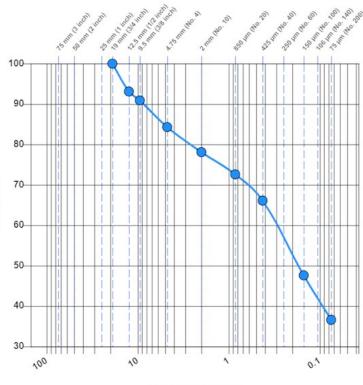
Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	93.1	
9.5 mm (3/8 inch)	90.9	
4.75 mm (No. 4)	84.3	
2 mm (No. 10)	78.1	
850 µm (No. 20)	72.6	
425 µm (No. 40)	66.1	
150 µm (No. 100)	47.6	
75 μm (No. 200)	36.6	

Gravel (%) 15.7

Sand (%) 47.7

Silt & Clay (%) 36.6

D60 0.217



Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt and gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

% Passing

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 228.7



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Sampled By:

Drill Crew

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318270 Alternate ID: 43-1-C-1 17 75'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 75

Boring Number: 43-1-C-1 Location: In-place

Location Details: Boring 43-1-C-1 17 75'

Sample Date: 05/28/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested By: **Tested Date:** 06/29/2020 Nelson, Brennan

Laboratory Data

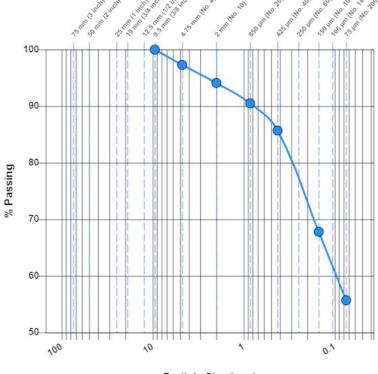
Sieve Size	Passing (%)	Specification
4.75 mm (No. 4)	97.3	
2 mm (No. 10)	94.1	
850 µm (No. 20)	90.5	
425 µm (No. 40)	85.7	
150 µm (No. 100)	67.8	
75 μm (No. 200)	55.7	

Gravel (%) 2.7

Sand (%) 41.6

Silt & Clay (%) 55.7

D60 0.086



Particle Size (mm)

Classification: ML Sandy silt

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 246.6 grams



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4511 West First Street Suite 4

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Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

B2001991

Sample Information

Sample Number: 318272 Alternate ID: 43-1-C-1 19 85'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 85

Boring Number: 43-1-C-1 Sampled By: **Drill Crew**

Location: In-place

Location Details: Boring 43-1-C-1 19 85'

Sample Date: 06/02/2020

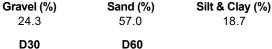
Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

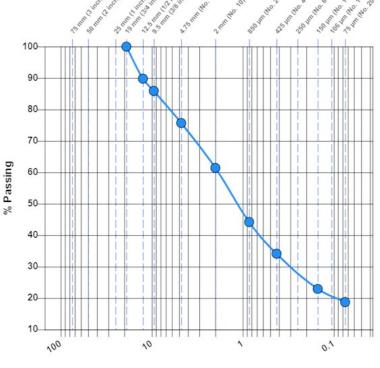
18.7

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	89.8	
9.5 mm (3/8 inch)	85.9	
4.75 mm (No. 4)	75.7	
2 mm (No. 10)	61.4	
850 µm (No. 20)	44.2	
425 µm (No. 40)	34.1	
150 µm (No. 100)	22.9	
75 μm (No. 200)	18.7	



0.213 1.906



Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt and gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 327.3 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Sampled By:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 near Mellen, WI

Enbridge Line 5 Re-route

B2001991

Drill Crew

Sample Information

Sample Number: 318749 Alternate ID: 44-1-C-1 4 7.5'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 7.5

Boring Number: 44-1-C-1 Location: In-place

Boring 44-1-C-1 Sample 4 7.5' **Location Details:**

Sample Date: 05/07/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

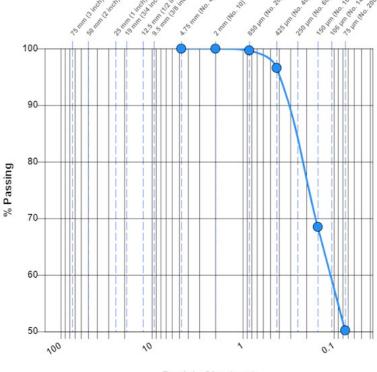
Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
4.75 mm (No. 4)	100.0	
2 mm (No. 10)	100.0	
850 µm (No. 20)	99.7	
425 µm (No. 40)	96.6	
150 µm (No. 100)	68.5	
75 μm (No. 200)	50.2	

Sand (%) Silt & Clay (%) 49.8 50.2

D60 0.115



Particle Size (mm)

Classification: ML Sandy silt

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 283.5 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Sampled By:

Drill Crew

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318751 Alternate ID: 44-1-C-1 9 20'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 20

Boring Number: 44-1-C-1 Location: In-place

Location Details: Boring 44-1-C-1 Sample 9 20'

Sample Date: 05/07/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

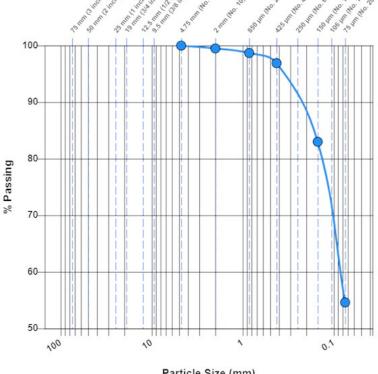
Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
4.75 mm (No. 4)	100.0	
2 mm (No. 10)	99.5	
850 µm (No. 20)	98.7	
425 µm (No. 40)	96.9	
150 µm (No. 100)	83.0	
75 μm (No. 200)	54.6	

Sand (%) Silt & Clay (%) 45.4 54.6

D60 0.081



Particle Size (mm)

Classification: ML Sandy silt

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 257.5 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

Enbridge Line 5 near Mellen, WI

Enbridge Line 5 Re-route

B2001991

Sample Information

Sample Number: 318752 Alternate ID: 44-1-C-1 12 35'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 35

Boring Number: 44-1-C-1 Sampled By: **Drill Crew**

Location: In-place

Location Details: Boring 44-1-C-1 Sample 12 35'

Sample Date: 05/07/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

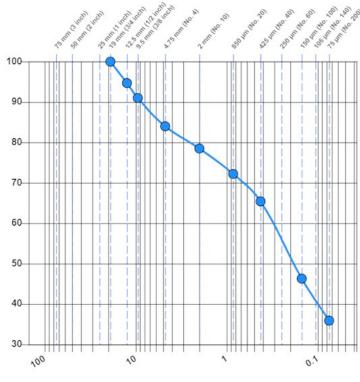
Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	94.7	
9.5 mm (3/8 inch)	91.0	
4.75 mm (No. 4)	84.0	
2 mm (No. 10)	78.5	
850 µm (No. 20)	72.2	
425 µm (No. 40)	65.4	
150 µm (No. 100)	46.3	
75 μm (No. 200)	35.9	

Silt & Clay (%) Gravel (%) Sand (%) 16.0 48.1 35.9

D60 0.347



Particle Size (mm)

Classification: SM Silty sand with gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

% Passing

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 172.4 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Sampled By:

Drill Crew

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318753 Alternate ID: 44-1-C-1 13 40'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 40

Boring Number: 44-1-C-1

Location: In-place

Boring 44-1-C-1 Sample 13 40' **Location Details:**

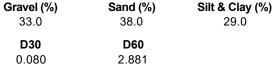
Sample Date: 05/11/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

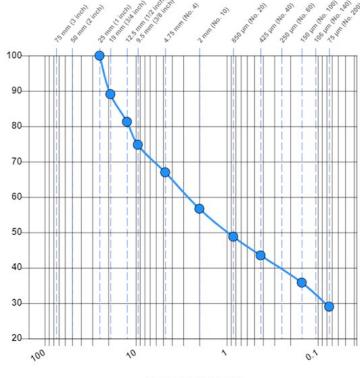
Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
25 mm (1 inch)	100.0	
19 mm (3/4 inch)	89.1	
12.5 mm (1/2 inch)	81.3	
9.5 mm (3/8 inch)	74.8	
4.75 mm (No. 4)	67.0	
2 mm (No. 10)	56.7	
850 µm (No. 20)	48.8	
425 µm (No. 40)	43.5	
150 µm (No. 100)	35.8	
75 μm (No. 200)	29.0	



29.0



Particle Size (mm)

Classification: SM Silty sand with gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

% Passing

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 228.0 grams



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4511 West First Street Suite 4

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Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318754 Alternate ID: 44-1-C-1 15 50'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 50 Sampled By: **Drill Crew**

Boring Number: 44-1-C-1

In-place Location:

Location Details: Boring 44-1-C-1 Sample 15 50'

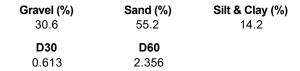
Sample Date: 05/11/2020

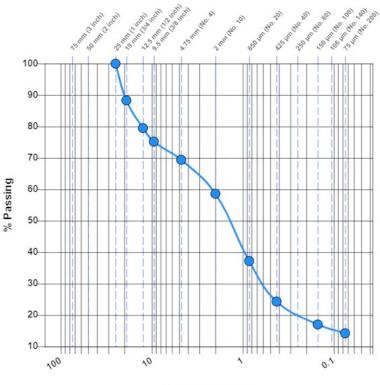
Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
25 mm (1 inch)	100.0	
19 mm (3/4 inch)	88.3	
12.5 mm (1/2 inch)	79.5	
9.5 mm (3/8 inch)	75.2	
4.75 mm (No. 4)	69.4	
2 mm (No. 10)	58.6	
850 µm (No. 20)	37.2	
425 µm (No. 40)	24.3	
150 µm (No. 100)	17.0	
75 μm (No. 200)	14.2	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt and gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 211.6 grams



ASTM D6913

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Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318756 Alternate ID: 44-1-C-1 16 55'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 55 44-1-C-1 Sampled By: **Drill Crew**

Boring Number: Location: In-place

Boring 44-1-C-1 Sample 16 55' **Location Details:**

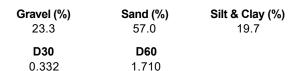
Sample Date: 05/12/2020

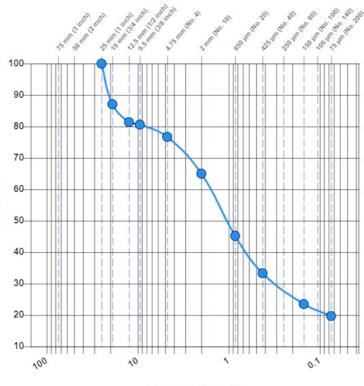
Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
25 mm (1 inch)	100.0	
19 mm (3/4 inch)	87.1	
12.5 mm (1/2 inch)	81.4	
9.5 mm (3/8 inch)	80.6	
4.75 mm (No. 4)	76.7	
2 mm (No. 10)	65.0	
850 µm (No. 20)	45.2	
425 μm (No. 40)	33.3	
150 µm (No. 100)	23.5	
75 µm (No. 200)	19.7	





Particle Size (mm)

Classification: SM Silty sand with gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

% Passing

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 259.5 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5

B2001991

near Mellen, WI

Enbridge Line 5 Re-route

Sample Information

Sample Number: 318758 Alternate ID: 45-2-C 6 12.5'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 12.5 **Boring Number:** 45-2-C Sampled By: **Drill Crew**

Location: In-place

Boring 45-2-C Sample 6 12.5' **Location Details:**

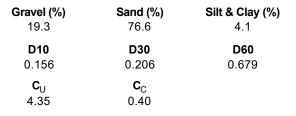
Sample Date: 04/23/2020

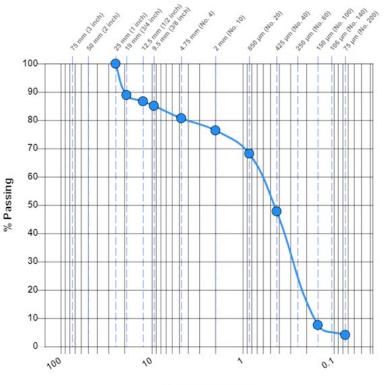
Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
25 mm (1 inch)	100.0	
19 mm (3/4 inch)	88.9	
12.5 mm (1/2 inch)	86.7	
9.5 mm (3/8 inch)	85.1	
4.75 mm (No. 4)	80.7	
2 mm (No. 10)	76.4	
850 µm (No. 20)	68.2	
425 μm (No. 40)	47.8	
150 μm (No. 100)	7.6	
75 µm (No. 200)	4.1	





Particle Size (mm)

Classification: SP Poorly graded sand with gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 329.0 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318760 Alternate ID: 45-2-C 12 35'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 35

Boring Number: 45-2-C Sampled By: **Drill Crew**

Location: In-place

Location Details: Boring 45-2-C Sample 12 35'

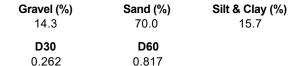
Sample Date: 04/24/2020

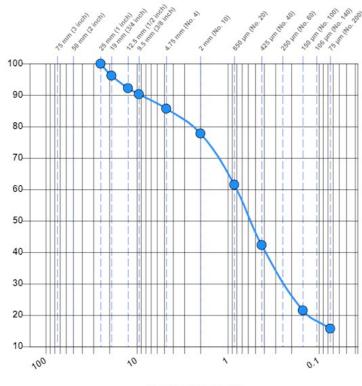
Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
25 mm (1 inch)	100.0	
19 mm (3/4 inch)	96.2	
12.5 mm (1/2 inch)	92.2	
9.5 mm (3/8 inch)	90.3	
4.75 mm (No. 4)	85.7	
2 mm (No. 10)	77.8	
850 µm (No. 20)	61.5	
425 μm (No. 40)	42.3	
150 µm (No. 100)	21.5	
75 µm (No. 200)	15.7	





Particle Size (mm)

Classification: SM Silty sand

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

% Passing

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 294.9 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 near Mellen, WI

Enbridge Line 5 Re-route

B2001991

Sample Information

Sample Number: 318762 Alternate ID: 45-2-C 14 45'

Sampling Method: Auger Boring ASTM D1452 Depth (ft): 45

Boring Number: 45-2-C Sampled By: **Drill Crew**

Location: In-place

Boring 45-2-C Sample 14 45' **Location Details:**

Sample Date: 04/24/2020

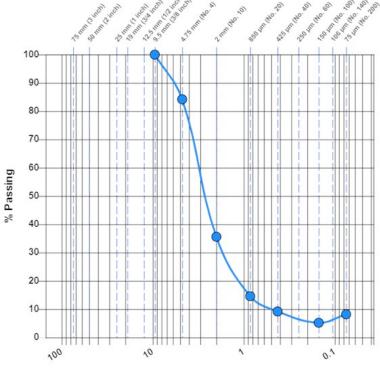
Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data

Sieve Size	Passing (%)	Specification
9.5 mm (3/8 inch)	100.0	
4.75 mm (No. 4)	84.2	
2 mm (No. 10)	35.6	
850 µm (No. 20)	14.6	
425 μm (No. 40)	9.2	
150 µm (No. 100)	5.2	
75 µm (No. 200)	4.2	

Gravel (%)	Sand (%)	Silt & Clay (%)
15.8	80.0	4.2
D10	D30	D60
0.488	1.693	3.381
$\mathbf{c}_{\scriptscriptstyleU}$	\mathbf{c}_{c}	
6.93	1.74	



Particle Size (mm)

Classification: SP Poorly graded sand with gravel

Specimen Obtained: Oven Dry **Test Method:** Method A (Composite Sieving)

Dispersion Apparatus: Shaking

General

Results: The test is for informational purposes. Remarks: Total dry weight of sample 220.8 grams



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

395887 Depth (ft): 15 Sample Number: SC-1 Sampled By: **Drill Crew Boring Number:**

Sample Date: 07/27/2021

Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

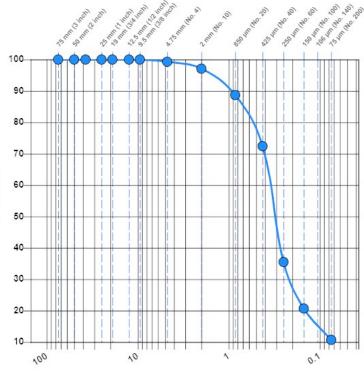
% Passing

Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
9.5 mm (3/8 inch)	100.0	
4.75 mm (No. 4)	99.3	
2 mm (No. 10)	97.1	
850 μm (No. 20)	88.7	
425 µm (No. 40)	72.4	
250 μm (No. 60)	35.5	
150 µm (No. 100)	20.7	
75 µm (No. 200)	10.7	

Gravel (%) **Sand (%)** Silt & Clay (%) 0.7 88.6 10.7 D30 **D60** 0.213 0.366



Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt

General



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC

130 West Superior Street Suite 500 Duluth, MN 55802

B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

395888 Depth (ft): 35 Sample Number: SC-1 Sampled By: **Boring Number: Drill Crew**

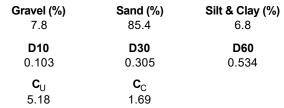
Sample Date: 07/27/2021

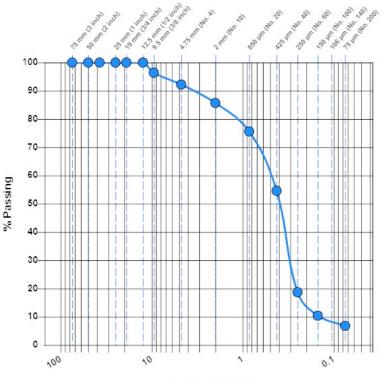
Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
12.5 mm (1/2 inch)	100.0	
9.5 mm (3/8 inch)	96.4	
4.75 mm (No. 4)	92.2	
2 mm (No. 10)	85.7	
850 µm (No. 20)	75.6	
425 µm (No. 40)	54.6	
250 µm (No. 60)	18.7	
150 µm (No. 100)	10.4	
75 μm (No. 200)	6.8	





Particle Size (mm)

Classification: SP-SM Poorly graded sand with silt

General



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

80 395890 Depth (ft): Sample Number: SC-1 Sampled By: **Drill Crew Boring Number:**

Sample Date: 07/27/2021

Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

% Passing

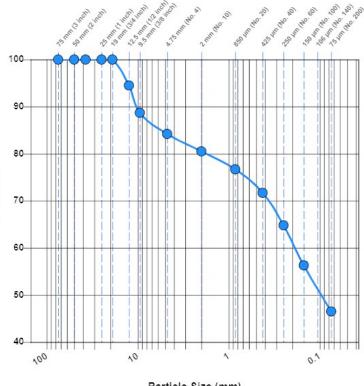
Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	94.5	
9.5 mm (3/8 inch)	88.7	
4.75 mm (No. 4)	84.2	
2 mm (No. 10)	80.5	
850 µm (No. 20)	76.7	
425 μm (No. 40)	71.7	
250 μm (No. 60)	64.8	
150 µm (No. 100)	56.3	
75 μm (No. 200)	46.5	

Silt & Clay (%) Gravel (%) Sand (%) 15.8 37.7 46.5

D60 0.194



Particle Size (mm)

Classification: SC Clayey sand with gravel

General



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

100 395891 Depth (ft): Sample Number: SC-1 Sampled By: **Drill Crew Boring Number:**

Sample Date: 07/27/2021

Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

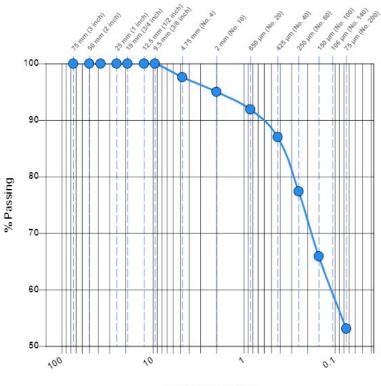
Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
9.5 mm (3/8 inch)	100.0	
4.75 mm (No. 4)	97.6	
2 mm (No. 10)	95.0	
850 μm (No. 20)	91.9	
425 μm (No. 40)	87.0	
250 μm (No. 60)	77.4	
150 µm (No. 100)	65.9	
75 µm (No. 200)	53.1	

Sand (%) Silt & Clay (%) Gravel (%) 2.4 53.1 44.5

D60 0.092



Particle Size (mm)

Classification: CL Sandy lean clay

General



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC

130 West Superior Street Suite 500 Duluth, MN 55802

B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

10 395892 Depth (ft): Sample Number: SC-2 Sampled By: **Drill Crew Boring Number:**

Sample Date: 07/27/2021

Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

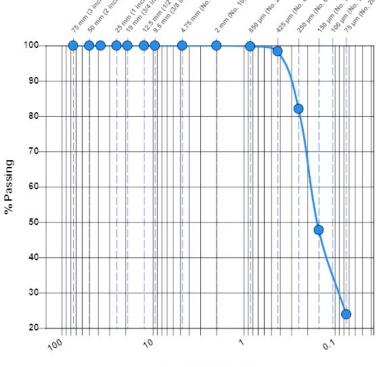
Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
2 mm (No. 10)	100.0	
850 µm (No. 20)	99.8	
425 µm (No. 40)	98.4	
250 µm (No. 60)	82.1	
150 µm (No. 100)	47.8	
75 μm (No. 200)	23.9	

Sand (%) Silt & Clay (%) 76.1 23.9

D30 **D60** 0.083 0.186



Particle Size (mm)

Classification: SM Silty sand

General



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

40 395893 Depth (ft): Sample Number: SC-2 Sampled By: **Drill Crew Boring Number:**

Sample Date: 07/27/2021

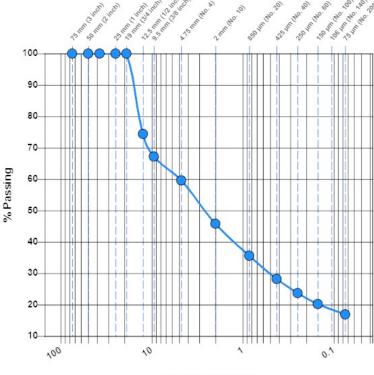
Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve Size	Passing (%)	Specification
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	74.4	
9.5 mm (3/8 inch)	67.2	
4.75 mm (No. 4)	59.6	
2 mm (No. 10)	45.8	
850 µm (No. 20)	35.6	
425 µm (No. 40)	28.2	
250 μm (No. 60)	23.7	
150 µm (No. 100)	20.2	
75 μm (No. 200)	16.9	

Silt & Clay (%) Gravel (%) Sand (%) 40.4 42.7 16.9 D30 **D60** 0.528 5.000



Particle Size (mm)

Classification: SC Clayey sand with gravel

General



ASTM D6913

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

60 398015 Depth (ft): Sample Number: SC-4 Sampled By: **Boring Number: Drill Crew**

Sample Date: 08/11/2021

Received Date: 08/19/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 08/19/2021 Tested By: Streier, Jim

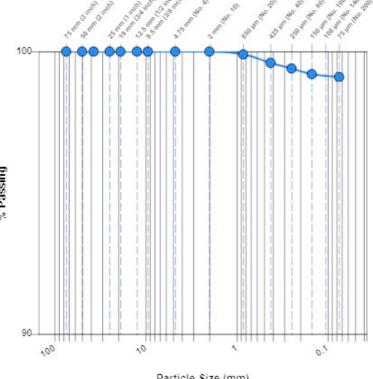
Laboratory Data

Sieve Size	Passing (%)	Specification
75 mm (3 inch)	100.0	
50 mm (2 inch)	100.0	
37.5 mm (1.5 inch)	100.0	
25 mm (1 inch)	100.0	
19 mm (3/4 inch)	100.0	
12.5 mm (1/2 inch)	100.0	
9.5 mm (3/8 inch)	100.0	
4.75 mm (No. 4)	100.0	
2 mm (No. 10)	100.0	
850 μm (No. 20)	99.9	
425 μm (No. 40)	99.6	
250 μm (No. 60)	99.4	
150 µm (No. 100)	99.2	
75 µm (No. 200)	99.1	



 \mathbf{C}_{C} \mathbf{C}_{U}

Classification: ML Silt



Particle Size (mm)

General

Results: The test is for informational purposes.

Remarks:



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318263 **Alternate ID:** 43-1-C-1 4 7.5'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 43-1-C-1 4 7.5

Sample Date: 05/27/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
43-1-C-1 4 7.5 7.0				

General

Results: The test is for informational purposes.

Il m



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

B2001991

Sample Information

Sample Number: 318264 **Alternate ID:** 43-1-C-1 7 15'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 43-1-C-1 7 15'

Sample Date: 05/27/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
43-1-C-1 7 15.0 22.3				

General

Results: The test is for informational purposes.

Il m



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967

Location:

Results:

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318265 Alternate ID: 43-1-C-1 9 35' Sampled By: Drill Crew

Sampling Method: Auger Boring ASTM D1452

In-place

Location Details: Boring 43-1-C-1 9 35'

Sample Date: 05/27/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
43-1-C-1 9 35.0 13.5				

General



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318266 **Alternate ID:** 43-1-C-1 11 45'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 43-1-C-1 11 45'

Sample Date: 05/27/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
43-1-C-1 11 45.0 17.7				

General

Results: The test is for informational purposes.

Ilm



ASTM D2216

4511 West First Street Suite 4 Duluth MN 55807

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318269 **Alternate ID:** 43-1-C-1 15 65'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 43-1-C-1 15 65'

Sample Date: 05/28/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/26/2020 Tested By: Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
43-1-C-1 15 65.0 14.0				

General

Results: The test is for informational purposes.

Ilm



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Enbridge Line 5 Re-route Houston, TX 77056

Enbridge Line 5 near Mellen, WI

B2001991

Sample Information

Sample Number: 318270 Alternate ID: 43-1-C-1 17 75'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 43-1-C-1 17 75'

Sample Date: 05/28/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
43-1-C-1 17 75.0 11.2				

General



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

B2001991

Sample Information

Sample Number: 318272 **Alternate ID:** 43-1-C-1 19 85'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 43-1-C-1 19 85'

Sample Date: 06/02/2020

Received Date: 06/25/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
43-1-C-1 19 85.0 12.0				

General

Results: The test is for informational purposes.

Ilm



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967

Results:

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318749 **Alternate ID:** 44-1-C-1 4 7.5'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 44-1-C-1 Sample 4 7.5'

Sample Date: 05/07/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 **Tested By:** Nelson, Brennan

Laboratory Data			
Boring #	Sample #	Depth (ft)	Moisture Content (%)
44-1-C-1	4	7.5	17.5

General

The test is for informational purposes.

Ilm



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318751 **Alternate ID:** 44-1-C-1 9 20'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 44-1-C-1 Sample 9 20'

Sample Date: 05/07/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/29/2020 Tested By: Nelson, Brennan

Laboratory Data			
Boring # Sample # Depth (ft) Moisture Content (%)			
44-1-C-1 9 20.0 20.6			

General

Results: The test is for informational purposes.



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318752 **Alternate ID:** 44-1-C-1 12 35'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 44-1-C-1 Sample 12 35'

Sample Date: 05/07/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data			
Boring # Sample # Depth (ft) Moisture Content (%)			
44-1-C-1 12 35.0 11.7			

General

Results: The test was not able to be completed.



ASTM D2216

4511 West First Street Suite 4 Duluth MN 55807

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318753 **Alternate ID:** 44-1-C-1 13 40'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 44-1-C-1 Sample 13 40'

Sample Date: 05/11/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 **Tested By:** Nelson, Brennan

Laboratory Data				
Boring # Depth (ft) Moisture Content (%)				
44-1-C-1 13 40.0 12.3				

General

Results: The test is for informational purposes.

Il m



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967

Results:

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318754 **Alternate ID:** 44-1-C-1 15 50'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 44-1-C-1 Sample 15 50'

Sample Date: 05/11/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 **Tested By:** Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
44-1-C-1 15 50.0 12.2				

General

The test is for informational purposes.



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318756 **Alternate ID:** 44-1-C-1 16 55'

Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 44-1-C-1 Sample 16 55'

Sample Date: 05/12/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 **Tested By:** Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
44-1-C-1 16 55.0 13.1				

General

Results: The test is for informational purposes.

Il m



ASTM D2216

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967

Results:

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318758 Alternate ID: 45-2-C 6 12.5' Sampled By: Drill Crew

Sampling Method: Auger Boring ASTM D1452

Location: In-place

Location Details: Boring 45-2-C Sample 6 12.5'

Sample Date: 04/23/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 Tested By: Nelson, Brennan

Laboratory Data			
Boring # Sample # Depth (ft) Moisture Content (%)			
45-2-C 6 12.5 2.1			

General

The test is for informational purposes.



ASTM D2216

4511 West First Street Suite 4 Duluth MN 55807

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct

Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 318760 Alternate ID: 45-2-C 12 35'
Sampling Method: Auger Boring ASTM D1452 Sampled By: Drill Crew

Location: In-place

Location Details: Boring 45-2-C Sample 12 35'

Sample Date: 04/24/2020

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 **Tested By:** Nelson, Brennan

Laboratory Data				
Boring # Sample # Depth (ft) Moisture Content (%)				
45-C-2 12 35.0 12.0				

General

Results: The test is for informational purposes.

ASTM D2216

Client:

4511 West First Street Suite 4 Duluth, MN 55807 Phone: 218-624-4967

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056 B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Project:

Drill Crew

Sample Information

 Sample Number:
 318762
 Alternate ID:
 45-2-C 14 45'

Sampling Method: Auger Boring ASTM D1452 Sampled By:

Location: In-place

Location Details: Boring 45-2-C Sample 14 45'

Sample Date: 04/24/2020

Results:

Received Date: 06/29/2020 Lab: 4511 West First Street, Suite 4, Duluth, MN

Tested Date: 06/30/2020 **Tested By:** Nelson, Brennan

Laboratory Data			
Boring # Sample # Depth (ft) Moisture Content (%)			
45-2-C	14	45.0	16.2

General

The test is for informational purposes.



11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056 B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 310573 Depth (ft): 60

Boring Number: 42-1-C-1 Sampled By: Drill Crew

Sample Date: 05/18/2020

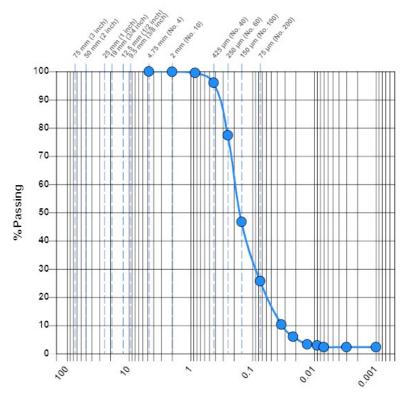
Received Date: 05/26/2020 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 05/29/2020 Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

<u> </u>			
Particle Size	% Passing	Specification	
4.75 mm (No. 4)	100.0	-	
2 mm (No. 10)	99.9	-	
850 µm (No. 20)	99.5	-	
425 μm (No. 40)	96.0	-	
250 μm (No. 60)	77.4	-	
150 μm (No. 100)	46.7	-	
75 μm (No. 200)	25.7	-	
33.8 (µm)	10.3	-	
22.1 (µm)	6.0	-	
13.0 (µm)	3.3	-	
9.2 (µm)	2.9	-	
6.5 (µm)	2.3	-	
3.2 (µm)	2.3	-	
1.3 (µm)	2.3	-	



Particle Size (mm)

Soil Classification: SM Silty sand

Gravel (%): 0.0 **Sand (%):** 74.3 **Silt (%):** 23.4 **Clay (%):** 2.3

 D_{60} (µm): 193.3 D_{30} (µm): 90.4 D_{10} (µm): 33.2 C_u : 5.82 C_c : 1.27

General



11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 320992 Depth (ft): 55

Boring Number: 43-1-C-1 Sampled By: **Drill Crew**

Sample Date: 06/23/2020

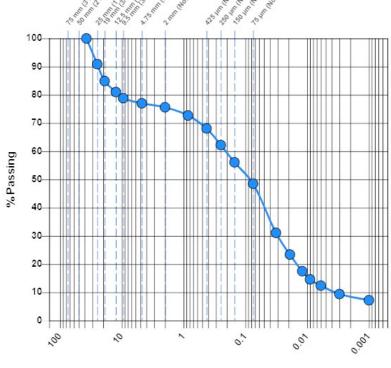
07/09/2020 **Received Date:** 11001 Hampshire Ave S, Bloomington, MN Lab:

Tested Date: 07/10/2020 Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

<u>Olovo Irgaromotor 7 triargolo</u>			
Particle Size	% Passing	Specification	
37.5 mm (1.5 inch)	100.0	ı	
25 mm (1 inch)	90.9	ı	
19 mm (3/4 inch)	84.9	-	
12.5 mm (1/2 inch)	81.0	ı	
9.5 mm (3/8 inch)	78.8	ı	
4.75 mm (No. 4)	77.0	-	
2 mm (No. 10)	75.6	ı	
850 µm (No. 20)	72.7	-	
425 µm (No. 40)	68.1	-	
250 µm (No. 60)	62.2	ı	
150 µm (No. 100)	56.1	-	
75 μm (No. 200)	48.5	-	
31.7 (µm)	31.1	ı	
19.0 (µm)	23.4	ı	
12.3 (µm)	17.5	-	
8.8 (µm)	14.6	ı	
6.3 (µm)	12.4	-	
3.1 (µm)	9.4	-	
1.3 (µm)	7.2	-	



Particle Size (mm)

Soil Classification: SC-SM Silty clayey sand with gravel

Gravel (%): Sand (%): Silt (%): 37.1 23.0 28.5 Clay (%): 11.4

D₆₀ (µm): 213.9 D₃₀ (µm): 30.1 D₁₀ (µm): 3.6 C_u : 59.42 C_c: 1.18



11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000

Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

B2001991 Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

Sample Information

Sample Number: 320971 Depth (ft): 75

Boring Number: 45-2-C Sampled By: **Drill Crew**

Sample Date: 06/23/2020

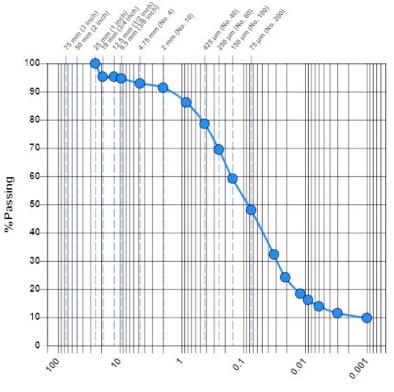
Received Date: 07/09/2020 11001 Hampshire Ave S, Bloomington, MN Lab:

Tested Date: 07/10/2020 Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

<u>Sieve-nyurometer Analysis</u>			
Particle Size	% Passing	Specification	
25 mm (1 inch)	100.0	-	
19 mm (3/4 inch)	95.3	-	
12.5 mm (1/2 inch)	95.3	-	
9.5 mm (3/8 inch)	94.7	-	
4.75 mm (No. 4)	92.9	-	
2 mm (No. 10)	91.4	-	
850 µm (No. 20)	86.2	-	
425 µm (No. 40)	78.6	-	
250 µm (No. 60)	69.5	-	
150 μm (No. 100)	59.2	-	
75 μm (No. 200)	48.1	-	
32.2 (µm)	32.3	-	
21.0 (µm)	24.2	-	
12.4 (µm)	18.4	-	
8.8 (µm)	16.2	-	
6.3 (µm)	13.9	-	
3.1 (µm)	11.5	-	
1.4 (µm)	9.8	-	



Particle Size (mm)

Soil Classification: SC-SM Silty clayey sand

Gravel (%): 7.1 Sand (%): Silt (%): 35.0 Clay (%): 13.1 44.8

28.9 131.50 4.41 D₆₀ (µm): 157.8 D₃₀ (µm): $D_{10} (\mu m)$: 1.2 C_{II}: C_c:



11001 Hampshire Avenue S Minneapolis, MN 55438 Phone: 952-995-2000 Client: Project:

Enbridge Energy, Limited Partnership Attn: Accounts Payable5400 Westheimer Ct Houston, TX 77056

Enbridge Line 5 Re-route Enbridge Line 5 near Mellen, WI

B2001991

Sample Information

Sample Number: 320973 Depth (ft): 95

Boring Number: 45-2-C Sampled By: Drill Crew

Sample Date: 06/23/2020

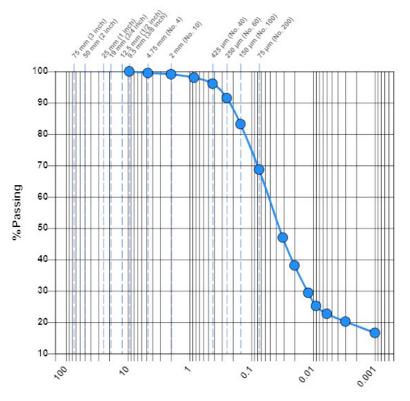
Received Date: 07/09/2020 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 07/10/2020 Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Sieve-Hydroffieler Affatysis			
Particle Size	% Passing	Specification	
9.5 mm (3/8 inch)	100.0	-	
4.75 mm (No. 4)	99.5	-	
2 mm (No. 10)	99.1	-	
850 μm (No. 20)	98.0	ı	
425 μm (No. 40)	96.1	ı	
250 μm (No. 60)	91.5	-	
150 μm (No. 100)	83.2	ı	
75 μm (No. 200)	68.7	-	
31.0 (µm)	47.0	-	
20.3 (µm)	38.1	-	
12.1 (µm)	29.4	-	
8.6 (µm)	25.2	-	
6.2 (µm)	22.7	-	
3.0 (µm)	20.2	-	
1.3 (µm)	16.6	-	



Particle Size (mm)

Soil Classification: CL Sandy lean clay

Gravel (%): 0.5 **Sand** (%): 30.8 **Silt** (%): 46.8 **Clay** (%): 21.9

D₆₀ (μm): 57.4 **D**₃₀ (μm): 12.6

General



4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

Sample Number: 395895 Depth (ft): 55

Boring Number: SC-1 Sampled By: Drill Crew

Sample Date: 07/27/2021

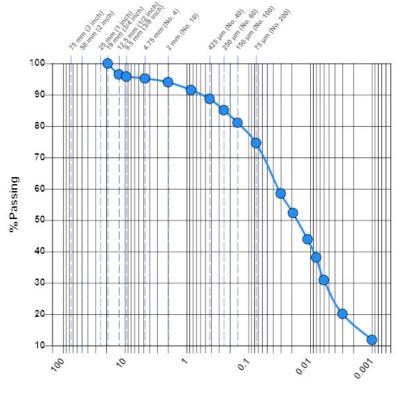
Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
19 mm (3/4 inch)	100.0	-
12.5 mm (1/2 inch)	96.5	_
9.5 mm (3/8 inch)	95.8	-
4.75 mm (No. 4)	95.2	-
2 mm (No. 10)	94.0	-
850 µm (No. 20)	91.5	-
425 μm (No. 40)	88.7	-
250 µm (No. 60)	85.1	-
150 µm (No. 100)	81.1	-
75 μm (No. 200)	74.6	ı
29.6 (µm)	58.5	ı
19.2 (µm)	52.3	ı
11.4 (µm)	43.9	ı
8.3 (µm)	38.1	-
6.0 (µm)	30.9	-
3.0 (µm)	20.1	-
1.3 (µm)	11.8	-



Particle Size (mm)

Soil Classification: CL-ML Silty clay with sand

Gravel (%): 4.8 Sand (%): 20.6 Silt (%): 47.3 Clay (%): 27.3

 D_{60} (µm): 34.2 D_{30} (µm): 5.8



4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

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Sample Information

Sample Number: 395896 Depth (ft): 25

Boring Number: SC-2 Sampled By: Drill Crew

Sample Date: 07/27/2021

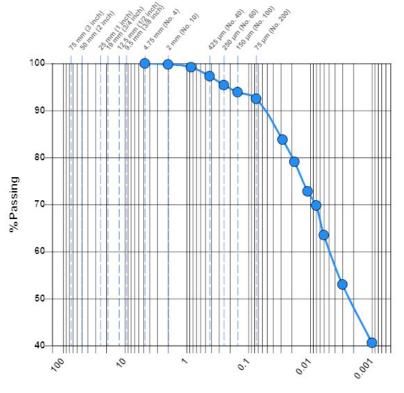
Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	1
2 mm (No. 10)	99.8	-
850 µm (No. 20)	99.2	-
425 μm (No. 40)	97.3	-
250 μm (No. 60)	95.4	-
150 μm (No. 100)	93.9	-
75 μm (No. 200)	92.5	-
28.2 (µm)	83.8	-
18.2 (µm)	79.1	-
10.7 (µm)	72.8	-
7.7 (µm)	69.8	-
5.5 (µm)	63.5	-
2.8 (µm)	53.0	
1.2 (µm)	40.6	-



Particle Size (mm)

Soil Classification: CL Lean clay

Gravel (%): 0.0 Sand (%): 7.5 Silt (%): 32.5 Clay (%): 60.0

 D_{60} (µm): 5.0



4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967 Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

Sample Information

Sample Number: 395897 Depth (ft): 30 **Boring Number:** SC-2 Sampled By: **Drill Crew**

Sample Date: 07/27/2021

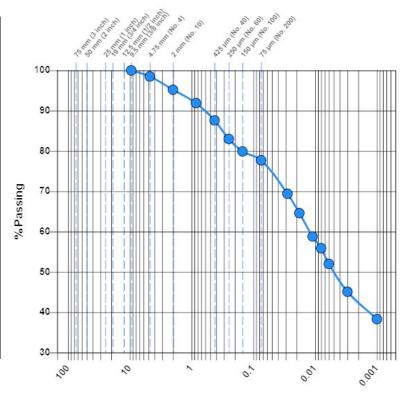
Received Date: 08/11/2021 Lab: 11001 Hampshire Ave S, Bloomington, MN

Tested Date: 08/11/2021 Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Sieve-Hydroffieler Affatysis						
Particle Size	% Passing	Specification				
9.5 mm (3/8 inch)	100.0	-				
4.75 mm (No. 4)	98.5	-				
2 mm (No. 10)	95.2	-				
850 µm (No. 20)	91.9	-				
425 µm (No. 40)	87.6	-				
250 µm (No. 60)	83.0	-				
150 μm (No. 100)	79.9	-				
75 μm (No. 200)	77.7	-				
28.3 (µm)	69.4	-				
18.3 (µm)	64.6	-				
10.8 (µm)	58.8	-				
7.7 (µm)	55.9	-				
5.6 (µm)	52.0	-				
2.8 (µm)	45.1	-				
1.2 (µm)	38.3	-				



Particle Size (mm)

Soil Classification: CH Fat clay with sand

Gravel (%): Sand (%): Silt (%): 1.5 20.8 28.0 Clay (%): 49.7

D₆₀ (µm): 12.4



ASTM D422

4511 West First Street Suite 4

Duluth, MN 55807 Phone: 218-624-4967

Tested Date:

Client: Project:

Lake Superior Consulting, LLC 130 West Superior Street

Suite 500 Duluth, MN 55802 B2104465 Enbridge Line 5 Silver Creek Near Mellen, Wisconsin

.

Sample Information

Sample Number:398017Depth (ft):70Boring Number:SC-3Sampled By:Drill Crew

Sample Date: 8/11/2021
Received Date: 8/19/2021

Lab: 11001 Hampshire Ave S, Bloomington, MN

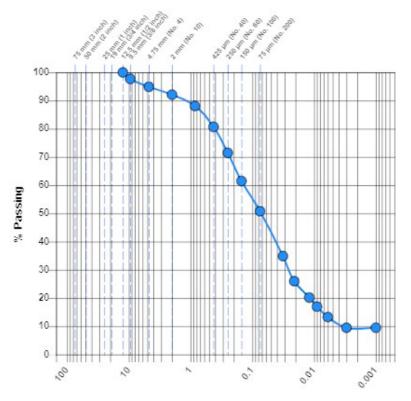
Tested By: Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

8/19/2021

Sieve-nyuroineter Analysis						
Particle Size	% Passing	Specification				
12.5 mm (1/2 inch)	100.0	-				
9.5 mm (3/8 inch)	97.7	1				
4.75 mm (No. 4)	94.9	-				
2 mm (No. 10)	92.1	-				
850 µm (No. 20)	88.1	-				
425 μm (No. 40)	80.7	-				
250 µm (No. 60)	71.5	-				
150 µm (No. 100)	61.5	-				
75 μm (No. 200)	50.8	-				
32.1 (µm)	34.9	-				
21.0 (µm)	26.0	-				
12.4 (µm)	20.2	-				
8.8 (µm)	17.0	-				
6.3 (µm)	13.3	-				
3.0 (µm)	9.5	-				
1.3 (µm)	9.5	-				



Particle Size (mm)

Soil Classification: CL Sandy lean clay

Gravel (%): 5.1 **Sand** (%): 44.1 **Silt** (%): 38.8 **Clay** (%): 12.0

 D_{60} (µm): 139.5 D_{30} (µm): 25.9 D_{10} (µm): 3.4 C_u : 41.03 C_c : 1.41

General



Phone: 218.624.4967 Fax: 218.624.0196 Web: braunintertec.com

Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (Method C) ASTM D 7012

Date: June 26, 2020

Project Number: B2001991

Client: Accounts Payable

Project Description:Enbridge Line 5 Re-route

Enbridge Energy, Limited Partnership

5400 Westheimer Ct Houston, TX 77056

Sample Data

Date Sampled: Not Given
Samples Obtained By: Braun
Date Received: 6/17/2020
Sample Preparation: Trim and Polished

Laboratory Data ASTM D4543 Limits

Boring Number:	43-1-C-1	43-1-C-1	43-1-C-1	43-1-C-1	
Sample Depth (ft):	145-146	168-169	175-176	180-181	
Date Tested:					
Rock Type:				Sandstone	
Moisture Condition During Testing:				Dry	
Diameter (in.):				1.75	
Length (in.):				3.34	
Length-to-Diameter Ratio (L/D):				1.9	$2.0 \le L/D \le 2.5$
Side Tolerance, Maximum (in.)				< 0.020	\leq 0.020 in.
End Tolerance, Maximum (in.)				< 0.001 in	\leq 0.001 in.
Perpendicularity Deviation (°)				< 0.001 in	≤ 0.250°
Parallelism Deviation (°)				< 0.001 in	≤ 0.25°
Maximum Load (lbs):				11,177	
Area (in ²):				2.41	
Compressive Strength (psi):	Untestable	Untestable	Untestable	4,640	
Compressive Strength (MPa):				32	

Remarks:

Location 43-1-C-1

Sample 180-181 was sulfur capped for testing purposes

Reviewed By: David Morrison

J/1/1____

Project Manager



Phone: 218.624.4967 Fax: 218.624.0196 Web: braunintertec.com

Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (Method C) **ASTM D 7012**

June 26, 2020 Date:

Accounts Payable

Enbridge Energy, Limited Partnership

5400 Westheimer Ct Houston, TX 77056

Project Number: B2001991

Project Description: Enbridge Line 5 Re-route

Untestable

Sample Data

Remarks:

Client:

Date Sampled: Not Given Samples Obtained By: Braun Date Received: 6/17/2020 Sample Preparation: Trim and Polished

Laboratory Data					ASTM D4543 Limits
Boring Number:	43-1-C-1	43-1-C-1	43-1-C-1	43-1-C-1	

10,640

72

Sample Depth (ft):	185-186	189-190	195-196	206-207	
Date Tested:					
Rock Type:	Sandstone				
Moisture Condition During Testing:	Dry				
Diameter (in.):	1.76				
Length (in.):	3.39				
Length-to-Diameter Ratio (L/D):	1.9				$2.0 \le L/D \le 2.5$
Side Tolerance, Maximum (in.)	< 0.020				\leq 0.020 in.
End Tolerance, Maximum (in.)	< 0.001 in				\leq 0.001 in.
Perpendicularity Deviation (°)	< 0.001 in				≤ 0.250°
Parallelism Deviation (°)	< 0.001 in				≤ 0.25°
Maximum Load (lbs):	25,860				
Area (in ²):	2.43				

Untestable

Compressive Strength (psi): Compressive Strength (MPa):

Location 43-1-C-1

Reviewed By: David Morrison

T/M____

Untestable

Project Manager



Phone: 218.624.4967 Fax: 218.624.0196 Web: braunintertec.com

Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (Method C) ASTM D 7012

Date: August 17, 2021 **Project Number:** B2104465

Client: Scott Mcdonald

Lake Superior Consulting, LLC 130 West Superior Street Dulth, MN 55802 **Project Description:** Enbridge Line 5 Silver Creek

Sample Data

Date Sampled: 7/13/2021 - 7/15/2021

Samples Obtained By: Drill Crew
Date Received: 7/23/2021
Sample Preparation: Cut and Polished

Laboratory Data

Boring Number:	SC-2	SC-2	SC-2
Sample Depth (ft):	74.5	133.5	143.5
Date Tested:	7/30/2021	7/30/2021	7/30/2021
Rock Type:	Conglomerate	Conglomerate	Siltstone
Moisture Condition During Testing:	Dry	Dry	Dry
Diameter (in.):	1.76		1.76
Length (in.):	3.65		4.08
Length-to-Diameter Ratio (L/D):	2.1		2.3
Side Tolerance, Maximum (in.)	< 0.020		< 0.020
End Tolerance, Maximum (in.)	< 0.001 in		< 0.001 in
Perpendicularity Deviation (°)	< 0.001 in		< 0.001 in
Parallelism Deviation (°)	< 0.001 in		< 0.001 in
Maximum Load (lbs):	33,850		20,279
Area (in ²):	2.43		2.43
Compressive Strength (psi):	13,930	Unable to Test	8,350
Compressive Strength (MPa):	95		57

Remarks:

Reviewed By:

David Morrison Project Manager 91/M_



Phone: 218.624.4967 Fax: 218.624.0196 Web: braunintertec.com

Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (Method C) ASTM D 7012

Date: August 17, 2021 **Project Number:** B2104465

Client: Scott Mcdonald

Lake Superior Consulting, LLC 130 West Superior Street Dulth, MN 55802 **Project Description:**Enbridge Line 5 Silver Creek

Sample Data

Date Sampled: 7/15/2021
Samples Obtained By: Drill Crew
Date Received: 7/23/2021
Sample Preparation: Cut and Polished

Laboratory Data

Boring Number:	SC-2	SC-2	SC-2
Sample Depth (ft):	153-154	163-164	173-174
Date Tested:	7/30/2021	7/30/2021	7/30/2021
Rock Type:	Conglomerate	Conglomerate	Conglomerate
Moisture Condition During Testing:	Dry	Dry	Dry
Diameter (in.):	1.76	1.77	1.77
Length (in.):	3.70	3.64	3.97
Length-to-Diameter Ratio (L/D):	2.1	2.1	2.2
Side Tolerance, Maximum (in.)	< 0.020	< 0.020	< 0.020
End Tolerance, Maximum (in.)	< 0.001 in	< 0.001 in	< 0.001 in
Perpendicularity Deviation (°)	< 0.001 in	< 0.001 in	< 0.001 in
Parallelism Deviation (°)	< 0.001 in	< 0.001 in	< 0.001 in
Maximum Load (lbs):	23,560	15,233	12,208
Area (in ²):	2.43	2.46	2.46
Compressive Strength (psi):	9,700	6,190	4,960
Compressive Strength (MPa):	66	42	34

Remarks:

Reviewed By:

David Morrison Project Manager 91/M___



Phone: 218.624.4967 Fax: 218.624.0196 Web: braunintertec.com

Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (Method C) ASTM D 7012

 Date:
 September 15, 2021
 Project Number:
 B2104465

Client: Scott Mcdonald

Lake Superior Consulting, LLC 130 West Superior Street Dulth, MN 55802 **Project Description:** Enbridge Line 5 Silver Creek

Sample Data

Date Sampled: 7/23/2021 -7/26/2021

Samples Obtained By: Drill Crew
Date Received: 8/11/2021
Sample Preparation: Cut and Polished

Laboratory Data

Boring Number:	SC-3	SC-3	SC-3	SC-3	SC-3
Sample Depth (ft):	205	212	222	229	239
Date Tested:	8/20/2021	8/20/2021	8/20/2021	8/20/2021	8/20/2021
Rock Type:	Conglomerate	Conglomerate	Conglomerate	Conglomerate	Conglomerate
Moisture Condition During Testing:	Dry	Dry	Dry	Dry	Dry
Diameter (in.):				1.76	1.76
Length (in.):				4.40	4.33
Length-to-Diameter Ratio (L/D):				2.5	2.5
Side Tolerance, Maximum (in.)				< 0.020	< 0.020
End Tolerance, Maximum (in.)				< 0.001 in	< 0.001 in
Perpendicularity Deviation (°)				< 0.001 in	< 0.001 in
Parallelism Deviation (°)				< 0.001 in	< 0.001 in
Maximum Load (lbs):				10,427	10,607
Area (in ²):				2.43	2.43
Compressive Strength (psi):	Unable to Test	Unable ot Test	Unable to Test	4,290	4,370
Compressive Strength (MPa):				29	30

Remarks:

Reviewed By:

David Morrison Project Manager

SIM



Phone: 218.624.4967 Fax: 218.624.0196 Web: braunintertec.com

Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (Method C) ASTM D 7012

 Date:
 September 15, 2021
 Project Number:
 B2104465

Client: Scott Mcdonald

Lake Superior Consulting, LLC 130 West Superior Street Dulth, MN 55802 **Project Description:** Enbridge Line 5 Silver Creek

Sample Data

Date Sampled: 7/23/2021 -7/26/2021

Samples Obtained By: Drill Crew
Date Received: 8/25/2021
Sample Preparation: Cut and Polished

Laboratory Data

Boring Number:	SC-3	SC-3	SC-3
Sample Depth (ft):	207	215	223
Date Tested:	9/14/2021	9/14/2021	9/14/2021
Rock Type:	Conglomerate	Conglomerate	Conglomerate
Moisture Condition During Testing:	Dry	Dry	Dry
Diameter (in.):			1.76
Length (in.):			4.40
Length-to-Diameter Ratio (L/D):			2.5
Side Tolerance, Maximum (in.)			< 0.020
End Tolerance, Maximum (in.)			< 0.001 in
Perpendicularity Deviation (°)			< 0.001 in
Parallelism Deviation (°)			< 0.001 in
Maximum Load (lbs):			2,717
Area (in ²):			2.43
Compressive Strength (psi):	Unable to Test	Unable ot Test	1,120
Compressive Strength (MPa):			8

Remarks:

Reviewed By:

David Morrison Project Manager



Phone: 218.624.4967 Fax: 218.624.0196 Web: braunintertec.com

Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (Method C) ASTM D 7012

 Date:
 September 15, 2021
 Project Number:
 B2104465

Client: Scott Mcdonald Lake Superior Consulting, LLC

130 West Superior Street
Dulth, MN 55802

Project Description:Enbridge Line 5 Silver Creek

Sample Data

Date Sampled: 7/23/2021 -7/26/2021

Samples Obtained By: Drill Crew
Date Received: 8/25/2021
Sample Preparation: Cut and Polished

Laboratory Data

Boring Number:	SC-4	SC-4
Sample Depth (ft):	118.5	122
Date Tested:	8/20/2021	9/14/2021
Rock Type:	Sandstone	Sandstone
Moisture Condition During Testing:	Dry	Dry
Diameter (in.):		1.74
Length (in.):		3.78
Length-to-Diameter Ratio (L/D):		2.2
Side Tolerance, Maximum (in.)		< 0.020
End Tolerance, Maximum (in.)		< 0.001 in
Perpendicularity Deviation (°)		< 0.001 in
Parallelism Deviation (°)		< 0.001 in
Maximum Load (lbs):		4,064
Area (in ²):		2.38
Compressive Strength (psi):	Unable to Test	1,710
Compressive Strength (MPa):		12

Remarks:

Reviewed By:

51/M

David Morrison Project Manager