

ATTACHMENT A

**WEAVER BOTTOMS SEDIMENT BASIN MAINTENANCE PROJECT
PROJECT REPORT SUMMARY (APRIL 7, 2014)**

**PRE-PROJECT DREDGE MATERIAL SEDIMENT CORE
AND BASELINE CONTAMINANT ANALYSIS**

**PREPARED BY BRAUN INTERTEC CORPORATION FOR
THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES**

April 7, 2014

Proposal LC-13-08064

Ms. Jennifer Bury
Minnesota Department of Natural Resources
Division of Fisheries & Wildlife
500 Lafayette Road
St Paul, MN 55155

Re: Pre-Project Dredge Material Sediment Core & Baseline Contaminant Analysis
Weaver Bottoms Sediment Basin Maintenance Project
Kellogg, Minnesota

Dear Ms. Bury:

Braun Intertec has completed the sediment sampling activities at Weaver Bottoms near Kellogg, Minnesota. The objective of the work was to characterize the in-place sediment (future dredge material) for potential disposal purposes. Our scope of services is based on the Request for Proposal (RFP) provided by Minnesota Department of Natural Resources (MN DNR) (client), dated December 4, 2013.

Background

Based on information provided in the RFP, approximately 100,000 to 500,000 cubic yards (CY) of sediment are planned for removal of sediment within Weaver Bottoms to restore overwintering fish habitat. Dredge depths will extend from water and/or ice covered surface to a depth of 6 feet into sediments.

Sediment Sampling

Pursuant to the RFP, Braun Intertec collected six (6) sediment core samples at locations spatially located to best represent the proposed dredge area as defined depicted in the RFP (Figure 2.). Each core was 6 feet in depth (2 feet below maximum dredge depth of 4 feet into sediment). Samples were collected at depths ranging from 1- to 2-foot intervals to 5- to 6-foot intervals based in order to obtain representative ranges within sediments and ability to obtain a soil sample due to saturation of sediments.

Twelve (12) sieve samples were collected and analyzed for particle size by ASTM D-422.

Samples were submitted for chemical analysis, as described in the section below. The samples were collected at each location by driving a push probe sampler or auger into the underlying sediment using hand-driven sampling equipment.

For each core advanced, soil sample textures will be evaluated by visual methods as the samples are collected and noted in the field notes. Minnesota Pollution Control Agency (MPCA) guidance requires

that if distinct sediment layering is observed during sample collection, testing must be performed on each distinct layer.

Drilling tools were cleaned prior to and between sampling runs by washing the equipment with a brush and water containing trisodium phosphate and rinsing the equipment with water.

The samples were transferred to clean laboratory-supplied containers, preserved in accordance with Braun Intertec Standard Operating Procedures (SOPs) and transported to the Pace Analytical Services, Inc. for analysis. Chain of Custody were initiated at the time of sampling and maintained throughout the process.

Sample Analytical Parameters

Pursuant to the RFP, Braun Intertec submitted each sample for sieve analysis and held the analytical samples. Each sample was run for the #200 wash using ASTM C117 in place of the standard sieve analysis.

Samples for which more than 7% passes through the 200 sieve were analyzed for the baseline sediment parameters pursuant to the RFP and the MPCA Managing Dredged Materials (September 2012) guidance document. The parameters are as follows:

- Metals – arsenic, cadmium, chromium III, chromium VI, copper, lead, mercury, nickel, selenium, and zinc by SW-846 EPA 6010.
- Total phosphorus using method EPA365.3/365.4.
- Nitrate & nitrite using SM 4500-NO3 F.
- Ammonia nitrogen using SM 4500 NH3.
- Total Kjeldahl nitrogen using SM 4500 N.
- Polychlorinated biphenyls (PCBs) using method SW-846 8082.
- Total organic carbon using SW-846-9060.

Results

Sediments

Sediments observed in each boring consisted of organic silt/clay with sand and sandy organic silt/clay to the termination depth of each hand auger. Soil boring logs with descriptions of the various soil strata encountered during the soil hand auger operations are attached.

The results of the 200 wash analysis indicated that all samples passed less than 93% on the #200 sieve. As a result, chemical analysis was performed on these samples.

Soil Chemistry

Analytical results for the sample from HA-1, HA-2, HA-3, HA-4, HA-5 and HA-6 indicated the following:

Metals

- Chromium IV and selenium were not detected at or above the laboratory method reporting limit (MRL) in the samples analyzed. Although chromium VI was not detected above the MRL, the reporting limit was above the MPCA Level 1 management category.
- Arsenic, cadmium, chromium III, copper, lead, mercury, nickel, selenium, and zinc were detected at concentrations above the laboratory MRL in each sample analyzed. However, in each case, the concentration was below the MPCA Level 1 management category with the exception of arsenic at HA-1, HA-4 and HA-5 but the arsenic concentration for these locations was below the MPCA Level 2 management category.

PCBs

- PCBs were not detected at or above the laboratory MRL for eight PCB compounds included in the analytical list.

Other Parameters

- Ammonia, total Kjeldahl, total phosphorous and total organic carbon were detected at various concentration. Nitrate+nitrite was not detected at or above the laboratory MRL. Management criteria have not been established for these compounds. The MPCA requirement to include these analyses is geared toward the end-use of the dredge sediments and the results should be provided to disposal facilities or receiving land-owners. Additional consultation with the MPCA may be required.

Recommendations

Based on the analytical results from our sampling and testing, excavated lake sediments in the proposed dredge area within Prichard Lake are suitable for industrial reuse. Due to only the concentration of arsenic exceeding the MPCA Level 1 management category at HA-1, HA-4 and HA-5 and the low levels exhibited at these locations and the fact that chromium VI was not detected above the MRL at these locations, land application for agricultural reuse may be considered from MPCA for the dredge sediment. Therefore, we recommend that these results be submitted for approval by MPCA prior to beginning any dredging work.

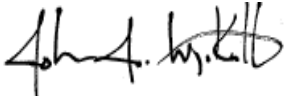
General

Our scope of our work was determined by our understanding of the rules and guidance of the Minnesota Pollution Control Agency as they apply to the objectives of the project set forth in the RFP. Therefore, the proposed scope of work is not warranted to conform explicitly to current MPCA written guidance.

We appreciate the opportunity to provide our professional services on this project. Please call John Wyciskalla or Mark Gretebeck at 608.781.7277 if you have questions about the report or require additional information.

Sincerely,

BRAUN INTERTEC CORPORATION



John J. Wyciskalla, PG
Associate Principal/Senior Scientist



Mark L. Gretebeck
Principal

Attachment:
Sediment Sampling Location Map
Summary Table of Sediment Testing Results
Laboratory Analytical Reports
Soil Hand Auger Logs

Sediment Sampling Location Map



○ **HAND AUGER SOIL BORING LOCATION**



SCALE: 1"= 400'

Sheet of Fig:	Project No:	LC1308064
	Drawing No:	LC1308064
	Scale:	1"= 400'
	Drawn By:	JAG
	Date Drawn:	4/7/14
	Checked By:	JJW
	Last Modified:	4/9/14

SEDIMENT SAMPLING LOCATIONS
SEDIMENT TESTING
WEAVER BOTTOMS BASELINE SEDIMENT ANALYSIS
PRITCHARD LAKE
KELLOGG, MINNESOTA

BRAUN
INTERTEC

11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

Summary of Sediment Sampling Testing Results



Braun Intertec Corporation
 2309 Palace Street
 LaCrosse, WI 54603

Phone: 608.781.7277
 Fax: 608.781.7279
 Web: braunintertec.com

March 26, 2014

Project No.: LC-13-08064

Ms. Jennifer Bury
 Minnesota Department of Natural Resources
 500 Lafayette Road
 St. Paul, MN 55155-4002

Re: Laboratory Soil Testing (Particles Passing No. 200 Sieve)
 Weaver Bottoms Baseline Sediment Analysis
 Kellogg, MN

Dear Ms. Bury:

This letter presents the laboratory test results for soil particles passing a number 200 sieve (P200) by washing according to the procedures outlined in ASTM C117-13. Results for each sample can be found in the table below.

Laboratory Test Results Summary

<u>Sample Number</u>	<u>Sample Depth (ft)</u>	<u>Sampled By</u>	<u>USCS Classification</u>	<u>Moisture Content (%)</u>	<u>Material Passing No. 200 Sieve (%)</u>
HA-1	3	David Bradshaw	Sandy Organic Silt/Clay	314	56.5
HA-1	5-6	David Bradshaw	Sandy Organic Silt/Clay	350	69.5
HA-2	1-2	David Bradshaw	Organic Silt/Clay with Sand	215	84.3
HA-2	3-4	David Bradshaw	Sandy Organic Silt/Clay	321	67.7
HA-3	1-2	David Bradshaw	Organic Silt/Clay with Sand	162	84.2
HA-3	5-6	David Bradshaw	Sandy Organic Silt/Clay	80	62.5
HA-4	1-2	David Bradshaw	Organic Silt/Clay with Sand	142	85.8
HA-4	5-6	David Bradshaw	Organic Silt/Clay with Sand	166	73.9
HA-5	1-2	David Bradshaw	Organic Silt/Clay with Sand	232	76.9
HA-5	3-4	David Bradshaw	Organic Silt/Clay with Sand	269	71.7
HA-6	1-2	David Bradshaw	Organic Silt/Clay with Sand	241	80.4
HA-6	3-4	David Bradshaw	Sandy Organic Silt/Clay	295	67.8

Thank you for the opportunity to be of service on this project. If we can provide additional assistance, please call Scott Willinger at 608.781.7277.

Sincerely,

BRAUN INTERTEC CORPORATION

Scott Willinger
 Laboratory Manager

Table 1
Summary Tables of Sediment Testing Results
Weaver Bottoms, Prichard Lake MN
LC-13-08064

Compound/Parameter	CAS No.	Sample Identifier						Recreational Soil Reference Value (mg/kg)	Residential Soil Reference Value (mg/kg)	Short Term Worker Soil Reference Value (mg/kg)	Industrial Soil Reference Value (mg/kg)	Tier I Soil Leaching Value (mg/kg)	Dredge Management Level 1	Dredge Management Level 2
		HA-1 (1-2')	HA-2 (1-2')	HA-3 (3-4')	HA-4 (3-4')	HA-5 (3-4')	HA-6 (1-2')							
		3/4/2014	3/4/2014	3/4/2014	3/4/2014	3/4/2014	3/4/2014							
Organic Content														
Total Organic Carbon	7440440	48800	43000	47900	59200	60800	49300	NE	NE	NE	NE	NE	NE	NE
Polychlorinated Biphenyls (mg/kg)														
PCB 1016	12674-11-2	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	NE	NE	NE	NE	NE	NE	NE
PCB 1221	11104-28-2	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	NE	NE	NE	NE	NE	NE	NE
PCB 1232	11141-16-5	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	NE	NE	NE	NE	NE	NE	NE
PCB 1242	53469-21-9	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	NE	NE	NE	NE	NE	NE	NE
PCB 1248	12672-29-6	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	NE	NE	NE	NE	NE	NE	NE
PCB 1254	11097-69-1	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	NE	NE	NE	NE	NE	NE	NE
PCB 1260	11096-82-5	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	NE	NE	NE	NE	NE	NE	NE
Total PCBs	1336-36-3	<0.0859	<0.073	<0.090	<0.0809	<0.0994	<0.0782	1.4	1.2	8	8	2.1	1.2	8
Metals (mg/kg)														
Arsenic	7440-38-2	9.7	8.2	8.1	10.8	11.7	6.5	11	9	70	20	15.1	9	20
Cadmium	7440-43-9	0.82J	1.8	1.3J	1.0J	1.1J	1.0J	35	25	NE	200	4.4	25	200
Chromium, Trivalent	16065-83-1	30.0	45.4	40.1	32.7	38.2	31.7	NE	44000	NE	100000	NE	44000	100000
Copper	7440-50-8	25.1	37.6	30.3	25.7	30.8	25.4	100	100	3000	9000	400	100	9000
Lead	7439-92-1	23.1	29.7	23.5	21.5	26.8	21.3	300	300	700	700	525	300	700
Mercury	7439-97-6	0.096	0.10	0.063	0.10	0.080	0.096	1.2	0.5	0.4	1.5	1.6	0.5	1.5
Nickel	7440-02-0	27.1	34.0	31.5	27.8	33.7	25.3	800	560	1400	2500	88	560	2500
Selenium	7782-49-2	<1.9	<1.5	<1.8	<1.8	<2.1	<1.7	200	160	1400	1300	1.5	160	1300
Zinc	7440-66-6	95.3	121	107	94.8	113	90.1	12000	8700	85000	75000	1500	8500	75000
Other Parameters														
% Solids (% Wt)	SOLIDS	27.9	36.4	44.3	25.5	27.9	31.9	NE	NE	NE	NE	NE	NE	NE
Ammonia as N	7664-41-7	675	542	602	569	771	533	NE	NE	NE	NE	NE	NE	NE
Chromium, Hexavalent	18540-29-9	<89.6	<68.7	<56.4	<98	<89.6	<78.5	120	87	340	650	18	87	650
Nitrate + Nitrite as N	C-005	<8.5	<7.4	<9.0	<8.1	<10.0	<7.8	NE	NE	NE	NE	NE	NE	NE
Phosphorus, Total as P	7723-14-0	1210	1140	1010	988	1520	1030	NE	NE	NE	NE	NE	NE	NE
Total Kjeldahl Nitrogen	TKN	7770	5250	7730	9030	9050	5390	NE	NE	NE	NE	NE	NE	NE

Notes:

J Flag - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

mg/kg = Milligrams per kilogram.

< = Less than the reporting limit indicated in parentheses.

NE = Not Established

SRV - Soil Reference Value established by the Minnesota Pollution Control Agency; 1999, revised 2009

SLV - Soil Leaching Value established by the Minnesota Pollution Control Agency; 1999, revised 2005

Dredge Management Level 1= results less than SRV 1 (suitable for residential landuse)

DredgeManagement Level 2= results less than SRV 2 (suitable for industrial landuse)

Dredge Management Level 3- exceeds SRV2 (must be treated or disposed in a landfill with MPCA approved industrial waste management plan)