Alliant Energy Corporate Services, Inc.
Headquarters
4902 North Biltmore Lane
Madison, WI 53718-2148

1-800-ALLIANT (800-255-4268)
alliantenergy.com

August 31, 2016

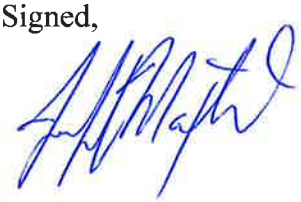
To: CCR Operating Record
Re: Notification of Completion of Closure pursuant to 40 CFR 257.100(b)(5)

Closure of the Inactive Coal Combustion Residuals (CCR) Surface Impoundment at the Fox Lake Generating Station was completed on August 17, 2016. Closure was completed through removal of the CCR in accordance with 40 CFR 257.100(b)(5) on August 17, 2016. This notification and the attached written certification from a qualified professional engineer have been prepared in accordance with 40 CFR 257.100(c)(3) and 257.105(i)(3).

This notification applies to the following CCR unit at this facility:

CCR Surface Impoundments
FoxLake Ash Pond (Inactive CCR Surface Impoundment)

Signed,



Print Name	Title
Jeff Maxted	Senior Environmental Specialist
Phone No. or Email Address	
(608) 458-3853; jeffreymaxted@alliantenergy.com	

Coal Combustion Residuals

Ash Pond Closure Certification Report

Prepared for
Interstate Power and Light Company
Fox Lake Generating Station

August 2016

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
952.832.2600
www.barr.com

Coal Combustion Residuals Ash Pond Closure Certification Report

August 2016

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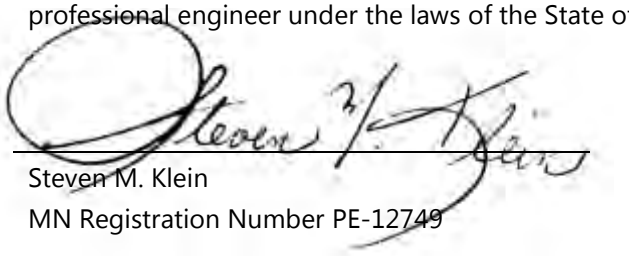
Certifications

I hereby certify that based on the verification procedures and data collected under my direction as documented in this report, the coal combustion residuals (CCR) in the Fox Lake Generating Station's inactive CCR surface impoundment was removed in accordance with 40 CFR 257.100(b)(5), as described in my report. This report was prepared by me or under my direct supervision and I am a duly licensed professional engineer under the laws of the State of Minnesota.



Steven M. Klein
MN Registration Number PE-12749

August 17, 2016
Date

1.0 Introduction

This report presents the results of construction observation, documentation, surveying, and sampling work performed by Barr Engineering Co. (Barr) during the removal of coal combustion residual (CCR) from the inactive surface impoundment at the Fox Lake Generating Station (Station), located northeast of Sherburn, MN, in Martin County. The Station's inactive CCR surface impoundment is subject to Federal Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments per 40 CFR 257 Subpart D and is owned and operated by Interstate Power and Light Company (IPL), a wholly-owned subsidiary of Alliant Energy (Alliant). The inactive CCR surface impoundment, formally known as the "Ash Pond," was used as a bottom ash settling pond until the Station's conversion to natural gas in 1998. Shortly after the natural gas conversion, the settling pond was dredged but not verified to be clean of CCR material nor formally closed as it continues to serve as the Station's wastewater treatment basin for National Pollutant Discharge Elimination System (NPDES) permitted low volume waste discharges. It is Barr's understanding that the inactive surface impoundment is unlined as stated in the "Fox Lake Ash Pond Closure Study" prepared by Burns & McDonnell Engineering Company, Inc. dated February 2015.

On December 11, 2015, a Notification of Intent to Initiate Closure of the inactive CCR surface impoundment at the Fox Lake Generating Station was prepared and certified by Sargent & Lundy, LLC. The notification's intended closure approach was to close the inactive CCR surface impoundment by removal of CCR material via the use of a hydraulic dredge with dredging work to commence in third quarter of 2016 and completion by the fourth quarter of 2016.

It is Barr's understanding that IPL chose to remove the CCR in its Fox Lake Generating Station's inactive CCR surface impoundment through the use of hydraulic dredging procedures for the following reasons:

1. Given the impoundment's proximity to Fox Lake, it might be very difficult to dewater the impoundment due to the hydrogeology.
2. If the impoundment were to be dewatered to enable CCR removal by mechanical dredging in dry conditions, the berms or earthen areas that separate the impoundment from Fox Lake might become unstable and could potentially fail during dredging operations due to differential water levels and geotechnical forces.
3. If the impoundment were to be dredged in wet conditions, hydraulic dredging has the highest potential for creating a smooth, verifiable bathymetric surface that would enable determinations about the removal of CCR material.

IPL moved forward with hydraulic dredging and retained JR Brennan Company (a hydraulic dredging contractor) to remove CCR from the Station's inactive CCR surface impoundment with the direction that none of the impoundment's slopes are to be disturbed and that to the maximum extent practicable, all loose sediment and CCR materials shall be removed from the bottom. During the dredging operation, IPL modified this requirement and directed JR Brennan to perform slope excavation on the east side of the basin as described in Section 2.0 of this report. IPL also stipulated that the impoundment may contain *de minimis* CCR following the dredging activity and still comply with the performance standard for clean closure described in the preamble for 40 CFR 257.100(b)(5). IPL retained Barr as an "Independent Certifier"

to, upon completion of dredging operations, certify that the CCR in the Station's inactive CCR surface impoundment has been removed in accordance with 40 CFR 257.100(b)(5) and as further described within this report[1].

As the water in the impoundment could not be removed to enable a visual inspection of the bottom of the impoundment, a verification process was developed that included:

1. Preparing a detailed pre-dredging bathymetric survey and a detailed post-dredging bathymetric survey of the impoundment that:
    a. Provides a means to determine the volume of soft sediment and CCR that was removed,
    b. Enables Barr to determine whether there are locations in the impoundment where the dredge might have missed soft sediment and CCR material; (i.e., underwater ridges or islands) and inform the dredger where additional dredging is needed, and
    c. Provides record drawings of the pre-and post-dredging operation.

2. Performing pre-dredging and post-dredging sediment coring of the impoundment bottom to:
    a. Develop a clear understanding of what the CCR and soft sediment column and the underlying "hard bottom" native material look like, and
    b. Determine if the CCR and soft sediment was removed from the bottom of the impoundment or if and where additional dredging is needed.

Sections 3.0 and 4.0 of this report, respectively, describe the bathymetric and sediment coring operations and results.

[1] On the date of completion of the closure, the standard for closure as promulgated in 40 C.F.R. 257.100(5)(b) read "CCR removal and decontamination of the CCR surface impoundment are complete when all CCR in the inactive surface impoundment is removed, including the bottom liner of the CCR unit."

2.0 Closure Method

The CCR and soft sediment were removed from the bottom of the impoundment using a hydraulic dredge. All dredged material was pumped directly to a polymer injection facility where a polymer approved by the Minnesota Pollution Control Agency (MPCA) was blended with the dredge spoils. The blended material was discharged into geotubes that were placed on a lined geotube dewatering pad approximately 1,000 feet away from the impoundment in the former coal yard to the southeast of the plant. Once dewatered sufficiently, the dredged material is to be loaded into trucks and hauled off site to an IPL-approved landfill for final disposal. At the time this report was prepared, the dredged material was being dewatered and none had been removed from the Fox Lake Generation Station site. Water draining from the dredged material and geotubes was piped back to a zone near the inactive CCR surface impoundment where approximately half of the water was discharged to the impoundment and half discharged to the causeway that leads to Fox Lake.

Barr was informed that when the water level in the impoundment was drawn down via the hydraulic dredging operation, IPL representatives identified CCR material on the east bank of the impoundment where CCR was formerly discharged when the impoundment was active. IPL directed JR Brennan to mechanically excavate the CCR on the east bank using a backhoe excavator and cast the excavated material into the bottom of the impoundment for the hydraulic dredge to remove during its pond-bottom, CCR and soft sediment dredging operation. Following the mechanical excavation, IPL directed JR Brennan to place loose rock material on the disturbed slope for erosion protection. The east slope excavation extents and rock placement was not observed or verified by Barr, as our certification work was limited to removal of CCR and soft sediment from the bottom of the impoundment. However, the volume of the mechanically excavated material was accounted for by Barr's post-dredge bathymetric survey.

3.0 Bathymetric Surveys

Pre-dredge and post-dredge bathymetric surveys were performed by Barr to (a) determine the volume of soft sediment and CCR that was removed from the bottom of the impoundment, (b) identify if there were locations in the impoundment that the dredge might have missed soft sediment and CCR material (i.e., underwater ridges or islands) and inform the dredger where additional dredging is needed, and (c) have record drawings of the pre-and post-dredging operation. The pre-dredge survey was performed on July 6, 2016 as shown on Drawing C-01 and the post-dredge survey was performed on August 6, 2016 as shown on Drawing C-02.

Both pre- and post- surveys were performed in a similar manner using a Z-boat, a mobile remote hydrographic survey boat connected to a real time kinetic (RTK) global positioning system (GPS). A baseline was established on the south side of the impoundment where an approximately 20-foot by 20-foot grid pattern was set for data collection and consistency. The Z-boat was remotely operated and collected bathymetric data over essentially the same 20-foot by 20-foot grid pattern in both the pre- and post-bathymetric surveys. A bathymetric surface for each survey was created from the bathymetric data collected every 3 linear feet along the gridlines as the Z-boat traversed the grid pattern created for the pond. The impoundment slopes and an approximately 20-foot-wide zone above and around the entire crest of the impoundments were manually surveyed with a RTK rover GPS system. The topographic data collected with the rover was then combined with the bathymetric data collected by the Z-boat to make a comprehensive surface of the pond bottom and sideslope for both the pre- and post- surveys shown in Drawings C-01 and C-02.

3.1 Bathymetric Survey Results

The pre-dredge and post-dredge bathymetric surveys were used to determine the volume of CCR and soft sediment that was removed from the impoundment. The volumetric calculation was performed using AutoCAD Civil 3D software that incorporated the pre-dredge impoundment bottom surface and the post-dredge impoundment bottom surface as shown on Drawings C-01 and C-02, respectively. Approximately 8,100 cubic yards (cy) of sediment was calculated to be removed from the pond.

The post-dredge survey was also reviewed in concert with sediment coring locations, as described in Section 4.0 of this report, to identify if any unexplainable ridges or mounds were present (i.e., mounds in areas that may not have been cored) that might indicate portions of the pond were not sufficiently dredged. From the post-dredge bathymetric survey and sediment coring data collected, it was determined that the impoundment bottom had been smoothly graded and that no unexplainable mounds or ridges were present after completion of dredging on August 5, 2016.

4.0 Sediment Cores

Sediment cores were collected both prior to dredging and following dredging as a verification method to confirm loose sediment and CCR removal. Pre-dredge sediment cores were collected to better understand the depth of sediment required to be removed, determine native pond bottom material, and determine if there was a clear visual distinction between the soft sediment and native pond bottom deposits. The post-dredge sediment cores were collected to confirm removal of soft sediment. The pre-dredge cores were performed on July 15, 2016. Post-dredge cores were collected on August 1, 2016 and then resampled again on August 3, 4, and 5, 2016 in all areas where the August 1 cores revealed significant CCR and soft sediment present. This coring work was an iterative process where the dredging contractor was informed of cores that revealed CCR and soft sediment was still present and of cores that revealed *de minimis* levels of CCR and soft sediment.

A total of four (4) pre-dredge cores were collected with vibracore equipment from a small jon boat and seventy (70) post-dredge cores were collected using a push to refusal coring method from a small jon boat. The location and depth of soft sediment for each core is shown in Figure 1. Each sediment core was logged and nearly all cores recovered were photographed. Table 1 summarizes the observation results of the sediment cores and the photographs taken of the sediment cores are included in Appendix A.

4.1 Sediment Core Results

The four (4) pre-dredge sediment cores (SC-01 through SC-04) revealed a clear distinction between the overlying soft sediment and CCR material and the underlying hard native material with an average soft sediment thickness of about 4 feet. A review of the pre-dredge sediment core photos included in Appendix A revealed that the zone of CCR and soft sediment was predominantly black or dark grey in color while the underlying hard bottom native soils were brown, olive or light grey in color and visually classified as lean clay (CL). The clear distinction in color between the zone of CCR and the underlying native soils allowed for a sediment core visual inspection method to identify if CCR and soft sediment was removed from the bottom of the impoundment

On August 1, 2016, when JR Brennan felt its dredging operation was largely completed, Barr collected its first set of post-dredge sediment cores. On that date, eighteen (18) cores (SC-05 through SC-22) were removed from the pond bottom at the locations shown on Figure 1. Sediment cores that revealed a very small layer of soft sediment still present were determined to be *de minimis* if the soft sediment in the core was predominantly brown, light grey or olive in color, indicating it was comprised largely of native soil that had been loosened and resettled during the dredging process. Inspection of the sediment cores revealed five of the initial eighteen core locations had *de minimis* amounts of CCR or soft sediment as defined above. Based on the initial post-dredge coring results, JR Brennan was directed to continue its hydraulic dredging process so that the initial eighteen core locations and all subsequent core locations produced *de minimis* results. The *de minimis* layer in all final sediment cores ranged from none to no more than 0.07 foot of soft sediment as shown in Table 1.

The subsequent rounds of post-dredge coring work occurred on August 3–5, 2016, where four additional cores were placed surrounding each of the August 1 cores that failed to meet the *de minimis* criteria. For example, sediment core SC-05 was found to still have CCR and soft sediment present, and sediment cores SC-05A, SC-05B, SC-05C and SC-05D were taken in the area after it had been re-dredged. If predominantly black- or dark grey-colored soft sediment was found in any of the surrounding cores, the contractor was informed of that and in turn performed additional dredging until the *de minimis* criteria was met in subsequent verification cores.

5.0 Conclusion

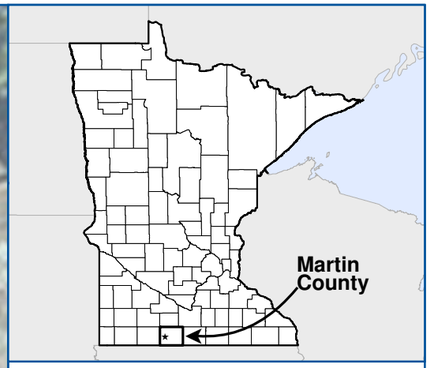
This report presents the summary of all observation, documentation, and bathymetric and sediment coring data collected by Barr to verify that the CCR and soft sediment in the inactive CCR surface impoundment at the Fox Lake Generating Station was removed. It is Barr's opinion that the removal of soft sediment and CCR material from the inactive CCR surface impoundment was performed in accordance with 40 CFR 257.100(b)(5) and that the surface impoundment contains no more than *de minimis* amounts of CCR as described herein.

Table

Table 1
Sediment Core Results Summary
Inactive CCR Surface Impoundment
Fox Lake Generating Station

Sediment Core ID	Northing	Easting	Date	Total Core Depth (ft.)	Loose Sediment Depth (ft.)	Native Subgrade Material (ft.)	Photo
SC-01-PRE	574333.14	2436919.44	7/15/2016	5.90	5.30	0.60	X
SC-02-PRE	574340.96	2436996.27	7/15/2016	5.60	5.20	0.40	X
SC-03-PRE	574330.53	2437117.95	7/15/2016	4.10	2.60	1.50	X
SC-04-PRE	574333.63	2437205.71	7/15/2016	4.50	3.00	1.50	X
SC-05	574314.97	2436791.93	8/1/2016	0.65	0.45	0.20	X
SC-05A	574312.47	2436788.34	8/4/2016	0.15	0.03	0.12	X
SC-05B	574317.47	2436788.34	8/4/2016	0.35	0.03	0.32	X
SC-05C	574312.47	2436803.34	8/4/2016	0.30	0.04	0.26	X
SC-05D	574317.47	2436803.34	8/4/2016	0.50	0.07	0.43	X
SC-06	574327.47	2436866.74	8/1/2016	0.65	0.65	0.00	X
SC-06A	574323.72	2436859.78	8/5/2016	0.19	Trace	0.19	X
SC-06B	574328.65	2436858.92	8/5/2016	No Recovery	Trace	No Recovery	X
SC-06C	574326.29	2436874.56	8/5/2016	0.24	0.05	0.19	X
SC-06D	574331.22	2436873.70	8/5/2016	0.25	0.02	0.23	X
SC-07	574302.47	2436866.93	8/1/2016	0.40	0.25	0.15	X
SC-07A	574301.63	2436859.07	8/4/2016	No Recovery	Trace	No Recovery	
SC-07B	574306.51	2436860.14	8/4/2016	No Recovery	Trace	No Recovery	
SC-07C	574298.42	2436873.72	8/4/2016	0.20	Trace	0.20	X
SC-07D	574303.31	2436874.79	8/4/2016	0.30	Trace	0.30	X
SC-08	574314.92	2436941.93	8/1/2016	0.50	0.25	0.25	X
SC-08A	574312.42	2436934.43	8/4/2016	0.25	Trace	0.25	X
SC-08B	574317.42	2436934.43	8/4/2016	0.30	0.05	0.25	X
SC-08C	574312.42	2436949.43	8/4/2016	0.32	0.02	0.30	X
SC-08D	574317.42	2436949.43	8/4/2016	0.35	0.02	0.33	X
SC-09	574352.47	2436991.93	8/1/2016	0.40	0.30	0.10	X
SC-09A	574347.74	2436985.59	8/3/2016	0.45	0.02	0.43	X
SC-09B	574352.47	2436984.03	8/3/2016	0.80	0.01	0.79	X
SC-09C	574352.45	2436999.83	8/3/2016	0.35	0.05	0.30	X
SC-09D	574357.20	2436998.26	8/3/2016	0.30	0.01	0.29	X
SC-10	574289.97	2436991.93	8/1/2016	0.45	0.35	0.10	X
SC-10A	574287.47	2436984.43	8/4/2016	0.40	0.05	0.35	X
SC-10B	574292.47	2436984.43	8/4/2016	0.30	Trace	0.30	X
SC-10C	574287.47	2436999.43	8/4/2016	0.35	0.05	0.30	X
SC-10D	574292.47	2436999.43	8/4/2016	0.30	Trace	0.30	X
SC-11	574314.97	2437041.93	8/1/2016	0.25	0.07	0.18	X
SC-12	574364.97	2437091.93	8/1/2016	0.50	0.40	0.10	X
SC-12A	574359.93	2437085.83	8/4/2016	0.45	0.03	0.42	X
SC-12B	574364.60	2437084.03	8/4/2016	0.32	0.07	0.25	X
SC-12C	574365.34	2437099.83	8/4/2016	0.30	0.02	0.28	X
SC-12D	574370.00	2437098.02	8/4/2016	0.21	0.02	0.19	X
SC-13	574264.97	2437091.93	8/1/2016	0.55	0.45	0.10	X
SC-13A	574262.47	2437084.43	8/5/2016	0.19	0.06	0.13	X
SC-13B	574267.47	2437084.43	8/5/2016	No Recovery	Trace	No Recovery	
SC-13C	574262.47	2437099.43	8/5/2016	0.24	0.03	0.21	X
SC-13D	574267.47	2437099.43	8/5/2016	0.25	0.03	0.22	
SC-14	574364.97	2437141.93	8/1/2016	0.37	0.27	0.10	X
SC-14A	574362.47	2437134.43	8/5/2016	0.40	0.05	0.35	X
SC-14B	574367.47	2437134.43	8/5/2016	0.31	0.07	0.24	X
SC-14C	574362.47	2437149.43	8/5/2016	0.45	0.05	0.40	
SC-14D	574367.47	2437149.43	8/5/2016	0.40	0.03	0.37	X
SC-15	574314.97	2437141.93	8/1/2016	0.20	0.00	0.20	X
SC-16	574264.97	2437141.93	8/1/2016	0.30	0.05	0.25	X
SC-17	574389.97	2437191.93	8/1/2016	0.23	0.23	0.00	X
SC-17A	574387.47	2437184.43	8/5/2016	0.14	0.07	0.07	X
SC-17B	574392.47	2437184.43	8/5/2016	0.35	0.01	0.34	X
SC-17C	574387.47	2437199.43	8/5/2016	0.45	0.03	0.42	X
SC-17D	574392.47	2437199.43	8/5/2016	0.30	Trace	0.30	X
SC-18	574314.97	2437191.93	8/1/2016	0.35	0.05	0.30	X
SC-19	574239.97	2437191.93	8/1/2016	0.40	0.40	0.00	X
SC-19A	574237.47	2437184.43	8/5/2016	0.24	0.02	0.22	X
SC-19B	574242.47	2437184.43	8/5/2016	0.17	0.01	0.16	X
SC-19C	574237.47	2437199.43	8/5/2016	0.28	0.05	0.23	X
SC-19D	574242.47	2437199.43	8/5/2016	0.12	0.02	0.10	X
SC-20	574364.97	2437229.43	8/1/2016	0.70	0.70	0.00	X
SC-20A	574362.47	2437221.93	8/5/2016	0.22	Trace	0.22	X
SC-20B	574367.47	2437221.93	8/5/2016	0.10	0.01	0.09	X
SC-20C	574362.47	2437236.93	8/5/2016	0.40	0.07	0.33	X
SC-20D	574367.47	2437236.93	8/5/2016	No Recovery	No Recovery	No Recovery	X
SC-21	574289.97	2437229.43	8/1/2016	0.80	0.30	0.50	X
SC-21A	574287.47	2437221.93	8/5/2016	0.22	0.05	0.17	X
SC-21B	574292.47	2437221.93	8/5/2016	0.15	0.07	0.08	X
SC-21C	574287.47	2437236.93	8/5/2016	0.45	0.05	0.40	
SC-21D	574292.47	2437236.93	8/5/2016	Trace	Trace	Trace	
SC-22	574239.97	2437241.93	8/1/2016	0.50	Trace	0.50	X

Figure



Pre-Dredge Sediment Core Location

Post-Dredge Sediment Core Location

Note:
Sediment core location labels include the loose sediment depth measurement in feet surrounded by parenthesis.

0 30 60 120

Feet

INTERSTATE POWER AND LIGHT COMPANY
FOX LAKE GENERATING STATION
SEDIMENT CORE LOCATIONS

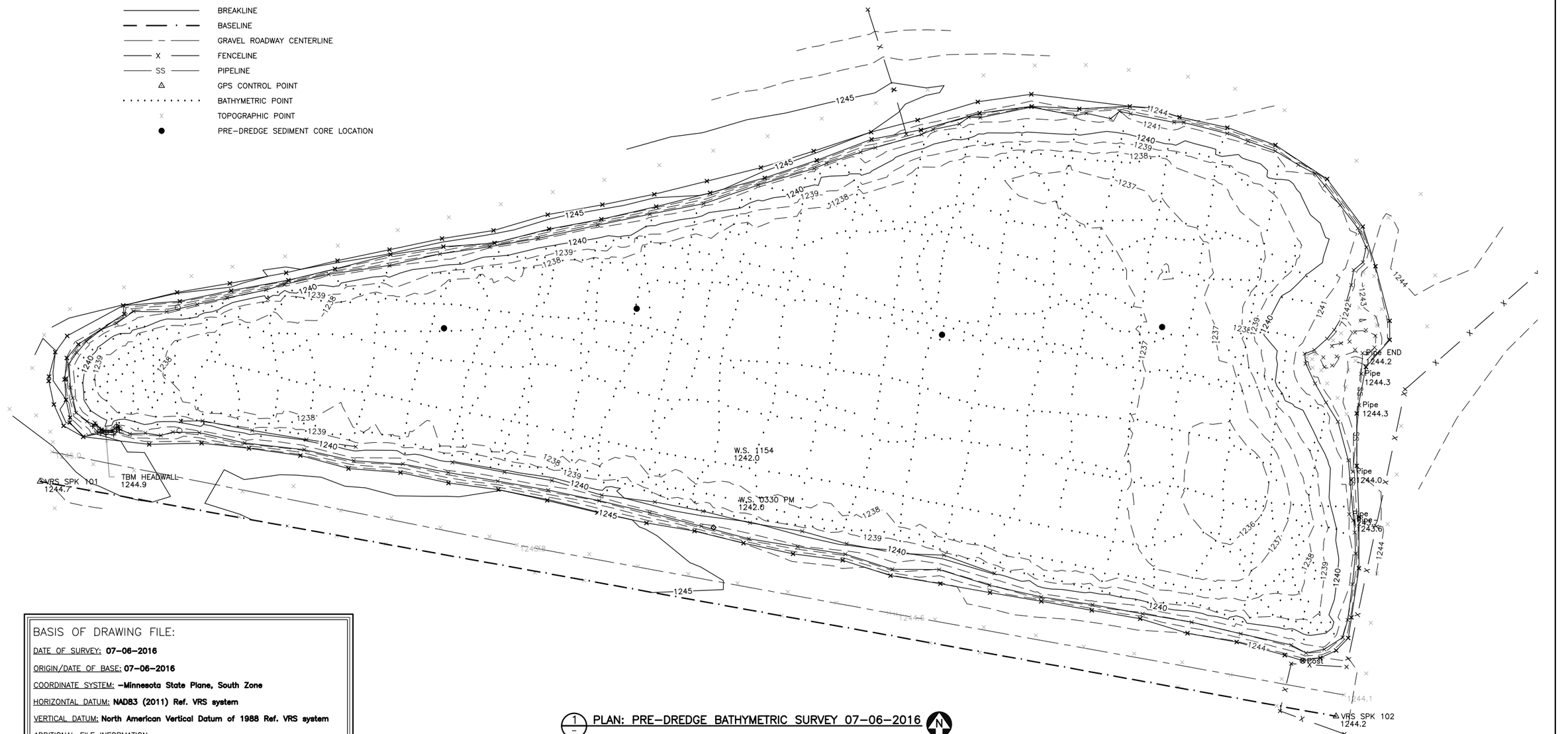
FIGURE 1

BARR

Drawings

LEGEND

- 1240 — PRE–DREDGE 5' CONTOUR
- 1239 — PRE–DREDGE 1' CONTOUR
- BREAKLINE
- BASELINE
- GRAVEL ROADWAY CENTERLINE
- X — FENCELINE
- SS — PIPELINE
- GPS CONTROL POINT
- BATHYMETRIC POINT
- TOPOGRAPHIC POINT
- PRE–DREDGE SEDIMENT CORE LOCATION



BASIS OF DRAWING FILE:

DATE OF SURVEY: **07–06–2016**

ORIGIN/DATE OF BASE: **07–06–2016**

COORDINATE SYSTEM: **–Minnesota State Plane, South Zone**

HORIZONTAL DATUM: **NAD83 (2011) Ref. VRS system**

VERTICAL DATUM: **North American Vertical Datum of 1988 Ref. VRS system**

ADDITIONAL FILE INFORMATION:

1 — PLAN: PRE–DREDGE BATHYMETRIC SURVEY 07–06–2016

0 20 40
SCALE IN FEET

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

RELEASED TO/FOR: CLIENT 8/10/16; BID; CONSTRUCTION; PERMIT

DATE RELEASED: A B C 0 1 2 3

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1–800–632–2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
Suite 200
MINNEAPOLIS, MN 55435
Ph: 1–800–632–2277
Fax: (952) 832–2601
www.barr.com

Scale	AS SHOWN
Date	8/8/2016
Drawn	JHS
Checked	
Designed	
Approved	SMK

INTERSTATE POWER & LIGHT CO.
SHERBURN, MINNESOTA

FOX LAKE GENERATING STATION
SHERBURN, MINNESOTA

INACTIVE CCR SURFACE IMPOUNDMENT
PRE–DREDGE BATHYMETRIC SURVEY 7/6/2016

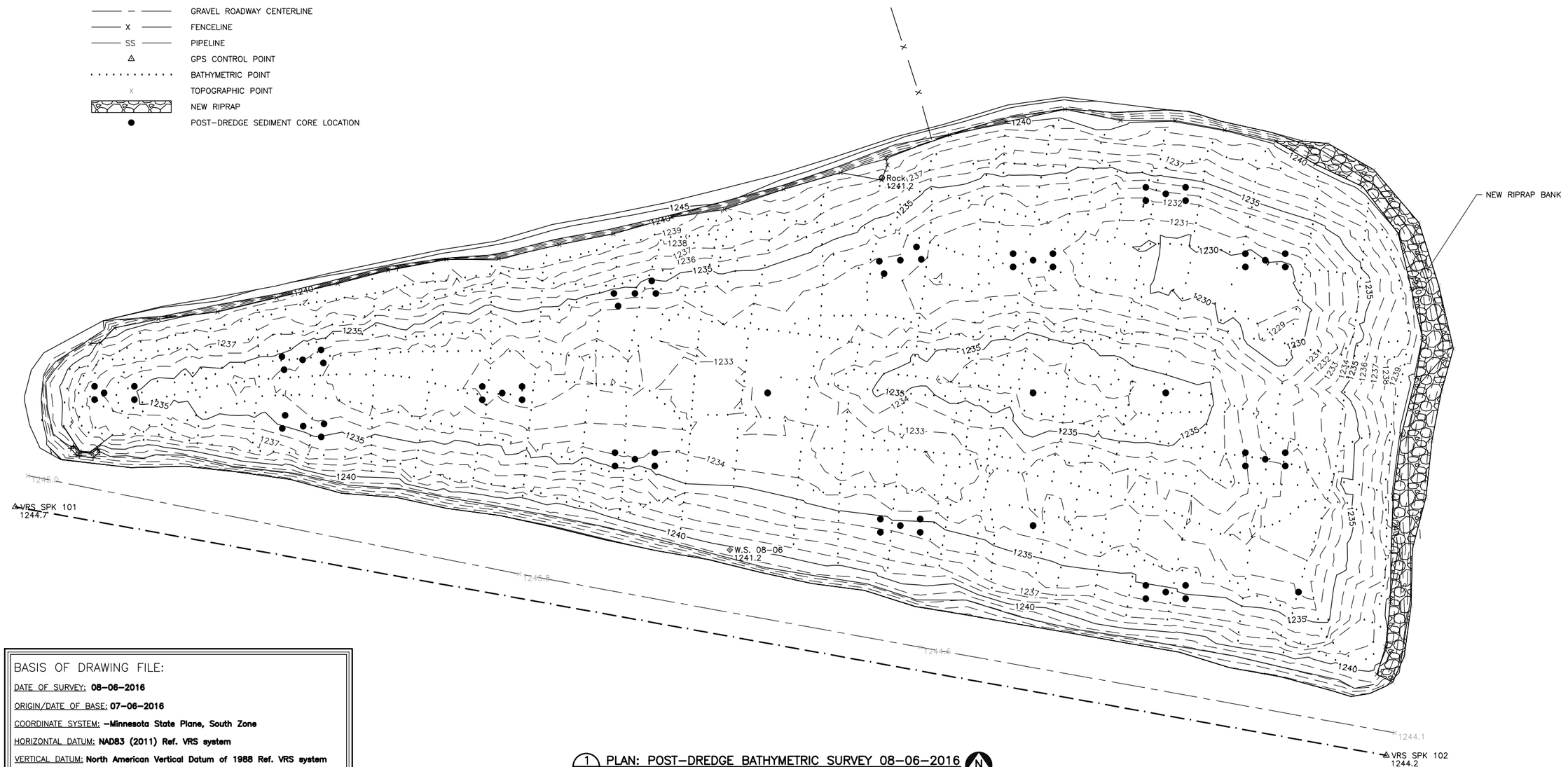
BARR PROJECT No. 23/46–1034.00
CLIENT PROJECT No.
DWG. No. C–01
REV. No. A

LEGEND

- 1240 — POST-DREDGE 5' CONTOUR
- 1239 — POST-DREDGE 1' CONTOUR
- BREAKLINE
- BASELINE
- GRAVEL ROADWAY CENTERLINE
- FENCELINE
- PIPELINE
- GPS CONTROL POINT
- BATHYMETRIC POINT
- TOPOGRAPHIC POINT
- NEW RIPRAP
- POST-DREDGE SEDIMENT CORE LOCATION

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
Final-Volume	**1.00**	**1.00**	70635.33 Sq. Ft.	8114.51 Cu. Yd.	22.34 Cu. Yd.	8092.17 Cu. Yd.<Cut>
Totals			70635.33 Sq. Ft.	8114.51 Cu. Yd.	22.34 Cu. Yd.	8092.17 Cu. Yd.<Cut>



BASIS OF DRAWING FILE:

DATE OF SURVEY: **08-06-2016**

ORIGIN/DATE OF BASE: **07-06-2016**

COORDINATE SYSTEM: **-Minnesota State Plane, South Zone**

HORIZONTAL DATUM: **NAD83 (2011) Ref. VRS system**

VERTICAL DATUM: **North American Vertical Datum of 1988 Ref. VRS system**

ADDITIONAL FILE INFORMATION:

1 – PLAN: POST-DREDGE BATHYMETRIC SURVEY 08-06-2016

0 20 40
SCALE IN FEET

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

CLIENT	08/10/16								
BID									
CONSTRUCTION									
PERMIT									
RELEASED TO/FOR	A	B	C	0	1	2	3		
	DATE RELEASED								

BARR
Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
Suite 200
MINNEAPOLIS, MN 55435
Ph: 1-800-632-2277
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www.barr.com

Scale	AS SHOWN
Date	08/08/16
Drawn	JHS
Checked	
Designed	
Approved	SMK

INTERSTATE POWER & LIGHT CO.
SHERBURN, MINNESOTA

FOX LAKE GENERATING STATION
SHERBURN, MINNESOTA

INACTIVE CCR SURFACE IMPOUNDMENT
POST-DREDGE BATHYMETRIC SURVEY 8/6/2016

BARR PROJECT No. 23/46-1034.00
CLIENT PROJECT No.
DWG. No. C-02
REV. No. A

Appendix A

Sediment Core Information

Pre-dredge Sediment Cores

Sediment Core/Boring Log

10.3-4.3

VC: vibracore
PC: push core

Proj#: 2346 1039.00-200-100 Project: ~~Bar~~ Alliant Energy - Ash Pond
Collection Date(s): 7-15-16 GPS X:
Ice Thickness (feet): → GPS Y:
Water Depth (feet): 4.3 GPS Z:
Length of Push (feet): 6.0' Driller: Bar
Recovery (feet): 5.9' Crew: JWJ/SRN2
% Recovery: Observer: —
Core/Boring#: C-1
Drilling Method: VC
Logged by: JWJ
Checked by: SRN2

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.3	0-2 2-4 4-5.3	W	Loose	N	low	Trace	None Noticed	Blk	Trace	Ashy silts (ML)		0-5.3 = Blk loose Ashy silts vfg ashy soils softer than Pudding
5.3	5.9	5.3-5.9	Moist	Stiff	low	Yes	N	N	N	N	CL		5.3-5.9 = olive blue to rusty brown Stiff lean clay w/ some sand at trace gravel subang

Refusal @ 6.0'
lost 0.1' out Bottom (clay) of tube

Photo #1 – SC-01-Pre-Dredge

Sediment Core/Boring Log

10.2'-4.5' = 5.7

VC: vibracore
PC: push core

Proj#: 23461034.00-200-100 Project:
Collection Date(s): 7-15-16 GPS X:
Ice Thickness (feet): ~ GPS Y:
Water Depth (feet): 4.5 GPS Z:
Length of Push (feet): 5.7 Driller: Baff
Recovery (feet): 5.6 Crew: JWJ/SRN2
% Recovery: Observer:
Core/Boring#: C-2
Drilling Method: VC
Logged by: JWJ
Checked by: SRN2

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.2	0-2	W	Loose	N	low	Ashy Bits	None Noticed	Blk	Trace	ML		0-5.2' = Blk loose Ashy Silts vfg ashy bits softer than pudding
		2-4											
		4-5.2											
5.2	5.6	5.2-5.6	M	Stiff	Yes	Yes	N	N	N		CL		5.2-5.6 = Olive blue to rusty brown stiff lean clay w/ some sand and gravel subgravel
													~~Refusal~~ Refusal @ 5.7'

Photo #2 – SC-02-Pre-Dredge

Sediment Core/Boring Log

8.4-4.1

VC: vibracore
PC: push core

Proj#: 23 46 1034.00-200-100 Project:
Collection Date(s): 7-15-16 GPS X:
Ice Thickness (feet): — GPS Y:
Water Depth (feet): 4.1 GPS Z:
Length of Push (feet): 4.3 Driller: Barr
Recovery (feet): 4.1 Crew: JWJ/SRN2
% Recovery: Observer:
Core/Boring#: C-3
Drilling Method: VC
Logged by: JWJ
Checked by: SRN2

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	2.6	0-2.6	W	Loose	N	Low	Ash bits vfg	None Noted	Blk	Trace	ML		0-2.6 = Blk loose Ashy silts vfg ash bits softer than pudding
2.6	4.1	2.6-4.1	M	Stiff	Low	Yes	N	N	N	N	CL		2.6-4.1 = Olive blue/green to rusty brown lean clay w/ vfg-fg sand and f.ne gravel subrnd to sub angular
													Refusal @ 4.3 ft

Photo #3 – SC-03-Pre-Dredge

Sediment Core/Boring Log

9.6 - 4.8 =

VC: vibracore
PC: push core

Proj#: 23461034.00 200-100 Project:
Collection Date(s): 7-15-16 GPS X:
Ice Thickness (feet): — GPS Y:
Water Depth (feet): 4.8 GPS Z:
Length of Push (feet): 4.8' Recovery (feet): ~~4.5~~ ~4.5' % Recovery:
Driller: Barr Crew: JWJ/SRM2 Observer: —
Core/Boring#: C-4 Drilling Method: VC Logged by: JWJ Checked by: SRM2

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	~~3.0~~	0-2' ~~0-3.0~~ 2-3'	W	Loose	N	Low	Vfg Ash	None	Blk	Trace	ML		0-3.0' = Black loose Ash/Silt/ts w/ vfg Ash bits, softer than padding * lost approximately 1.0 ft of loose sed during extraction
3.0	~~3.5~~ 4.5	~~2-3.1'~~ 3.0-4.5	M	Stiff	Low	Yes	N	N	N	N	CL		3.0 - 4.5 = Olive blue/green to rusty brown lean clay w/ vfg-cgs and and fine gravel subang-subrnd.
													Refusal @ 4.8'
													*

Photo #4 – SC-04-Pre-Dredge

Post-dredge Sediment Cores

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/1/16 GPS X: 2436791.93 Length of Push (feet): 0.65 Driller: Barr
Ice Thickness (feet): - GPS Y: 574314.97 Recovery (feet): 0.65 Crew: KDM/JKH2
Water Depth (feet): 5.65' GPS Z: - % Recovery: Observer: -
Core/Boring#: SC-05
Drilling Method: PC
Logged by: JKH2
Checked by: -

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.65												Water
5.65	6.10		yes	soft				no					Dark grey/black, reddish chunks present that is easily broken, ~1" piece of gravel
6.10	6.30		some	hard				no			CH		Lighter grey clay

Photo #1 – SC-05

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash pond Core/Boring#: SC-05A

Collection Date(s): 8/4/16 GPS X: 2436788.34 Length of Push (feet): 0.15 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574312.47 Recovery (feet): 0.15 Crew: SBN2/JKH2 Logged by: JKH2

Water Depth (feet): 5 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5												Water
5	5.03		wet	soft				no					silts + gravel mixed ~~with~~ w/ soft sediment
5.03	5.15		some	hard				no			CH		Hard Grey clay

Photo #2 – SC-05A

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-05B

Collection Date(s): 8/4/16 GPS X: 2436788.34 Length of Push (feet): 0.35 Driller: Barr Drilling Method: PC

Ice Thickness (feet): – GPS Y: 574317.47 Recovery (feet): 0.35 Crew: SRR12 JKH2 Logged by: JKH2

Water Depth (feet): 5.6 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.6												Water
5.6	5.63		wet	soft				no					gravel + soft clay
5.63	5.95		none	hard				no			CH		hard grey clay

Photo #3 – SC-05B

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/4 GPS X: 2436803.34 Length of Push (feet): 0.3 Driller: Barr
Ice Thickness (feet): - GPS Y: 574312.47 Recovery (feet): 0.3 Crew: SEN2 JKHZ
Water Depth (feet): 5.5 GPS Z: % Recovery: Observer:

Core/Boring#: SC-05C
Drilling Method: PC
Logged by: JKHZ
Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.5												water
5.5	5.54		wet	soft									silts + gravel mixed w/ soft sediment
5.54	5.70		some	hard							CH		Grey clay

Photo #4 – SC-05C

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-05D

Collection Date(s): 8/4/16 GPS X: 2436803.34 Length of Push (feet): 0.5 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574317.47 Recovery (feet): 0.5 Crew: JKH2/SRN2 Logged by: JKH2

Water Depth (feet): 5.8 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.8												Water
5.8	5.87		wet	soft				no					Silts + gravel, trace soft sediment
5.87	6.3		some	hard				no			CH		Hard grey clay

Photo #5 – SC-05D

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-06

Collection Date(s): 8/1 GPS X: 2436866.74 Length of Push (feet): 0.65 Driller: Barr Drilling Method: PC

Ice Thickness (feet): – GPS Y: 574327.47 Recovery (feet): 0.65 Crew: KDM/KHZ Logged by:

Water Depth (feet): 6.4 GPS Z: – % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.4												Water
6.4	7.05		wet	soft				none					Black, mucky material, dark grey (almost black) soft, clay-like in texture w/ trace gritty sand size material Trace wood *Did not recover firm clay bottom)

Photo #6 – SC-06

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-06A

Collection Date(s): 8/5/16 GPS X: 2436859.78 Length of Push (feet): 0.55 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574323.72 Recovery (feet): 0.55 Crew: SRN/ABW Logged by: JKH2

Water Depth (feet): 7.3 GPS Z: - % Recovery: - Observer: - Checked by: -

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	7.3												water
7.3	7.85		some	hard				no			CH		Grey clay, sometimes mixed at top w/ trace soft sediment

Photo #7 – SC-06A

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-06B
Collection Date(s): 8/5/16 GPS X: 2436858.92 Length of Push (feet): 0.35 Driller: Barr Drilling Method: PC
Ice Thickness (feet): - GPS Y: 574328.65 Recovery (feet): 0.35 Crew: ABW/SRN2 Logged by: JKH2
Water Depth (feet): 7.6 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	7.6												Water
7.6	7.95		some	hard				no				CH	DK grey clay w/ trace silt/[redacted] mix on top soft sediment

Photo #8 – SC-06B

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23401034 Project: Fox Lake Ash Pond Core/Boring#: SC-06C

Collection Date(s): 8/5/16 GPS X: 2436874.56 Length of Push (feet): 0.35 Driller: Barr Drilling Method: PC

Ice Thickness (feet): – GPS Y: 574326.29 Recovery (feet): 0.35 Crew: SRNZ/ARW Logged by: JBHZ

Water Depth (feet): 6.6 GPS Z: – % Recovery: – Observer: – Checked by: –

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.6												Water
6.6	6.65		wet	soft				no					silt, soft sediment mixture, very dark grey
6.65	6.95		some	hard				no			CH		grey clay

Photo #9 – SC-06C

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-06 D

Collection Date(s): 8/5/16 GPS X: 2436873.70 Length of Push (feet): 0.42 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574331.22 Recovery (feet): 0.42 Crew: ABW/SRN2 Logged by: JKHZ

Water Depth (feet): 6.8 GPS Z: - % Recovery: - Observer: - Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	6.8												water
6.8	6.82		wet	soft				no					Dark grey silt w/ [illegible] mix soft sediment
6.82	7.22		some	hard				no			CH		grey clay, trace silt

Photo #10 – SC-06D

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461054 Project: Fox Lake Ash Pond
Collection Date(s): 8/1/16 GPS X: 2436866.93 Length of Push (feet): 0.4 Driller: Barr
Ice Thickness (feet): - GPS Y: 574302.47 Recovery (feet): 0.4 Crew: JKH2/KDM
Water Depth (feet): 4.9 GPS Z: - % Recovery: Observer:
Core/Boring#: SC-07
Drilling Method: PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	4.9												Water
4.9	5.15		wet	soft				no					-Dark grey soft sandy clay -Not as mucky as others
5.15	5.3		some	hard				no					Dark grey clay

Photo #11 – SC-07

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond

Collection Date(s): 8/4/16 GPS X: 2436859.07 Length of Push (feet): - Driller: Barr

Ice Thickness (feet): - GPS Y: 574301.63 Recovery (feet): - Crew: SRN2/JKH2

Water Depth (feet): 5.6' GPS Z: - % Recovery: - Observer: -

Core/Boring#: SC-08A

Drilling Method: PC

Logged by: JKH2

Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.6												Water
5.6	-			hard				no			CH		-Brown clay on sides of core device -Fell out after various attemps -Trace silts visible on way out soft sediment

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-0[illegible]3

Collection Date(s): 8/4/16 GPS X: [illegible] Length of Push (feet): - Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: [illegible] Recovery (feet): - Crew: SRN2/JKH2 Logged by: JKH2

Water Depth (feet): 7.6 GPS Z: - X: 2436860.14 % Recovery: Observer: Checked by:

y: 574306.51

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	7.6												Water
7.6	-												-Brown clay, no ash in core, fell out multiple times -Brown clay on core device

BARR

Sediment Core/Boring Log

page_____of_____

VC: vibracore
PC: push core

Proj#: 23461084 Project: Fox Lake Ash Pond Core/Boring#: SC-08C

Collection Date(s): 8/4/16 GPS X: 2436873.72 Length of Push (feet): 0.2 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574298.42 Recovery (feet): 0.2 Crew: SRN2/JKH2 Logged by: JKH2

Water Depth (feet): 6.1 GPS Z: % Recovery: - Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.1												Water
6.1	6.3		some	hard				no			CH		Brown clay w/ trace ~~sand~~/silts on top, no ash soft sediment

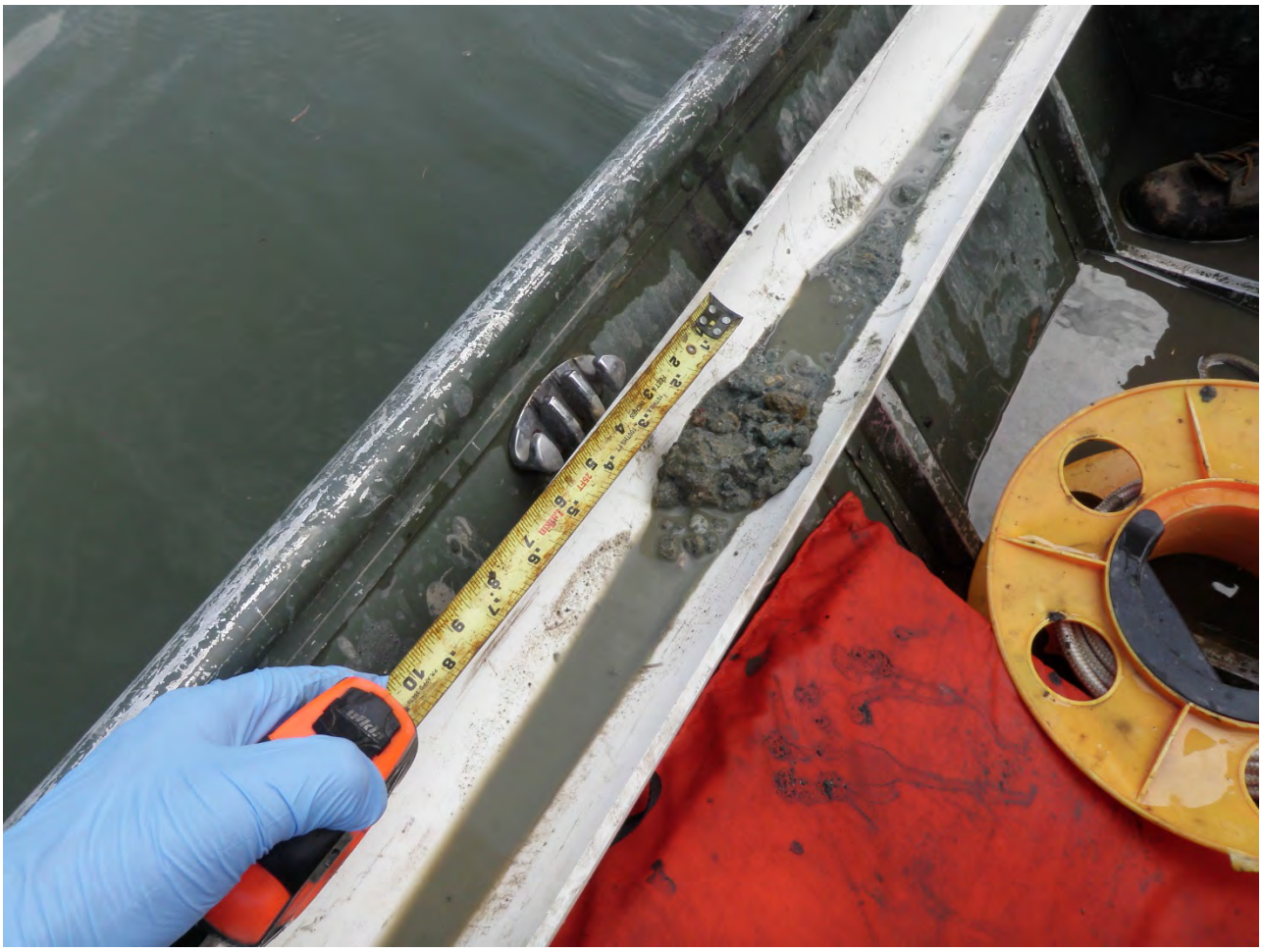

Photo #12 – SC-07C

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/4/16 GPS X: 2436874.79 Length of Push (feet): 0.3 Driller: Barr
Ice Thickness (feet): - GPS Y: 574303.31 Recovery (feet): 0.3 Crew: SRN2/JKH2
Water Depth (feet): 6.35 GPS Z: - % Recovery: - Observer: -
Core/Boring#: SC-07D
Drilling Method: PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	6.35												Water
6.35	6.65		same	hard				no			CH		Brown clay, trace [illegible] + silts on top soft sediment

Photo #13 – SC-07D

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-08
Collection Date(s): 8/1 GPS X: 2436941.93 Length of Push (feet): 0.5 Driller: Barr Drilling Method: PG.
Ice Thickness (feet): — GPS Y: 574314.92 Recovery (feet): 0.5 Crew: KDM/JKH2 Logged by: JKH2
Water Depth (feet): 8.9' GPS Z: — % Recovery: — Observer: — Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	8.9												Water
8.9	9.15		wet	soft				none					Hard dark clay mixed w/ sediment & muck
9.15	9.35		some	hard							CH		Light grey clay

Photo #14 – SC-08

BARR

Sediment Core/Boring Log

VC: vibracore
(PC: push core)

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-08A

Collection Date(s): 3/4/16 GPS X: 2436934.43 Length of Push (feet): 0.25 Driller: Barr Drilling Method: PC

Ice Thickness (feet): – GPS Y: 574312.42 Recovery (feet): 0.25 Crew: SRN2/JKH2 Logged by: JKH2

Water Depth (feet): 9.0 GPS Z: – % Recovery: – Observer: – Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	9.0												Water
9.0	9.05		wet	soft				no					Dark silts + soft material, trace soft sediment
9.05	9.25		some	hard				no			CH		Brown clay

Photo #15 – SC-08A

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-08B

Collection Date(s): 8/4/16 GPS X: 2436934.43 Length of Push (feet): 0.3 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574317.42 Recovery (feet): 0.3 Crew: SRN2/JKH2 Logged by: JKH2

Water Depth (feet): 9.1 GPS Z: - % Recovery: - Observer: - Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.1												Water
9.1	9.4		some	hard				no			CH		Brown Clay w/ trace [illegible], silts on top soft sediments,

Photo #16 – SC-08B

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-08C

Collection Date(s): 8/4/16 GPS X: 2436949.43 Length of Push (feet): 0.32 Driller: Barr Drilling Method: PC

Ice Thickness (feet): – GPS Y: 574312.42 Recovery (feet): 0.32 Crew: SRN2/JKH2 Logged by: JKH2

Water Depth (feet): 9.3 GPS Z: – % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.3												Water
9.3	9.32		wet	soft				no					mixed w/ silt soft sediment
9.32	9.62		some	hard				no			CH		Brown clay

Photo #17 – SC-08C

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-08D

Collection Date(s): 8/4/16 GPS X: Length of Push (feet): 0.35 Driller: Barr Drilling Method: PC

Ice Thickness (feet): GPS Y: Recovery (feet): 0.35 Crew: SRN2/JKH2 Logged by: JKH2

Water Depth (feet): 9.9 GPS Z: % Recovery: - Observer: - Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	9.9												Water
9.9	9.95		wet	soft				no					Silts + [illegible] with Brown Clay soft sediment
9.95	10.25		some	hard				no			CH		Brown Clay

Photo #18 – SC-08D

Sediment Core/Boring Log

BARR

VC: vibracore
(PC: push core)

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-09

Collection Date(s): 8/1/16 GPS X: 2436991.93 Length of Push (feet): 0.4 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574352.47 Recovery (feet): 0.4 Crew: KDM/JKHZ Logged by: JKHZ

Water Depth (feet): 5.3 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.3												water
5.3	5.4		wet	soft				no					soft grey clay
5.4	5.5		wet	soft				no					soft clays, sands, mottled brn & grey
5.6	5.7		some	hard				no			CH		Hard brown/tan clay

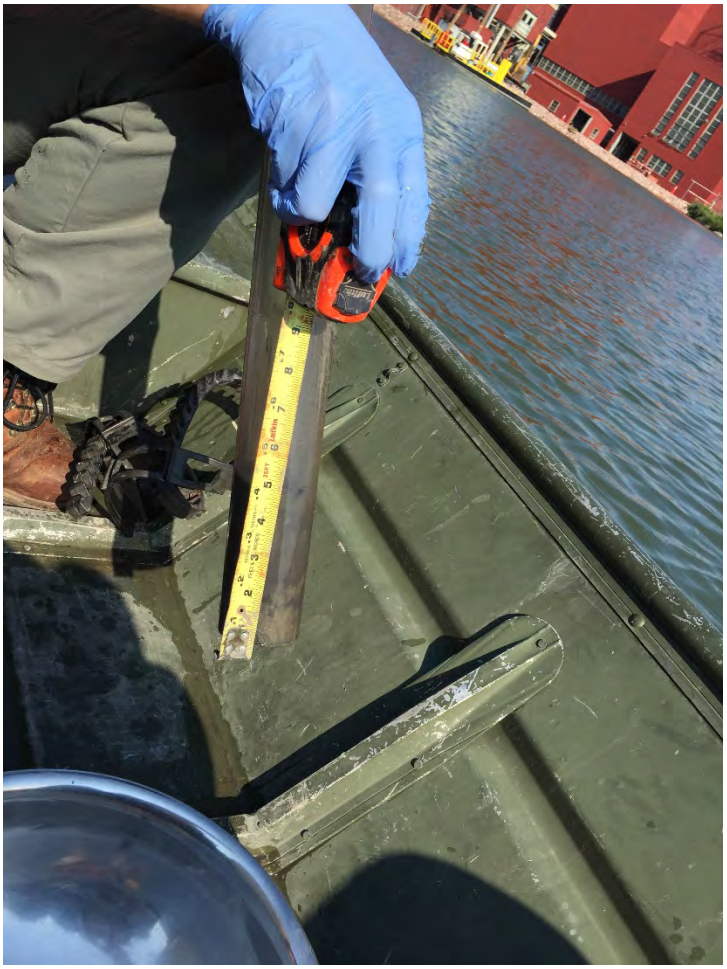

Photo #19 – SC-09

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-09A

Collection Date(s): 8/3/16 GPS X: 2436985.59 Length of Push (feet): 0.45 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574347.74 Recovery (feet): 0.45 Crew: PWS BRNB JKH2 Logged by: JKH2

Water Depth (feet): 5.15 GPS Z: - % Recovery: - Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.15												Water
5.15	5.17		wet	soft				no					Ashy soft sediment
5.17	5.60		some	hard				no			CH		Brown clay

Photo #20 – SC-09A

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/3/16 GPS X: 2436984.03 Length of Push (feet): 0.8 Driller: Barr
Ice Thickness (feet): – GPS Y: 574352.47 Recovery (feet): 0.8 Crew: PWS/JKHZ
Water Depth (feet): 3.70 GPS Z: % Recovery: Observer:
Core/Boring#: SC-09B
Drilling Method: PC
Logged by: JKHZ
Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	3.7												Water
3.7	3.71		wet	soft				no					Ash & soft sediment
3.71	4.50		some	hard				no			CH		Mixed gravel & hard brown clay

Photo #21 – SC-09B

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond

Collection Date(s): 8/3/16 GPS X: 2436999.83 Length of Push (feet): 0.35 Driller: Barr

Ice Thickness (feet): - GPS Y: 574352.45 Recovery (feet): 0.35 Crew: PWS/JKH2

Water Depth (feet): 5.91 GPS Z: % Recovery: Observer:

Core/Boring#: SC-09G

Drilling Method: PC

Logged by: JKH2

Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	5.91												Water
5.91	5.96		Soft wet	soft				no					-Clayey gravely sediment - Brown/dark grey
5.96	6.26		some	hard				no			CH		Brown Clay

Photo #22 – SC-09C

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-09D

Collection Date(s): 8/3/16 GPS X: 2436998.26 Length of Push (feet): 0.3 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574357.20 Recovery (feet): 0.3 Crew: PWS/JKH2 Logged by: JKH2

Water Depth (feet): 4.20 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	4.2												Water
4.2	4.5		some	hard				no			CH		Brown clay w/ dusting of ~~ash~~ soft sediment

Photo #23 – SC-09D

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/1/16 GPS X: 2436991.93 Length of Push (feet): 0.45 Driller: Barr
Ice Thickness (feet): - GPS Y: 574287.97 Recovery (feet): 0.45 Crew: KDH/JKH2
Water Depth (feet): 6.0 GPS Z: - % Recovery: - Observer: -

Core/Boring#: SC-10
Drilling Method: PC
Logged by: JKH2
Checked by: -

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.0												Water
6.0	6.35			soft				n.s					Dark-grey soft clayey material, some black traces, mucky & clayey combo
6.35	6.45			Firm				n.d			CH		Light grey clay

Photo #24 – SC-10

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond

Collection Date(s): 8/4/16 GPS X: 2436984.43 Length of Push (feet): 0.4 Driller: Barr

Ice Thickness (feet): - GPS Y: 574287.47 Recovery (feet): 0.4 Crew: SRN2/JKH2

Water Depth (feet): 6.3 GPS Z: % Recovery: Observer:

Core/Boring#: SC-10A

Drilling Method: PC

Logged by: JKH2

Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.3												Water
6.3	6.35		yes	soft				no					soft sediment Clay w/ gravel, trace silts on top
6.35	6.7		some	hard				no			CH		Brown/Grey Clay

Photo #25 – SC-10A

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC10B

Collection Date(s): 8/4/16 GPS X: 243684.43 Length of Push (feet): 0.3 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574292.47 Recovery (feet): 0.3 Crew: SRNZ/JKH2 Logged by: JKH2

Water Depth (feet): 0.8 GPS Z: - % Recovery: - Observer: - Checked by: -

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	0.8												Water
0.8	6.85		wet	soft				no					soft gravel, [illegible], soft sediments
6.85	7.1		some	hard				no			CH		Brown clay w/ gravel

Photo #26 – SC-10B

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond

Collection Date(s): 8/4/16 GPS X: 2436999.43 Length of Push (feet): 0.35 Driller: Barr

Ice Thickness (feet): – GPS Y: 574287.47 Recovery (feet): 0.35 Crew: SRN2/JKH2

Water Depth (feet): 6.9 GPS Z: % Recovery: Observer: –

Core/Boring#: SC-10C

Drilling Method: PC

Logged by: JKH2

Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.9												Water
6.9	6.95		wet	soft				no					soft gravel, some soft sediments
6.95	7.25		some mo	hard				no			CH		Brown clay

Photo #27 – SC-10C

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-10D

Collection Date(s): 8/4/16 GPS X: Length of Push (feet): 0.3 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: Recovery (feet): 0.3 Crew: SRNZ/JKH2 Logged by: JKH2

Water Depth (feet): GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	5.8												Water
5.8	6.1		some	hard				no			CH		Gravel at top w/ trace [redacted] on top of Brown clay soft sediments

[redacted]

Photo #28 – SC-10D

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC111

Collection Date(s): 8/1 GPS X: 2437041.93 Length of Push (feet): 0.25 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574314.97 Recovery (feet): 0.25 Crew: KDM/JKH2 Logged by: JKH2

Water Depth (feet): 8.9 GPS Z: - % Recovery: Observer: - Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	8.9												Water
8.9	9.08		wet	soft				no					Some dark muck
9.08	9.15		little	hard				no					-Medium grey hard clay
8.97													- some brown & mottled shades of grey
													- some gravel chunks
													* Felt immediate hard resistance. Can't feel soft part w/ water depth or w/ tube *

Photo #29 – SC-11

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-12

Collection Date(s): 8/1/16 GPS X: 2437091.93 Length of Push (feet): 0.5 Driller: Barr Drilling Method: PC

Ice Thickness (feet): – GPS Y: 574364.97 Recovery (feet): 0.5 Crew: KDM/JKH2 Logged by: JKH2

Water Depth (feet): 8.1 GPS Z: – % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	8.1												Water
8.1	8.5		wet	soft		yes		no					-Soft soupy pudding consistency -Grey clayey mucks w/ ash chunks -Outside of tube was smeared to 1'
8.5	8.6		some	hard				no			CH		-lighter grey firm clay -woody debris, gravel

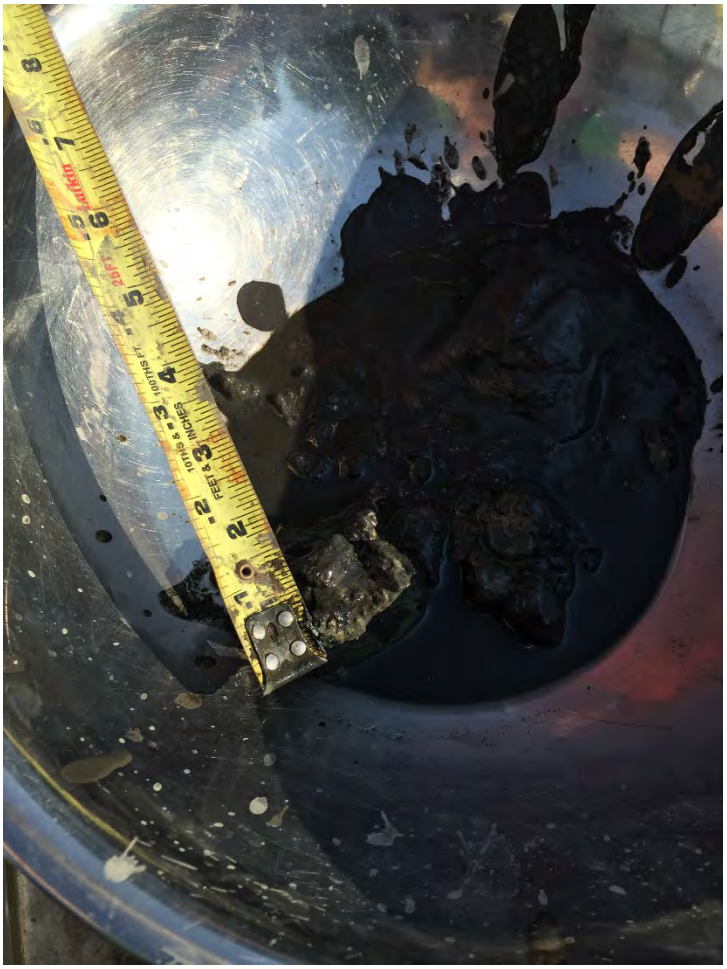

Photo #30 – SC-12

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Foxlake Ash Pond Core/Boring#: SC-12A

Collection Date(s): 3/4/16 GPS X: 2437085.83 Length of Push (feet): 0.45 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 374359.93 Recovery (feet): 0.45 Crew: SRNZ/JKH2 Logged by: JKH2

Water Depth (feet): 9.8 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.8												Water
9.8	9.87		wet	soft				no					~~gravelly silty sediments~~ -soft clay, silt, gravel mix
9.87	10.25		some	hard				no			CH		Grey clay

Photo #31 – SC-12A

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-12B

Collection Date(s): 8/4/16 GPS X: 2437084.03 Length of Push (feet): 0.32 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574364.60 Recovery (feet): 0.32 Crew: SRN2/JKH2 Logged by: JKH2

Water Depth (feet): 9.5 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.5												Water
9.5	9.52		wet	soft				no					Gravelly silts & sediments
9.52	9.82		some	hard				no			CH		Grey clay

Photo #32 – SC-12B

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-12C

Collection Date(s): 8/4/16 GPS X: 2437099.83 Length of Push (feet): 0.30 Driller: Barr Drilling Method: PC

Ice Thickness (feet): – GPS Y: 574365.34 Recovery (feet): 0.30 Crew: SRNZ/JKH2 Logged by: JKH2

Water Depth (feet): 9.1 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	9.1												Water
9.1	9.12		wet	soft				no					gravelly silty sediment, grey to dark grey
9.12	9.4		some	hard				no			CH		Grey clay

Photo #33 – SC-12C

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-12D

Collection Date(s): 8/4/16 GPS X: 2437098.02 Length of Push (feet): 0.21 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574370.00 Recovery (feet): 0.21 Crew: SRNZ/JKH2 Logged by: JKH2

Water Depth (feet): 9.0 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.0												Water
9.0	9.03		wet	soft				no					Gravelly silts & sediments
9.03	9.21		some	hard				no			CH		Grey clay w/ black clay intermixed

Photo #34 – SC-12D

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/1/16 GPS X: 2437091.93 Length of Push (feet): 0.55 Driller: Barr
Ice Thickness (feet): - GPS Y: 574264.97 Recovery (feet): 0.55 Crew: KDH/JKH2
Water Depth (feet): 8.1 GPS Z: - % Recovery: Observer:

Core/Boring#: SC-13
Drilling Method: PC
Logged by: JKH2
Checked by: -

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	8.1												Water
8.1	8.55		wet	soft				no					Consistent grey color, cohesive clayey texture w/ grit, w/ very pudding like consistancy, small black specs throughout
8.55	8.65		some	hard				no			CH		Hard grey clay
													30' away from water discharge into pond

Photo #35 – SC-13

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-13A

Collection Date(s): 8/5/16 GPS X: 2437084.43 Length of Push (feet): 0.19 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574262.47 Recovery (feet): 0.19 Crew: SRN2/[redacted] ABW Logged by: JKH2

Water Depth (feet): 5.6 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.6												water
5.6	5.66		wet	soft				no					silty [redacted] soft sediment mix
5.66	5.79		some	hard				no			CH		Grey clay

Photo #36 – SC-13A

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond

Collection Date(s): 8/5/16 GPS X: 2437084.43 Length of Push (feet): - Driller: Barr

Ice Thickness (feet): - GPS Y: 5747267.47 Recovery (feet): None Crew: ABW/SRN2

Water Depth (feet): 6.7 GPS Z: % Recovery: Observer:

Core/Boring#: SC-13B

Drilling Method: PC

Logged by: JRH2

Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	6.7												Water
6.7	-												No recovery

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23401034 Project: Fox Lake Ash Pond Core/Boring#: SC-13G

Collection Date(s): 8/5/16 GPS X: 2437079.43 Length of Push (feet): 0.24 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 5742607.47 Recovery (feet): 0.24 Crew: ABW/SRNZ Logged by: JKH2

Water Depth (feet): 4.4 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	4.4												Water
4.40	4.64		some	hard				no			CH		light grey clay, trace silt

Photo #37 – SC-13C

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461084 Project: Fox Lake Ash Pond
Collection Date(s): 8/5/16 GPS X: 2437099.43 Length of Push (feet): 0.25 Driller: Barr
Ice Thickness (feet): - GPS Y: 574267.47 Recovery (feet): 0.25 Crew: ABW/SBN2
Water Depth (feet): 5.6 GPS Z: % Recovery: Observer:

Core/Boring#: SC-13D
Drilling Method: PC
Logged by: JKHZ
Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	5.6												Water
5.6	5.63		yes	soft				no					silty [illegible] soft sediments
5.63	5.85		some	hard				no			CH		Grey clay

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-14

Collection Date(s): 8/1/16 GPS X: 2437141.93 Length of Push (feet): 0.37 Driller: Barr Drilling Method: PC

Ice Thickness (feet): — GPS Y: 574364.97 Recovery (feet): 0.37 Crew: RAM JKHZ Logged by: JKHZ

Water Depth (feet): 10.1 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	10.1												water
10.1	10.37		yes	soft		some		no					-Grey, soft, pudding-like, less cohesive than SC-13, thin (1/8" thick) flakes of crumbly, light grey material, easily broken by hand, small stick also present
10.37	10.47		some	hard				no			CH		Mottled brown + grey firm clay

Photo #38 – SC-14

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-14A

Collection Date(s): 8/5/16 GPS X: 2437134.43 Length of Push (feet): 0.4 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574362.47 Recovery (feet): 0.4 Crew: ABW | SRN2 Logged by: JKH2

Water Depth (feet): 8.9 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	8.9												Water
8.9	8.97		wet	soft				no					soft silt / gravel
8.97	9.3		some	hard				no			CH		clay

Photo #39 – SC-14A

Sediment Core/Boring Log

BARR

VC: vibracore
(PC: push core)

Proj#: 23601034 Project: Fox Lake Ash Pond Core/Boring#: SC-14B

Collection Date(s): 8/5/16 GPS X: 2437134.43 Length of Push (feet): 0.31 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574367.47 Recovery (feet): 0.31 Crew: ABW | SRN2 Logged by: JKH2

Water Depth (feet): 9.2 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	9.2												Water
9.2	9.23		wet	soft				no					gravelly silt mixed w/ soft sediments
9.23	9.51		some	hard				no			CH		clay

Photo #40 – SC-14B

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-14C

Collection Date(s): 8/5/16 GPS X: 2437149.43 Length of Push (feet): 0.45 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574362.47 Recovery (feet): 0.45 Crew: ABW/[redacted] SRN2 Logged by: JKH2

Water Depth (feet): 9.6 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	9.6												water
9.6	9.65		wet	soft				no					silt not representative, poor recovery
9.65	10.05		some	hard				no			CH		Grey Clay

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-14D

Collection Date(s): 8/5/16 GPS X: Length of Push (feet): 0.4 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: Recovery (feet): 0.4 Crew: ABW | SRN2 Logged by: JKH2

Water Depth (feet): 9.7 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.7												Water
9.7	9.75		wet	soft				no					Gravelly silt, trace [redacted] soft sediments
9.75	9.81		some	hard				no			CH		Grey clay.

Photo #41 – SC-14D

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/1/16 GPS X: 2437141.93 Length of Push (feet): 0.2 Driller: Barr
Ice Thickness (feet): – GPS Y: 574314.97 Recovery (feet): 0.2 Crew: KDM/JKH2
Water Depth (feet): 4.8 GPS Z: – % Recovery: . Observer: –
Core/Boring#: SC15
Drilling Method: PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	4.8												Water
4.8	5.0		some	hard				no			CH		Immediately hit hard grey/brown mottled clay with gravel. Small chunks (1/2" Diameter) of black coal like materia

Photo #42 – SC-15

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/1/16 GPS X: 2437141.93 Length of Push (feet): 0.3 Driller: Barr
Ice Thickness (feet): - GPS Y: 574264.97 Recovery (feet): 0.3 Crew: KDM/JKH2
Water Depth (feet): 7.5 GPS Z: - % Recovery: Observer:
Core/Boring#: SC-16
Drilling Method: PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	7.5												water
7.5	7.55		wet	Soft				no					soupy grey sediment w/ clay balls
7.55	7.80		some	hard				no			CH		Hard brown clay
													30' from water discharge into pond

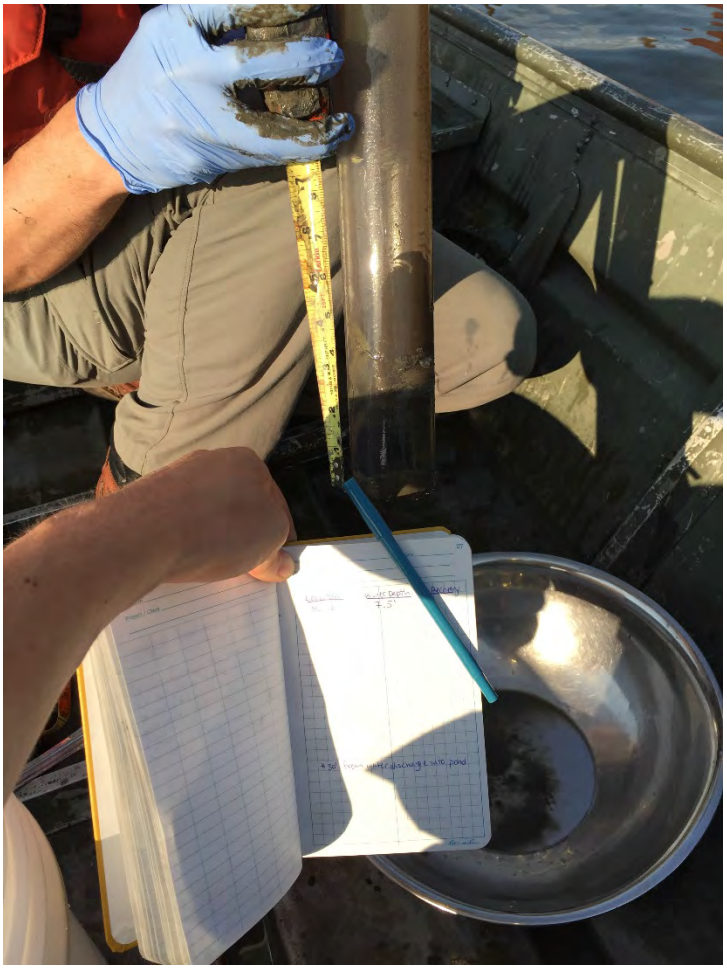

Photo #43 – SC-16

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC17

Collection Date(s): 8/1/16 GPS X: 2437191.93 Length of Push (feet): 0.23 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574389.97 Recovery (feet): 0.23 Crew: KDM/JKH2 Logged by: JKH2

Water Depth (feet): 9.7 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.7												Water
9.7	9.93												-Hard, crumbly/crunchy grey material - Some grey clay mixed in -Consistent throughout *Did not recover firm clay bottom*

Photo #44 – SC-17

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/5/16 GPS X: 2437184.43 Length of Push (feet): 0.14 Driller: Barr
Ice Thickness (feet): 1 GPS Y: 574387.47 Recovery (feet): 0.14 Crew: AGW/SRN2
Water Depth (feet): 9.1 GPS Z: % Recovery: Observer:
Core/Boring#: SC-17A
Drilling Method: PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.10												Water
9.10	9.11		wet	soft				no					Silt mixed w/ soft sediments, very dark grey
9.11	9.24		some	hard				no			CH		Grey clay

Photo #45 – SC-17A

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-17B
Collection Date(s): 8/5/16 GPS X: 2437184.43 Length of Push (feet): 0.35 Driller: Barr Drilling Method: PC
Ice Thickness (feet): - GPS Y: 574392.47 Recovery (feet): 0.35 Crew: ABW/SRN2 Logged by: JKH2
Water Depth (feet): 7.5 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	7.5												Water
7.5	7.85		some	hard				no			CH		grey clay, trace silt/~~sand~~ soft sediments

Photo #46 – SC-17B

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23460034 Project: Fox Lake Ash Pond
Collection Date(s): 8/5/16 GPS X: 2437199.43 Length of Push (feet): 0.45 Driller: Barr
Ice Thickness (feet): GPS Y: 574387.47 Recovery (feet): 0.45 Crew: ABN | SRN2
Water Depth (feet): 9.0 GPS Z: % Recovery: Observer:
Core/Boring#: SC-17C
Drilling Method: PC
Logged by: JEHZ
Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	9.0												Water
9.0	9.07		surf	soft				no					silt / gravel / soft sediments
9.07	9.45		some	hard				no			CH		Grey clay

Photo #47 – SC-17C

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-17D

Collection Date(s): 8/5/16 GPS X: 2437199.43 Length of Push (feet): 0.3 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574392.47 Recovery (feet): 0.3 Crew: ABW/JKH2 Logged by: JKH2

Water Depth (feet): 8.3 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	8.3												Water
8.30	8.33		wet	soft				no					Silty gravel mixed w/ black clayey soft sediments
8.33	8.60		some	hard				no			CH		Grey Clay

Photo #48 – SC-17D

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Forest Lake Ash Pond
Collection Date(s): 8/1 GPS X: 2437191.93 Length of Push (feet): 0.35 Driller: Barr
Ice Thickness (feet): — GPS Y: 574314.97 Recovery (feet): 0.35 Crew: KDM/JKH2
Water Depth (feet): 5.6 GPS Z: — % Recovery: — Observer: —

Core/Boring#: SC718
Drilling Method: ~~Barr~~ PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	5.6												Water
5.6	5.65		wet	soft		yes & no		no					-1" x 0.5" crumbly grey ash chunk - some pudding-like & soupy grey material
5.65	5.95		some	hard		yes		no			CH		- Firm brown/tan clay w/ sand & trace grey clay - small piece of gravel

Photo #49 – SC-18

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/1/16 GPS X: 2437191.93 Length of Push (feet): 0.4 Driller: Barr
Ice Thickness (feet): - GPS Y: 574239.97 Recovery (feet): 0.4 Crew: EDM/JKH2
Water Depth (feet): 5.6 GPS Z: - % Recovery: Observer:
Core/Boring#: SC-19
Drilling Method: PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	5.6												Water
5.6	6.0		wet	Firm & soft mix		some		no			CH and inclusions		- Grey + Brown clay with black chunks mixed in throughout - Firm & not soupy - Appears to be clay mixed mixed w/ non-native material - Consistent throughout recovered material - 1" chunk of black coal * Did not recover firm clay bottom *

Photo #50 – SC-19

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23401034 Project: Fox Lake Ash Pond

Collection Date(s): 8/5/16 GPS X: 2437184.43 Length of Push (feet): 0.24 Driller: Barr

Ice Thickness (feet): - GPS Y: 574237.47 Recovery (feet): 0.24 Crew: ABW | SRN2

Water Depth (feet): 7.4 GPS Z: % Recovery: Observer:

Core/Boring#: SC-19A

Drilling Method: PC

Logged by: JKH2

Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	7.4												Water
7.40	7.42		wet	soft				no					Dark grey silt
7.42	7.64		some	hard				no			CH		Grey clay

Photo #51 – SC-19A

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-19B

Collection Date(s): 8/5/16 GPS X: 2437184.43 Length of Push (feet): 0.17 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574242.47 Recovery (feet): 0.17 Crew: ABW/SRN2 Logged by: JKH2

Water Depth (feet): 6.2 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.2												water
6.20	6.21		wet	soft				no					Dark grey silt
6.21	6.37		some	hard				no			CH		Grey clay

Photo #52 – SC-19B

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-19C

Collection Date(s): 8/5/16 GPS X: 2437199.43 Length of Push (feet): 0.28 Driller: Barr Drilling Method: PC

Ice Thickness (feet): GPS Y: 574237.47 Recovery (feet): 0.28 Crew: ABW/SRNZ Logged by: JKH2

Water Depth (feet): 7.1 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	7.1												Water
7.10	7.15		wet	soft				no					silty [illegible], dark grey soft sediments
7.15	7.38		some	hard				no			CH		Grey Clay

Photo #53 – SC-19C

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-19D
Collection Date(s): 8/5/16 GPS X: 2437199.43 Length of Push (feet): 0.12 Driller: Barr Drilling Method: PC
Ice Thickness (feet): - GPS Y: 574292.47 Recovery (feet): 0.12 Crew: ABW/SRN2 Logged by: JKH2
Water Depth (feet): 6.2 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.2												Water
6.20	6.22		wet	soft				no					silty soft sediments
6.22	6.32		some	hard				no			CH		Grey clay

Photo #54 – SC-19D

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Fish Pond Core/Boring#: SC-20
Collection Date(s): 8/1/16 GPS X: 2437229.43 Length of Push (feet): 0.7 Driller: Barr Drilling Method: PC
Ice Thickness (feet): - GPS Y: 574364.97 Recovery (feet): 0.7 Crew: KDM/JKHZ Logged by: JKHZ
Water Depth (feet): 10.4 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	10.4												Water
10.4	11.1		yes	soft		no		no			SP		- clayey soft grey sand - consistent throughout - Chunk of possible slag 3/4" diameter - More sandy than clayey - Fine, poorly graded - Unable to get clay plug - First push yielded no recovery

Photo #55 – SC-20

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Foxlake Ash Pond Core/Boring#: SC-20A
Collection Date(s): 8/5/16 GPS X: 2437221.93 Length of Push (feet): 0.22 Driller: Barr Drilling Method: PC
Ice Thickness (feet): - GPS Y: 574362.47 Recovery (feet): 0.22 Crew: ABW/SRN2 Logged by: JKH2
Water Depth (feet): 11.1 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	11.1												water
11.10	11.12		wet	soft				no					silt w/ gravel & ~~cobbles~~ soft sediments
11.12	11.32		some	hard				no			CH		grey clay

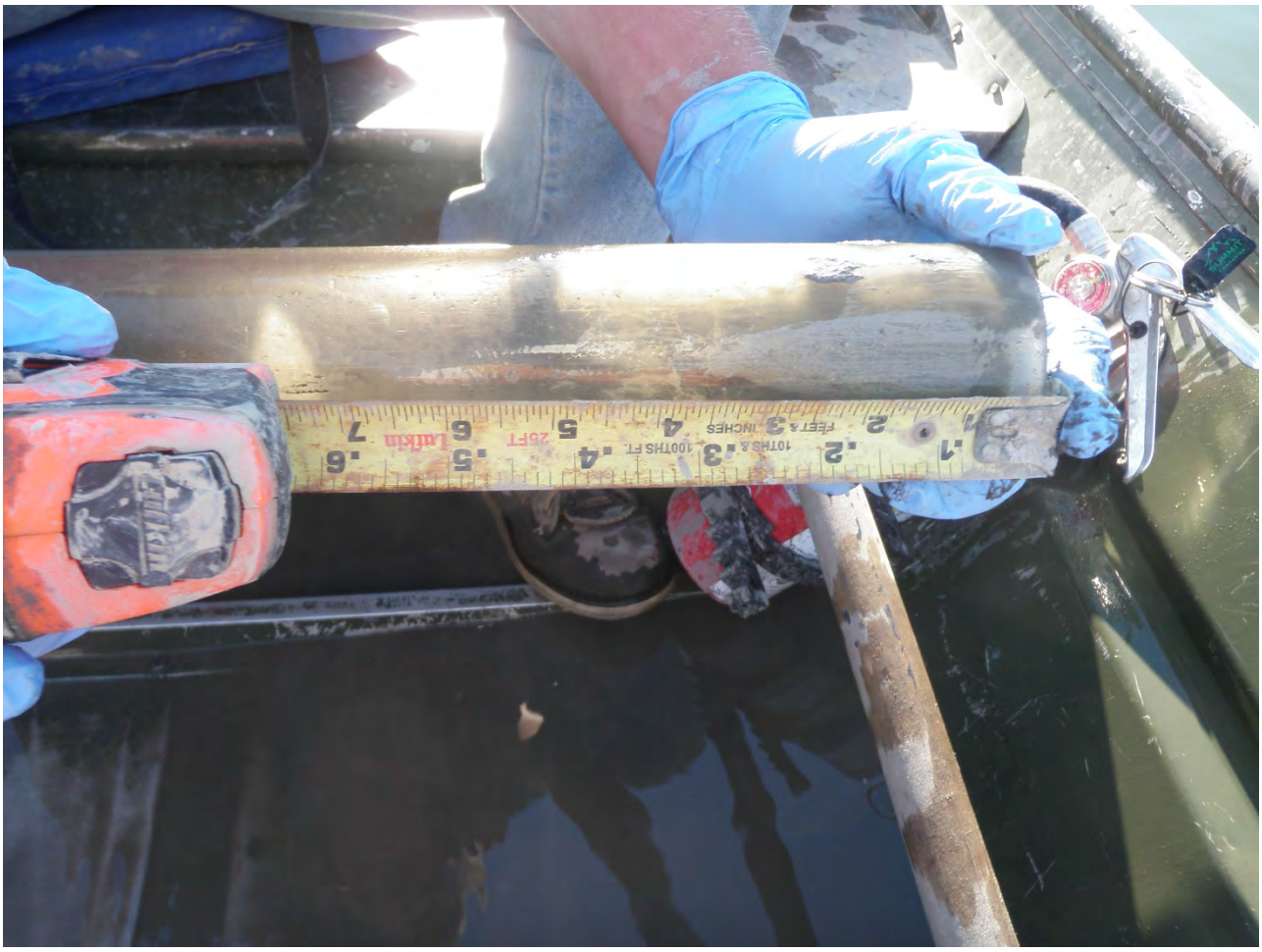

Photo #56 – SC-20A

BARR

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/5 GPS X: 2437221.93 Length of Push (feet): 0.1 Driller: Barr
Ice Thickness (feet): GPS Y: 574367.47 Recovery (feet): 0.1 Crew: ABW/SRN2
Water Depth (feet): 12.1 GPS Z: % Recovery: Observer:
Core/Boring#: SC-20B
Drilling Method: PC
Logged by: JKH2
Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	12.1												water
12.1	12.2		some	hard				no			CH		gray clay

Photo #57 – SC-20B

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-20C

Collection Date(s): 8/5/16 GPS X: 2437236.93 Length of Push (feet): 0.4 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574362.47 Recovery (feet): 0.4 Crew: ABW | SRNZ Logged by: JKHZ

Water Depth (feet): 10.9 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	10.9												Water
10.90	10.97												Grey silt w/ gravel & soft sediments
10.97	11.3												Grey clay

Photo #58 – SC-20C

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23401034 Project: Fox Lake Ash Pond Core/Boring#: SC-20D

Collection Date(s): 8/5/16 GPS X: 243726.93 Length of Push (feet): 0 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 374367.47 Recovery (feet): 0 Crew: ABW/SRN2 Logged by: JKH2

Water Depth (feet): 11.7 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	11.7												Water
11.7				Hard									Hard bottom. NO Recovery

Photo #59 – SC-20D

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-21
Collection Date(s): 8/1/16 GPS X: 2437229.43 Length of Push (feet): 0.8 Driller: Barr Drilling Method: PC
Ice Thickness (feet): – GPS Y: 574289.97 Recovery (feet): 0.8 Crew: KDH/JKH2 Logged by: JKH2
Water Depth (feet): 6.6 GPS Z: – % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	6.6												water
6.6	6.9		yes	soft		no		no					- Grey soupy material
6.9	6.91		some	brittle				no					- layer of black crumbly material
6.91	7.4		little	hard		yes		no			CH		- Firm grey clay w/ some brown

Photo #60 – SC-21

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Forlake Ash Pond Core/Boring#: SC-21A

Collection Date(s): 8/5/16 GPS X: 2437221.93 Length of Push (feet): 0.22 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574287.47 Recovery (feet): 0.22 Crew: ABW/SRN2 Logged by: JKH2

Water Depth (feet): 7.6 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	7.6												water
7.60	7.67		wet	soft				no					silt w/ gravel & clay
7.67	7.82		some	hard				no			CH		Dark grey clay

Photo #61 – SC-21A

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond
Collection Date(s): 8/5/16 GPS X: 2437221.93 Length of Push (feet): 0.15 Driller: Barr
Ice Thickness (feet): - GPS Y: 574292.47 Recovery (feet): 0.15 Crew: ABM/SRNZ
Water Depth (feet): 8.5 GPS Z: % Recovery: Observer:

Core/Boring#: SC-21B
Drilling Method: PC
Logged by: JKHZ
Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	8.5												water
8.5	8.65		some	Hard							CH		Clay w/ trace silt

Photo #62 – SC-21B

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-21C

Collection Date(s): 8/5/16 GPS X: 2437236.93 Length of Push (feet): 0.45 Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574287.47 Recovery (feet): 0.45 Crew: ABW/[illegible] SRN2 Logged by: JKH2

Water Depth (feet): 6.3 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	6.3												water
6.30	6.35		wet	soft				no					silt mixed w/ [illegible] soft sediments
6.35	6.75		some	hard				no			Clt		Dark grey clay

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23460134 Project: Fox Lake Ash Pond Core/Boring#: SC-21D

Collection Date(s): 8/5/16 GPS X: 2437236.93 Length of Push (feet): NR Driller: Barr Drilling Method: PC

Ice Thickness (feet): - GPS Y: 574292.47 Recovery (feet): NR Crew: ABM/SRN2 Logged by: JKH2

Water Depth (feet): 6.9 GPS Z: % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	6.9												Water
6.9	-		some	Hard				no			CH		Low recovery Partial Plug: clay w/ no silt/sand soft sediments

Sediment Core/Boring Log

VC: vibracore
PC: push core

Proj#: 23461034 Project: Fox Lake Ash Pond Core/Boring#: SC-22
Collection Date(s): 8/1/16 GPS X: 243724.93 Length of Push (feet): 0.5 Driller: Barr Drilling Method: PC
Ice Thickness (feet): - GPS Y: 574239.97 Recovery (feet): 0.5 Crew: EDM/JKH2 Logged by: JKH2
Water Depth (feet): 7.3 GPS Z: - % Recovery: Observer: Checked by:

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	7.3												water
7.3	7.8		some	hard		medium					CH		-Grey & Brown sandy clay -Hard, firm & consistent -1/4" dia black chunk -Piece of gravel 1" diameter

Photo #63 – SC-22