Appendices

Appendix A	Sediment Sampling Memo—Bassett Creek Park Pond
Appendix B	Sediment Sampling Memo—Winnetka Pond East
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Appendix A

Sediment Sampling Memo—Bassett Creek Park Pond

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Technical Memorandum

To: Bassett Creek Watershed Management Commission
From: Kevin Menken and Candice Kantor
Subject: Bassett Creek Park Pond Sediment Characterization
Date: February 27, 2017
Project: 23/27-0051

Introduction

This memorandum summarizes sediment characterization for sediment samples collected from the Bassett Creek Park Pond in the City of Crystal (City). Sediment samples were collected by Barr Engineering Co. (Barr) on September 28, 2016 on behalf of Bassett Creek Watershed Management Organization.

The purpose of sediment characterization is to determine whether the sediment in the pond, when excavated or dredged, could potentially be reused as fill, or if other management methods such as landfill disposal would be required. The use and/or disposal of excavated or dredged material is determined based on concentrations of potential contaminants in the sediments, including metals and polycyclic aromatic hydrocarbons (PAHs). Excavated sediment and soils that do not exhibit field screening impacts and do not exceed the Minnesota Pollution Control Agency's (MPCA) Soil Reference Values (SRV) or applicable Screening Soil Leaching Values (SLVs) may be considered Unregulated Fill that is suitable for off-site reuse according to the MPCA document *Best Management Practices for the Off-Site Reuse of Unregulated Fill* (MPCA, 2012). Sediment or soil excavated from stormwater ponds with constituents that exceed SRVs or applicable Screening SLVs are often disposed at a solid waste landfill, but other options involving specific land uses (e.g. non-residential) could be explored if there are suitable locations elsewhere at City-owned property.

Sediment Sample Collection

Sediment sampling was conducted in accordance with the MPCA's *Managing Stormwater Sediment, Best Management Practice Guidance* (MPCA, 2015). This document provides technical guidance for characterizing sediment in stormwater ponds, including the number of samples that should be collected and potential contaminants to be analyzed. Barr staff collected four sediment samples, which each sample being the composite of five coring locations, consistent with MPCA guidance recommendations for ponds 4 acres in size or larger. Barr staff used a plastic coring tube for collecting sediment cores where it was possible to push the coring tube in by hand, and used a stainless steel auger where sediment was too firm to push the coring tube. Collected sediment was then composited in a clean plastic 5-gallon bucket. A GPS unit was used to record the locations of the sampling locations, which are shown on Figure 1. Sediment sample BCPP-1 is the composite of coring locations BCPP-1A, BCPP-1A, BCPP-1C, BCPP-1D, and

BCPP-1E; sediment sample BCPP-2 is the composite of coring locations BCPP-2A, BCPP-2B, etc. Samples were placed in containers provided by the laboratory, and sent to Pace Analytical laboratory in Minneapolis for analyses of potential contaminants. In addition, a composite of all sampling locations was created (BCPP 1-4 Comp) for waste characterization sampling in the event that material is disposed in a landfill (landfills often require Toxicity Characteristic Leaching Procedure, or TCLP, testing for metals).

The MPCA guidance for stormwater pond sediment management lists the baseline parameters that should be tested for in order to determine whether excavated sediment is contaminated or could be considered Unregulated Fill (MPCA, 2015). The baseline parameters listed in the MPCA guidance are arsenic, copper, and polycyclic aromatic hydrocarbons (PAHs). PAHs are organic compounds that are formed by the incomplete combustion of organic materials, such as wood, oil, and coal. They are also naturally occurring in crude oil and coal. The MPCA determined that coal tar-based sealants are the largest source of PAHs to stormwater ponds, and a state-wide ban of coal tar-based sealants took effect January 1, 2014.

In addition to the baseline parameters, additional parameters may be appropriate with consideration of potential sources of other contaminants in the watershed. A query of MPCA's *What's in My Neighborhood* (WIMN) website was performed for the Bassett Creek Park Pond watershed. *WIMN* is a database maintained by the MPCA that includes potentially contaminated sites (e.g. documented tank leaks), and environmental permits and registrations (e.g. small quantity hazardous waste generator). Based on the WIMN query results and the land uses in the watershed, the sediment samples were analyzed for the MPCA's baseline parameters for stormwater ponds – arsenic, copper, and PAHs. In addition, samples were field screened for potential impacts from chemical impacts, including examination for visual staining, oil sheen, and odors. If field screening indicated possible impacts, additional analytical testing would have been considered.

Laboratory Methodologies and Determination of BaP Equivalents

The parameters analyzed and their laboratory analytical methods are listed below:

- Metals: arsenic, copper (method EPA 6010C)
- Polycyclic aromatic hydrocarbons (PAHs) (method EPA 8270D by SIM)

The PAHs that were analyzed can be grouped into two categories: carcinogenic (i.e. cancer causing) and non-carcinogenic. In order to assess the contamination level of the carcinogenic PAHs in stormwater pond sediment, the MPCA requires the calculation of a "BaP equivalents value". The BaP equivalents value is a single value representing the combined potency of 17 individual carcinogenic PAH compounds with BaP (benzo[a]pyrene) acting as the reference compound. The list of compounds and their respective potency equivalents factors used to calculate the BaP equivalents value can be found in the MPCA guidance

document, along with methods for addressing constituents at concentrations below the detection limit (MPCA 2015).

Laboratory analytical results for the sediment samples are summarized in Table 1. The detailed laboratory report is included in Attachment C, and includes the TCLP metals testing results.

Results of Sediment Characterization

Results of laboratory analytical testing on the sediment samples were compared to the MPCA's current SRVs and Screening SLVs on Table 1. Results of field screening for staining, sheen, or odor, were negative for all four sediment samples. Therefore, no additional analytical testing was conducted beyond the baseline parameter list for stormwater pond sediment characterization.

One of the four sediment samples collected in the pond had a BaP equivalents value exceeding the Screening SLV. Sediment sample BCPP-1 (composite of sampling locations BCPP-1A through BCPP-1E) had a BaP equivalents value of 1.7 mg/kg, exceeding the Screening SLV of 1.4 mg/kg. Results in the other three sediment samples collected from Bassett Creek Park Pond were below Minnesota's SRVs and Screening SLV. The sediment sampling results indicate that the sediment to be removed from the northwest portion of the Bassett Creek Park Pond, as indicated in Figure 1, may need to be taken to a landfill for disposal, and that the rest of the sediment to be removed from the pond is suitable for off-site reuse under MPCA's Unregulated Fill Best Practice (MPCA, 2012).

Screening SLVs represent very conservative criteria. If desired, Barr could assist the City in evaluating other potential re-use sites for the sediment from the northwest portion of the pond, taking into account site-specific factors for the receiving site (e.g., property ownership, depth to groundwater, soil type, etc.). If successful, additional evaluation might reduce the transportation and disposal costs associated with landfilling the sediment.

The MPCA has proposed changes to SRVs that could impact the interpretations in this memo. MPCA had originally intended that the SRV changes would be implemented later this year (2017), but recent conversations with MCPA staff indicated that the timing of these potential changes may not occur in 2017. The proposed changes to the SRVs are included on Table 1 for reference. The status of MPCA's SRV revisions should be reassessed prior to proceeding with the sediment excavation and management.

References

Minnesota Pollution Control Agency (MPCA), 2012. Best Management Practices for the Off-Site Reuse of Unregulated Fill. February 2012.

MPCA, 2015. Managing Stormwater Sediment, Best Management Practice Guidance, document wq-strm4-16, June 2015.

Tables

Table 1 – Bassett Creek Park Pond Sediment Analytical Data Summary

Figures

Figure 1 – Bassett Creek Park Pond Sediment Sampling Locations

Attachments

Attachment A – Sediment Core Field Logs

Attachment B – Photographs

Attachment C – Laboratory Analytical Data Report

Tables

Table 1
Bassett Creek Park Pond Sediment Analytical Data Summary
Bassett Creek Watershed Management Commission

							Sample ID:	**BCPP-1**	**BCPP-2**	**BCPP-3**	**BCPP-4**
							Sample Date:	**9/28/2016**	**9/28/2016**	**9/28/2016**	**9/28/2016**
Parameter	Units	Minnesota Screening Soil Leaching Values	Minnesota Residential Soil Reference Values	Proposed Minnesota Residential/ Recreational SRVs	Minnesota Industrial Soil Reference Values	Proposed Minnesota Commercial/ Industrial SRVs					
Effective Date		06/01/2013	06/22/2009	08/01/2016	06/22/2009	08/01/2016					
Exceedance Key		**Bold**	No Exceed	Underline	No Exceed	No Exceed					
General Parameters											
Moisture	%							41.6	47.3	65.6	62.5
Metals											
Arsenic	mg/kg	5.8	9	9	20	9		2.4	3.3	4.9	5.7
Copper	mg/kg	700	100	2200	9000	33000		13.3	17.2	21.9	30.0
Carcinogenic PAHs											
3-Methylcholanthrene	mg/kg	T	T	T	T	T		0.0235	0.0118 j	< 0.0043	< 0.0040
5-Methylchrysene	mg/kg	T	T	T	T	T		0.101	0.0139 j	< 0.0035	0.0043 j
7,12-Dimethylbenz(a)anthracene	mg/kg	T	T	T	T	T		< 0.0048	< 0.0053	< 0.0081	< 0.0075
7h-Dibenzo(c,g)carbazole	mg/kg	T	T	T	T	T		< 0.0029	< 0.0032	< 0.0049	< 0.0045
Benz(a)anthracene	mg/kg	T	T	T	T	T		0.634	0.325	0.0859	0.0643
Benzo(a)pyrene	mg/kg	T	T	T	T	T		0.748	0.43	0.13	0.0980
Chrysene	mg/kg	T	T	T	T	T		0.95	0.45	0.15	0.112
Dibenz(a,h)acridine	mg/kg	T	T	T	T	T		0.0204	0.0104 j	< 0.0110	< 0.0101
Dibenz(a,h)anthracene	mg/kg	T	T	T	T	T		0.0752	0.0381	0.0150 j	0.0112 j
Dibenzo(a,e)pyrene	mg/kg	T	T	T	T	T		0.0551	0.0283	0.0144 j	0.0101 j
Dibenzo(a,h)pyrene	mg/kg	T	T	T	T	T		0.0214	0.0118 j	< 0.0081	< 0.0075
Dibenzo(a,i)pyrene	mg/kg	T	T	T	T	T		0.0062 j	0.0043 j	0.0032 j	0.0026 j
Dibenzo(a,l)pyrene	mg/kg	T	T	T	T	T		0.0039 j	0.0035 j	0.0038 j	0.0034 j
Indeno(1,2,3-cd)pyrene	mg/kg	T	T	T	T	T		0.273 *	0.148	0.0496	0.0367
BaP Equivalents, calculated using Kaplan-Meier method	mg/kg	**1.4 T**	2 T	1 T	3 T	14 T		**1.7 a**	0.92 a	0.31 a	0.25 a
% Non-detects	%							13.3 a	13.3 a	40.0 a	33.3 a
PAHs											
2-Methylnaphthalene	mg/kg		100	39	369	370		0.0047 j	0.0018 j	< 0.0019	< 0.0017
Acenaphthene	mg/kg	81	1200	1300	5260	19000		0.0624	0.0249	0.0050 j	0.0055 j
Acenaphthylene	mg/kg	NA						0.0385	0.0154 j	0.0054 j	0.0055 j
Anthracene	mg/kg	1300	7880	6500	45400	97000		0.168 *	0.0639	0.0139 j	0.0133 j
Benzo(g,h,i)perylene	mg/kg	NA						0.28 *	0.149	0.0527	0.0385
Benzofluoranthenes	mg/kg							1.89	1.04	0.351	0.268
Fluoranthene	mg/kg	670	1080	510	6800	6700		2.15	0.887	0.274	0.199
Fluorene	mg/kg	110	850	860	4120	13000		0.0724	0.0276	0.0060 j	0.0060 j
Naphthalene	mg/kg	4.5	10	81	28	120		0.0056 j	0.0028 j	< 0.0018	< 0.0016
Phenanthrene	mg/kg	NA						1.05	0.321	0.0830	0.0610
Pyrene	mg/kg	440	890	44	5800	44		1.55	0.658	0.198	0.152

Tabe 1 Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

*	Estimated value, QA/QC criteria not met.
a	Estimated value, calculated using some or all values that are estimates.
j	Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.

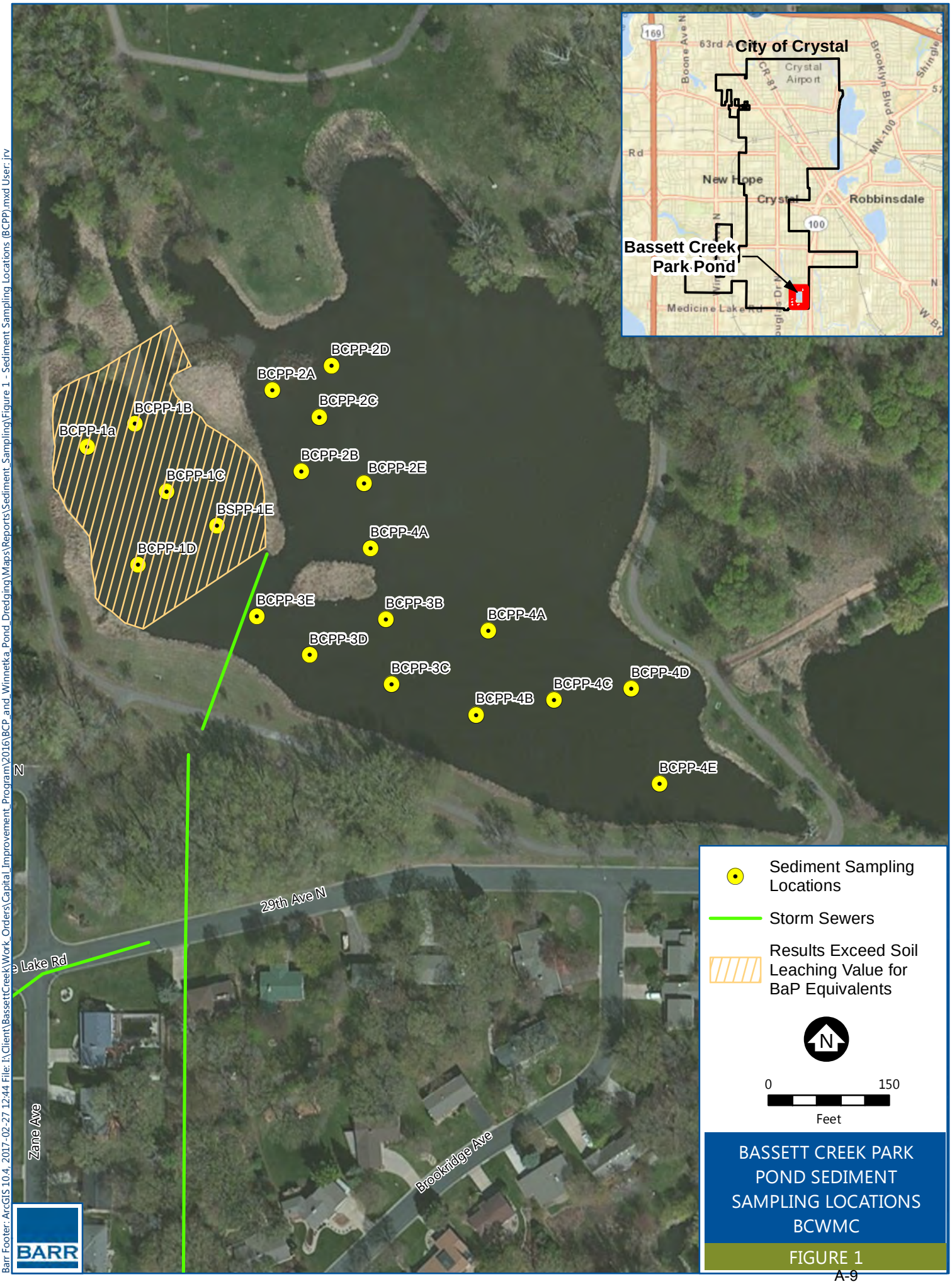
Minnesota Screening Soil Leaching Values

NA	Criterion value is not available for this analyte.
T	Value represents a criteria for the total carcinogenic PAHs as BaP.

Minnesota Soil Reference Values

T	Value represents a criteria for the total carcinogenic PAHs as BaP.

Figures



Barr Footer: ArcGIS 10.4, 2017-02-27 12:44 File: I:\Client\BassettCreek\Work_Orders\Capital_Improvement_Program\2016\BCP_and_Winnetka_Pond_Dredging\Maps\Reports\Sediment_Sampling\Figure 1 - Sediment Sampling Locations (BCPP).mxd User: jrv

Attachment A

Sediment/Soil Coring Logs

Sediment Core/Boring Log

VC: vibracore
PC: push core – HA @ BCPP-1C

Proj#: 23270057 Project: Bassett Creek Park Pond

Collection Date(s): 9/28/16 GPS X: GPS Length of Push (feet): see below Driller: BARR Core/Boring#: Quadrant 1

Ice Thickness (feet): NA GPS Y: GPS Recovery (feet): 1' Crew: KPM/PJM2 Drilling Method: Push core

Water Depth (feet): Varied GPS Z: GPS % Recovery: 1' Observer: — Logged by: PJM2

Checked by: KPM

	Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description	Water depth
BCPP-1A	0	1.9	1	S		High	↑ w/ depth	some organics		N	N	OL/ML		Dark brown organic silt ~~(illegible)~~ cohesiveness increases w/ depth (photo 1)	1.2 ft ~~0.5 ft~~
BCPP-1B	0	1.5	2	S		Low	low	organics		N	N	SP		Medium grey sand w/ layers of organic silt and organics (photo 2)	4"
BCPP-1C	0	2.1	3	S		Low	Low	N		N	N	SP		Grey medium sand (SP) w/ small amounts of coarse gravel sand - (photo 3)	3.0'
BCPP-1D	0	1.5	4	S		High	↑ w/ depth	wood		N	N	OL/ML		Dark brown organic silt w/ organic material.	2.0'
BCPP-1E	0	1.5	5	S		Med	Med	some sand		N	N	OL/ML		Dark brown organic silt w/ some med sand + organics.	1.2'

BCPP-1 composited and sampled @ 1210 (BCPP-1comp @ 1210)

Sediment Core/Boring Log

BARR

Proj#: 23270051 Project: Bassett Creek Park Pond

Collection Date(s): 9/28/16 GPS X: GPS Length of Push (feet): see below Driller: BARR

Ice Thickness (feet): NA GPS Y: GPS Recovery (feet): " Crew: KDM/RPM2

Water Depth (feet): Varied GPS Z: GPS % Recovery: " Observer: —

VC: vibracore
PC: push core
Core/Boring#: Quadrant 2
Drilling Method: Push core
Logged by: RPM2
Checked by: KDM

NAme	Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description	Water Level
BCPP-2A	0	1	1	S		Low	Low	S	N	N	N	SP		Gray med-coarse sand Thin layer of CL/ML @ 0.5' This layer was plastic and cohesive	0.5'
BCPP-2B	0	1	2	S		High	↑w/ depth	N	N	N	N	CL		Dark gray clayey w/ some organics	0.9'
	1	1.3		S		Low	Low	organics	N	N	N	Peaty Soil		Dark brown peaty soil/wetland deposit.	
BCPP-2C	0	1	3	S		High	↑w depth	organics	N	N	N	CL/SC		Dark brown silty clay w/ organics. Some coarse sand also observed (small amount)	1.0'
BCPP-2D	0	1	4	S		Low	Low	Organics	N	N	N	SP		Med gray sand w/ organics and some peaty soil.	0.8'
BCPP-2E	0	1	5	S		Low Med	↑Low Med	Organics	N	N	N	ML/Peat		Dark brown organic silt. At 1' transitions to brown organic soil/wetland deposit w/ shells.	1.4'

BCPP-2 Comp sampled @ 1300

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23270051 Project: Bassett Creek Park Pond
Collection Date(s): 9/28/16 GPS X: GPS Length of Push (feet): See Below Driller: BARR
Ice Thickness (feet): — GPS Y: GPS Recovery (feet): — Crew: KDM/PJM3
Water Depth (feet): Varied GPS Z: GPS % Recovery: — Observer: —
Core/Boring#: Quadrant 3
Drilling Method: Push core
Logged by: PJM
Checked by: KDM

	Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description	Water depth
BCPP-3A	0	1	1	S		Low	Low	Organics	N	N	N	ML		Dark brown organic silt w/ organics	1.2'
	1	1.3				Med	Med	"	"	"	"	ML		Brown/Grey organic silt (wetland deposit) w/ shells	
BCPP-3B	0	0.8	2	S		Low	Low	Organics	N	N	N	ML		Dk brown organic silt w/ organics & shells	2.8'
	0.8	1.3				Med	Med	"	"	"	"	ML		Brown/Grey organic silt (wetland deposit) w/ shells	
BCPP-3C	0	1.4	3	S		High	↑w depth	organics	N	N	N	ML		Dark brown organic silt	4.0'
BCPP-3D	0	1	4	S		High	↑w depth	organics	N	N	N	ML		Dark brown organic silt (very sandy consistency)	3.1'
BCPP-3E	0	0.6'	5	S		Med	Med high	—	N	Brown	N	SC		Grey sandy clay w/ lt brown staining, some gravel included (small amounts) (Photo Taken)	0.6'

BCPP-3Comp sampled @1340

Sediment Core/Boring Log

BARR

VC: vibracore
(PC): push core

Proj#: 23270051 Project: Basseth Creek Park Pond

Collection Date(s): 9/28/16 GPS X: GPS Length of Push (feet): See Below Driller: BARR

Ice Thickness (feet): — GPS Y: GPS Recovery (feet): " Crew: KDM/PSM2

Water Depth (feet): Varied GPS Z: GPS % Recovery: " Observer: —

Core/Boring#: Quadrant 4

Drilling Method: Push Core

Logged by: PSM2

Checked by: KDM

	Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description	Water depth
BCPP-4A	0	.5'	1	S	Dense	Low	med	Org	N	N	N	OL		Organic clay (some silt). Thin med sand seam also observed. Firm, high organic (fibrous) content and lower water content. (Dk grey)	3.3'
BCPP-4B	0	1.6'	2	S	Soupy	high	↑wl depth	org	N	N	N	ML		Drk brown organic silt. Organics decrease w/ depth. Little to no fibrous organics at bottom of core.	4.7'
BCPP-4C	0	1.5	3	S	Soupy	high	↑wl depth	org	N	N	N	ML		Drk brown organic silt. Organics ↓ w/ depth. Little to no organics at bottom of core. Increased density w/ depth.	5.0'
BCPP-4D	0	1.	4	S	soupy	high	↑w depth	—	N	N	N	ML		Drk brown organic silt. Some woody organics in first 6" @ 1', med brown sandy	3.0'
BCPP-4E	0	1.5	5	S	soupy	high	↑w depth	—	N	N	N	ML		Drk brown organic silt. No fibrous organics observed.	5.1'

BCPP-4 Comp sampled @1420

BCPP-1-4-Comp sampled @1430 1430

Attachment B

Photographs

Photograph #1: Sediment core collected with push core sampling device.

Photograph #2: Sediment core collected with push core sampling device.

Attachment C

Laboratory Analytical Data

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

November 11, 2016

Terri Olson
Barr Engineering
4300 MarketPointe Drive
Suite 200
Minneapolis, MN 55435

RE: Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Dear Terri Olson:
Enclosed are the analytical results for sample(s) received by the laboratory on September 28, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report was revised on October 14, 2016 to report some results for Pace samples #001 and 002 for 8270D at a lower dilution, per client request.

This report was further revised on November 11, 2016 to include TCLP RCRA8 metals results for Pace sample # 005, per client request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amanda J Albrecht

Amanda Albrecht
amanda.albrecht@pacelabs.com
Project Manager

Enclosures

cc: BarrDM, Barr Engineering
Kevin Menken, Barr Engineering

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
Alaska Certification UST-107
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10364126001	**BCPP-1 Comp**	Solid	09/28/16 12:10	09/28/16 16:20
10364126002	**BCPP-2 Comp**	Solid	09/28/16 13:00	09/28/16 16:20
10364126003	**BCPP-3 Comp**	Solid	09/28/16 13:40	09/28/16 16:20
10364126004	**BCPP-4 Comp**	Solid	09/28/16 14:20	09/28/16 16:20
10364126005	**BCPP-1-4 Comp**	Solid	09/28/16 14:30	09/28/16 16:20

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SAMPLE ANALYTE COUNT

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10364126001	**BCPP-1 Comp**	EPA 6010C	DM	2	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10364126002	**BCPP-2 Comp**	EPA 6010C	DM	2	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10364126003	**BCPP-3 Comp**	EPA 6010C	DM	2	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10364126004	**BCPP-4 Comp**	EPA 6010C	DM	2	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10364126005	**BCPP-1-4 Comp**	EPA 6010C	IP	7	PASI-M
		EPA 7470A	LMW	1	PASI-M

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Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Date: November 11, 2016

Case Narrative

Semi-Volatile Organics Analysis

8270D CPAH

Refering to data qualifiers that appear later in the report:

SS - The 7,12 dimethylbenz(a)anthracene result associated with batch QC did not meet secondary source verification criteria. It was recovered at 175% (recovery limits are 50-150%). The high recovery leads to a high bias in the QC but does not impact sample results.

IS - One internal standard (perylene) failed low for both Pace samples #001 and #002 with recoveries of 42% and 33%, respectively. The recovery limits are 50-200%. The low recovery leads to a high bias for the associates analytes and are flagged accordingly.

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ANALYTICAL RESULTS

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Sample: BCPP-1 Comp **Lab ID: 10364126001** Collected: 09/28/16 12:10 Received: 09/28/16 16:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050								
Arsenic	**2.4**	mg/kg	1.4	0.29	1	10/04/16 09:12	10/06/16 17:20	7440-38-2	
Copper	**13.3**	mg/kg	0.71	0.057	1	10/04/16 09:12	10/06/16 17:20	7440-50-8	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**41.6**	%	0.10	0.10	1		10/05/16 14:00		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**62.4**	ug/kg	17.1	1.0	1	09/29/16 06:44	10/04/16 17:07	83-32-9	
Acenaphthylene	**38.5**	ug/kg	17.1	0.97	1	09/29/16 06:44	10/04/16 17:07	208-96-8	
Anthracene	**168**	ug/kg	17.1	0.99	1	09/29/16 06:44	10/04/16 17:07	120-12-7	M6,R1
Benzo(a)anthracene	**634**	ug/kg	171	25.6	10	09/29/16 06:44	10/05/16 15:25	56-55-3	M6,R1
Benzo(a)pyrene	**748**	ug/kg	171	22.2	10	09/29/16 06:44	10/05/16 15:25	50-32-8	M6,R1
Benzo(g,h,i)perylene	**280**	ug/kg	171	49.5	10	09/29/16 06:44	10/05/16 15:25	191-24-2	M6,R1
Benzofluoranthenes (Total)	**1890**	ug/kg	512	188	10	09/29/16 06:44	10/05/16 15:25		M6,R1
Chrysene	**950**	ug/kg	171	9.0	10	09/29/16 06:44	10/05/16 15:25	218-01-9	M6,R1
Dibenz(a,h)acridine	**20.4**	ug/kg	17.1	6.5	1	09/29/16 06:44	10/04/16 17:07	226-36-8	IS
Dibenz(a,h)anthracene	**75.2**	ug/kg	17.1	5.8	1	09/29/16 06:44	10/04/16 17:07	53-70-3	IS
Dibenzo(a,e)pyrene	**55.1**	ug/kg	17.1	1.6	1	09/29/16 06:44	10/04/16 17:07	192-65-4	IS,M6
Dibenzo(a,h)pyrene	**21.4**	ug/kg	17.1	4.8	1	09/29/16 06:44	10/04/16 17:07	189-64-0	IS,M6
Dibenzo(a,i)pyrene	**6.2J**	ug/kg	17.1	1.7	1	09/29/16 06:44	10/04/16 17:07	189-55-9	IS,M6
Dibenzo(a,l)pyrene	**3.9J**	ug/kg	17.1	0.97	1	09/29/16 06:44	10/04/16 17:07	191-30-0	IS,M6
7H-Dibenzo(c,g)carbazole	**<2.9**	ug/kg	17.1	2.9	1	09/29/16 06:44	10/04/16 17:07	194-59-2	IS
7,12-Dimethylbenz(a)anthracene	**<4.8**	ug/kg	17.1	4.8	1	09/29/16 06:44	10/04/16 17:07	57-97-6	
Fluoranthene	**2150**	ug/kg	171	12.6	10	09/29/16 06:44	10/05/16 15:25	206-44-0	M6,R1
Fluorene	**72.4**	ug/kg	17.1	0.97	1	09/29/16 06:44	10/04/16 17:07	86-73-7	
Indeno(1,2,3-cd)pyrene	**273**	ug/kg	171	51.2	10	09/29/16 06:44	10/05/16 15:25	193-39-5	M6,R1
3-Methylcholanthrene	**23.5**	ug/kg	17.1	2.6	1	09/29/16 06:44	10/04/16 17:07	56-49-5	IS,M6
5-Methylchrysene	**101**	ug/kg	17.1	2.0	1	09/29/16 06:44	10/04/16 17:07	3697-24-3	
2-Methylnaphthalene	**4.7J**	ug/kg	17.1	1.1	1	09/29/16 06:44	10/04/16 17:07	91-57-6	M6
Naphthalene	**5.6J**	ug/kg	17.1	1.0	1	09/29/16 06:44	10/04/16 17:07	91-20-3	
Phenanthrene	**1050**	ug/kg	171	10.4	10	09/29/16 06:44	10/05/16 15:25	85-01-8	M6,R1
Pyrene	**1550**	ug/kg	171	12.8	10	09/29/16 06:44	10/05/16 15:25	129-00-0	M6,R1
Surrogates									
2-Fluorobiphenyl (S)	69	%.	46-125		1	09/29/16 06:44	10/04/16 17:07	321-60-8	
p-Terphenyl-d14 (S)	98	%.	46-125		1	09/29/16 06:44	10/04/16 17:07	1718-51-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Sample: BCPP-2 Comp **Lab ID: 10364126002** Collected: 09/28/16 13:00 Received: 09/28/16 16:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050								
Arsenic	**3.3**	mg/kg	1.7	0.35	1	10/04/16 09:12	10/06/16 17:33	7440-38-2	
Copper	**17.2**	mg/kg	0.86	0.069	1	10/04/16 09:12	10/06/16 17:33	7440-50-8	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**47.3**	%	0.10	0.10	1		10/05/16 15:05		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**24.9**	ug/kg	18.9	1.2	1	09/29/16 06:44	10/04/16 18:34	83-32-9	
Acenaphthylene	**15.4J**	ug/kg	18.9	1.1	1	09/29/16 06:44	10/04/16 18:34	208-96-8	
Anthracene	**63.9**	ug/kg	18.9	1.1	1	09/29/16 06:44	10/04/16 18:34	120-12-7	
Benzo(a)anthracene	**325**	ug/kg	94.6	14.2	5	09/29/16 06:44	10/05/16 16:52	56-55-3	
Benzo(a)pyrene	**430**	ug/kg	94.6	12.3	5	09/29/16 06:44	10/05/16 16:52	50-32-8	
Benzo(g,h,i)perylene	**149**	ug/kg	94.6	27.4	5	09/29/16 06:44	10/05/16 16:52	191-24-2	
Benzofluoranthenes (Total)	**1040**	ug/kg	284	104	5	09/29/16 06:44	10/05/16 16:52		
Chrysene	**450**	ug/kg	94.6	5.0	5	09/29/16 06:44	10/05/16 16:52	218-01-9	
Dibenz(a,h)acridine	**10.4J**	ug/kg	18.9	7.2	1	09/29/16 06:44	10/04/16 18:34	226-36-8	IS
Dibenz(a,h)anthracene	**38.1**	ug/kg	18.9	6.4	1	09/29/16 06:44	10/04/16 18:34	53-70-3	IS
Dibenzo(a,e)pyrene	**28.3**	ug/kg	18.9	1.7	1	09/29/16 06:44	10/04/16 18:34	192-65-4	IS
Dibenzo(a,h)pyrene	**11.8J**	ug/kg	18.9	5.3	1	09/29/16 06:44	10/04/16 18:34	189-64-0	IS
Dibenzo(a,i)pyrene	**4.3J**	ug/kg	18.9	1.8	1	09/29/16 06:44	10/04/16 18:34	189-55-9	IS
Dibenzo(a,l)pyrene	**3.5J**	ug/kg	18.9	1.1	1	09/29/16 06:44	10/04/16 18:34	191-30-0	IS
7H-Dibenzo(c,g)carbazole	**<3.2**	ug/kg	18.9	3.2	1	09/29/16 06:44	10/04/16 18:34	194-59-2	
7,12-Dimethylbenz(a)anthracene	**<5.3**	ug/kg	18.9	5.3	1	09/29/16 06:44	10/04/16 18:34	57-97-6	
Fluoranthene	**887**	ug/kg	94.6	7.0	5	09/29/16 06:44	10/05/16 16:52	206-44-0	
Fluorene	**27.6**	ug/kg	18.9	1.1	1	09/29/16 06:44	10/04/16 18:34	86-73-7	
Indeno(1,2,3-cd)pyrene	**148**	ug/kg	94.6	28.4	5	09/29/16 06:44	10/05/16 16:52	193-39-5	
3-Methylcholanthrene	**11.8J**	ug/kg	18.9	2.8	1	09/29/16 06:44	10/04/16 18:34	56-49-5	IS
5-Methylchrysene	**13.9J**	ug/kg	18.9	2.3	1	09/29/16 06:44	10/04/16 18:34	3697-24-3	
2-Methylnaphthalene	**1.8J**	ug/kg	18.9	1.2	1	09/29/16 06:44	10/04/16 18:34	91-57-6	
Naphthalene	**2.8J**	ug/kg	18.9	1.2	1	09/29/16 06:44	10/04/16 18:34	91-20-3	
Phenanthrene	**321**	ug/kg	94.6	5.8	5	09/29/16 06:44	10/05/16 16:52	85-01-8	
Pyrene	**658**	ug/kg	94.6	7.1	5	09/29/16 06:44	10/05/16 16:52	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	66	%.	46-125		1	09/29/16 06:44	10/04/16 18:34	321-60-8	
p-Terphenyl-d14 (S)	109	%.	46-125		1	09/29/16 06:44	10/04/16 18:34	1718-51-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Sample: BCPP-3 Comp **Lab ID: 10364126003** Collected: 09/28/16 13:40 Received: 09/28/16 16:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050								
Arsenic	**4.9**	mg/kg	2.5	0.51	1	10/04/16 09:12	10/06/16 17:36	7440-38-2	
Copper	**21.9**	mg/kg	1.3	0.10	1	10/04/16 09:12	10/06/16 17:36	7440-50-8	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**65.6**	%	0.10	0.10	1		10/05/16 15:05		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**5.0J**	ug/kg	29.0	1.8	1	09/29/16 06:44	10/05/16 17:20	83-32-9	
Acenaphthylene	**5.4J**	ug/kg	29.0	1.7	1	09/29/16 06:44	10/05/16 17:20	208-96-8	
Anthracene	**13.9J**	ug/kg	29.0	1.7	1	09/29/16 06:44	10/05/16 17:20	120-12-7	
Benzo(a)anthracene	**85.9**	ug/kg	29.0	4.3	1	09/29/16 06:44	10/05/16 17:20	56-55-3	
Benzo(a)pyrene	**130**	ug/kg	29.0	3.8	1	09/29/16 06:44	10/05/16 17:20	50-32-8	
Benzo(g,h,i)perylene	**52.7**	ug/kg	29.0	8.4	1	09/29/16 06:44	10/05/16 17:20	191-24-2	
Benzofluoranthenes (Total)	**351**	ug/kg	86.9	31.9	1	09/29/16 06:44	10/05/16 17:20		
Chrysene	**150**	ug/kg	29.0	1.5	1	09/29/16 06:44	10/05/16 17:20	218-01-9	
Dibenz(a,h)acridine	**<11.0**	ug/kg	29.0	11.0	1	09/29/16 06:44	10/05/16 17:20	226-36-8	
Dibenz(a,h)anthracene	**15.0J**	ug/kg	29.0	9.9	1	09/29/16 06:44	10/05/16 17:20	53-70-3	
Dibenzo(a,e)pyrene	**14.4J**	ug/kg	29.0	2.7	1	09/29/16 06:44	10/05/16 17:20	192-65-4	
Dibenzo(a,h)pyrene	**<8.1**	ug/kg	29.0	8.1	1	09/29/16 06:44	10/05/16 17:20	189-64-0	
Dibenzo(a,i)pyrene	**3.2J**	ug/kg	29.0	2.8	1	09/29/16 06:44	10/05/16 17:20	189-55-9	
Dibenzo(a,l)pyrene	**3.8J**	ug/kg	29.0	1.7	1	09/29/16 06:44	10/05/16 17:20	191-30-0	
7H-Dibenzo(c,g)carbazole	**<4.9**	ug/kg	29.0	4.9	1	09/29/16 06:44	10/05/16 17:20	194-59-2	
7,12-Dimethylbenz(a)anthracene	**<8.1**	ug/kg	29.0	8.1	1	09/29/16 06:44	10/05/16 17:20	57-97-6	
Fluoranthene	**274**	ug/kg	29.0	2.1	1	09/29/16 06:44	10/05/16 17:20	206-44-0	
Fluorene	**6.0J**	ug/kg	29.0	1.7	1	09/29/16 06:44	10/05/16 17:20	86-73-7	
Indeno(1,2,3-cd)pyrene	**49.6**	ug/kg	29.0	8.7	1	09/29/16 06:44	10/05/16 17:20	193-39-5	
3-Methylcholanthrene	**<4.3**	ug/kg	29.0	4.3	1	09/29/16 06:44	10/05/16 17:20	56-49-5	
5-Methylchrysene	**<3.5**	ug/kg	29.0	3.5	1	09/29/16 06:44	10/05/16 17:20	3697-24-3	
2-Methylnaphthalene	**<1.9**	ug/kg	29.0	1.9	1	09/29/16 06:44	10/05/16 17:20	91-57-6	
Naphthalene	**<1.8**	ug/kg	29.0	1.8	1	09/29/16 06:44	10/05/16 17:20	91-20-3	
Phenanthrene	**83.0**	ug/kg	29.0	1.8	1	09/29/16 06:44	10/05/16 17:20	85-01-8	
Pyrene	**198**	ug/kg	29.0	2.2	1	09/29/16 06:44	10/05/16 17:20	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	72	%.	46-125		1	09/29/16 06:44	10/05/16 17:20	321-60-8	
p-Terphenyl-d14 (S)	75	%.	46-125		1	09/29/16 06:44	10/05/16 17:20	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Sample: BCPP-4 Comp **Lab ID: 10364126004** Collected: 09/28/16 14:20 Received: 09/28/16 16:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050								
Arsenic	**5.7**	mg/kg	2.3	0.46	1	10/04/16 09:12	10/06/16 17:39	7440-38-2	
Copper	**30.0**	mg/kg	1.1	0.092	1	10/04/16 09:12	10/06/16 17:39	7440-50-8	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**62.5**	%	0.10	0.10	1		10/05/16 15:05		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**5.5J**	ug/kg	26.7	1.6	1	09/29/16 06:44	10/05/16 17:49	83-32-9	
Acenaphthylene	**5.5J**	ug/kg	26.7	1.5	1	09/29/16 06:44	10/05/16 17:49	208-96-8	
Anthracene	**13.3J**	ug/kg	26.7	1.5	1	09/29/16 06:44	10/05/16 17:49	120-12-7	
Benzo(a)anthracene	**64.3**	ug/kg	26.7	4.0	1	09/29/16 06:44	10/05/16 17:49	56-55-3	
Benzo(a)pyrene	**98.0**	ug/kg	26.7	3.5	1	09/29/16 06:44	10/05/16 17:49	50-32-8	
Benzo(g,h,i)perylene	**38.5**	ug/kg	26.7	7.7	1	09/29/16 06:44	10/05/16 17:49	191-24-2	
Benzofluoranthenes (Total)	**268**	ug/kg	80.0	29.3	1	09/29/16 06:44	10/05/16 17:49		
Chrysene	**112**	ug/kg	26.7	1.4	1	09/29/16 06:44	10/05/16 17:49	218-01-9	
Dibenz(a,h)acridine	**<10.1**	ug/kg	26.7	10.1	1	09/29/16 06:44	10/05/16 17:49	226-36-8	
Dibenz(a,h)anthracene	**11.2J**	ug/kg	26.7	9.1	1	09/29/16 06:44	10/05/16 17:49	53-70-3	
Dibenzo(a,e)pyrene	**10.1J**	ug/kg	26.7	2.5	1	09/29/16 06:44	10/05/16 17:49	192-65-4	
Dibenzo(a,h)pyrene	**<7.5**	ug/kg	26.7	7.5	1	09/29/16 06:44	10/05/16 17:49	189-64-0	
Dibenzo(a,i)pyrene	**2.6J**	ug/kg	26.7	2.6	1	09/29/16 06:44	10/05/16 17:49	189-55-9	
Dibenzo(a,l)pyrene	**3.4J**	ug/kg	26.7	1.5	1	09/29/16 06:44	10/05/16 17:49	191-30-0	
7H-Dibenzo(c,g)carbazole	**<4.5**	ug/kg	26.7	4.5	1	09/29/16 06:44	10/05/16 17:49	194-59-2	
7,12-Dimethylbenz(a)anthracene	**<7.5**	ug/kg	26.7	7.5	1	09/29/16 06:44	10/05/16 17:49	57-97-6	
Fluoranthene	**199**	ug/kg	26.7	2.0	1	09/29/16 06:44	10/05/16 17:49	206-44-0	
Fluorene	**6.0J**	ug/kg	26.7	1.5	1	09/29/16 06:44	10/05/16 17:49	86-73-7	
Indeno(1,2,3-cd)pyrene	**36.7**	ug/kg	26.7	8.0	1	09/29/16 06:44	10/05/16 17:49	193-39-5	
3-Methylcholanthrene	**<4.0**	ug/kg	26.7	4.0	1	09/29/16 06:44	10/05/16 17:49	56-49-5	
5-Methylchrysene	**4.3J**	ug/kg	26.7	3.2	1	09/29/16 06:44	10/05/16 17:49	3697-24-3	
2-Methylnaphthalene	**<1.7**	ug/kg	26.7	1.7	1	09/29/16 06:44	10/05/16 17:49	91-57-6	
Naphthalene	**<1.6**	ug/kg	26.7	1.6	1	09/29/16 06:44	10/05/16 17:49	91-20-3	
Phenanthrene	**61.0**	ug/kg	26.7	1.6	1	09/29/16 06:44	10/05/16 17:49	85-01-8	
Pyrene	**152**	ug/kg	26.7	2.0	1	09/29/16 06:44	10/05/16 17:49	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	69	%.	46-125		1	09/29/16 06:44	10/05/16 17:49	321-60-8	
p-Terphenyl-d14 (S)	71	%.	46-125		1	09/29/16 06:44	10/05/16 17:49	1718-51-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Sample: BCPP-1-4 Comp **Lab ID: 10364126005** Collected: 09/28/16 14:30 Received: 09/28/16 16:20 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP, TCLP	Analytical Method: EPA 6010C Preparation Method: EPA 3010								
	Leachate Method/Date: EPA 1311; 11/09/16 14:26 Initial pH: 8.15; Final pH: 3.06								
Arsenic	**<0.034**	mg/L	0.10	0.034	1	11/10/16 10:22	11/10/16 17:30	7440-38-2	
Barium	**0.73**	mg/L	0.20	0.079	1	11/10/16 10:22	11/10/16 17:30	7440-39-3	
Cadmium	**0.0016J**	mg/L	0.015	0.0011	1	11/10/16 10:22	11/10/16 17:30	7440-43-9	
Chromium	**<0.0046**	mg/L	0.050	0.0046	1	11/10/16 10:22	11/10/16 17:30	7440-47-3	
Lead	**0.021J**	mg/L	0.050	0.0091	1	11/10/16 10:22	11/10/16 17:30	7439-92-1	
Selenium	**<0.051**	mg/L	0.12	0.051	1	11/10/16 10:22	11/10/16 17:30	7782-49-2	
Silver	**<0.0050**	mg/L	0.050	0.0050	1	11/10/16 10:22	11/10/16 17:30	7440-22-4	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A								
	Leachate Method/Date: EPA 1311; 11/09/16 14:26 Initial pH: 8.15; Final pH: 3.06								
Mercury	**<0.094**	ug/L	0.60	0.094	1	11/10/16 08:35	11/10/16 13:39	7439-97-6	H3

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

QC Batch: 446183
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470A Mercury TCLP
Associated Lab Samples: 10364126005

METHOD BLANK: 2438626 Matrix: Water
Associated Lab Samples: 10364126005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.094	0.60	0.094	11/10/16 13:35	

METHOD BLANK: 2436110 Matrix: Water
Associated Lab Samples: 10364126005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.094	0.60	0.094	11/10/16 13:58	

METHOD BLANK: 2436111 Matrix: Water
Associated Lab Samples: 10364126005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.094	0.60	0.094	11/10/16 14:00	

LABORATORY CONTROL SAMPLE: 2438627

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	15	15.9	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2438628 2438629

Parameter	Units	10364126005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.094	15	15	16.0	15.6	107	104	80-120	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

QC Batch: 446181
QC Batch Method: EPA 3010
Analysis Method: EPA 6010C
Analysis Description: 6010C TCLP
Associated Lab Samples: 10364126005

METHOD BLANK: 2438608 Matrix: Water
Associated Lab Samples: 10364126005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	<0.034	0.10	0.034	11/10/16 17:12	
Barium	mg/L	<0.079	0.20	0.079	11/10/16 17:12	
Cadmium	mg/L	<0.0011	0.015	0.0011	11/10/16 17:12	
Chromium	mg/L	<0.0046	0.050	0.0046	11/10/16 17:12	
Lead	mg/L	<0.0091	0.050	0.0091	11/10/16 17:12	
Selenium	mg/L	<0.051	0.12	0.051	11/10/16 17:12	
Silver	mg/L	<0.0050	0.050	0.0050	11/10/16 17:12	

METHOD BLANK: 2436110 Matrix: Water
Associated Lab Samples: 10364126005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	<0.034	0.10	0.034	11/10/16 17:51	
Barium	mg/L	<0.079	0.20	0.079	11/10/16 17:51	
Cadmium	mg/L	<0.0011	0.015	0.0011	11/10/16 17:51	
Chromium	mg/L	<0.0046	0.050	0.0046	11/10/16 17:51	
Lead	mg/L	<0.0091	0.050	0.0091	11/10/16 17:51	
Selenium	mg/L	<0.051	0.12	0.051	11/10/16 17:51	
Silver	mg/L	<0.0050	0.050	0.0050	11/10/16 17:51	

METHOD BLANK: 2436111 Matrix: Water
Associated Lab Samples: 10364126005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/L	<0.034	0.10	0.034	11/10/16 17:54	
Barium	mg/L	<0.079	0.20	0.079	11/10/16 17:54	
Cadmium	mg/L	<0.0011	0.015	0.0011	11/10/16 17:54	
Chromium	mg/L	<0.0046	0.050	0.0046	11/10/16 17:54	
Lead	mg/L	<0.0091	0.050	0.0091	11/10/16 17:54	
Selenium	mg/L	<0.051	0.12	0.051	11/10/16 17:54	
Silver	mg/L	<0.0050	0.050	0.0050	11/10/16 17:54	

LABORATORY CONTROL SAMPLE: 2438609

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	5	4.9	98	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

LABORATORY CONTROL SAMPLE: 2438609

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Barium	mg/L	5	4.7	95	80-120	
Cadmium	mg/L	5	4.7	95	80-120	
Chromium	mg/L	5	4.6	92	80-120	
Lead	mg/L	5	4.7	94	80-120	
Selenium	mg/L	5	5.2	104	80-120	
Silver	mg/L	2.5	2.5	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2438610 2438611

Parameter	Units	10364126005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	<0.034	5	5	5.1	5.0	101	100	75-125	1	30	
Barium	mg/L	0.73	5	5	5.5	5.5	96	95	75-125	1	30	
Cadmium	mg/L	0.0016J	5	5	4.8	4.8	97	96	75-125	1	30	
Chromium	mg/L	<0.0046	5	5	4.6	4.6	93	92	75-125	1	30	
Lead	mg/L	0.021J	5	5	4.8	4.7	95	95	75-125	0	30	
Selenium	mg/L	<0.051	5	5	5.3	5.3	107	106	75-125	1	30	
Silver	mg/L	<0.0050	2.5	2.5	2.5	2.5	102	101	75-125	1	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

QC Batch: 438500 Analysis Method: EPA 6010C
QC Batch Method: EPA 3050 Analysis Description: 6010C Solids
Associated Lab Samples: 10364126001, 10364126002, 10364126003, 10364126004

METHOD BLANK: 2381790 Matrix: Solid
Associated Lab Samples: 10364126001, 10364126002, 10364126003, 10364126004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.19	0.94	0.19	10/06/16 17:15	
Copper	mg/kg	<0.038	0.47	0.038	10/06/16 17:15	

LABORATORY CONTROL SAMPLE: 2381791

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	42.7	40.4	95	80-120	
Copper	mg/kg	42.7	41.3	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2381792 2381793

Parameter	Units	10364126001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	2.4	68	66.4	63.3	61.2	90	89	75-125	3	20	
Copper	mg/kg	13.3	68	66.4	78.3	77.0	96	96	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

QC Batch: 439254
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10364126001

SAMPLE DUPLICATE: 2386803

Parameter	Units	1276140001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	2.8	2.8	0	30	

SAMPLE DUPLICATE: 2386804

Parameter	Units	10364126001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	41.6	42.5	2	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

QC Batch: 439284 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10364126002, 10364126003, 10364126004

SAMPLE DUPLICATE: 2387015

Parameter	Units	10364272007 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	19.5	19.1	2	30	

SAMPLE DUPLICATE: 2387193

Parameter	Units	10364126002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	47.3	47.8	1	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

QC Batch: 438145 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3550 Analysis Description: 8270D CPAH by SIM MSSV
Associated Lab Samples: 10364126001, 10364126002, 10364126003, 10364126004

METHOD BLANK: 2380189 Matrix: Solid
Associated Lab Samples: 10364126001, 10364126002, 10364126003, 10364126004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2-Methylnaphthalene	ug/kg	<0.64	10.0	0.64	10/04/16 13:44	
3-Methylcholanthrene	ug/kg	<1.5	10.0	1.5	10/04/16 13:44	
5-Methylchrysene	ug/kg	<1.2	10.0	1.2	10/04/16 13:44	
7,12-Dimethylbenz(a)anthracene	ug/kg	<2.8	10.0	2.8	10/04/16 13:44	
7H-Dibenzo(c,g)carbazole	ug/kg	<1.7	10.0	1.7	10/04/16 13:44	
Acenaphthene	ug/kg	<0.61	10.0	0.61	10/04/16 13:44	
Acenaphthylene	ug/kg	<0.57	10.0	0.57	10/04/16 13:44	
Anthracene	ug/kg	<0.58	10.0	0.58	10/04/16 13:44	
Benzo(a)anthracene	ug/kg	<1.5	10.0	1.5	10/04/16 13:44	
Benzo(a)pyrene	ug/kg	<1.3	10.0	1.3	10/04/16 13:44	
Benzo(g,h,i)perylene	ug/kg	<2.9	10.0	2.9	10/04/16 13:44	
Benzofluoranthenes (Total)	ug/kg	<11.0	30.0	11.0	10/04/16 13:44	
Chrysene	ug/kg	<0.53	10.0	0.53	10/04/16 13:44	
Dibenz(a,h)acridine	ug/kg	<3.8	10.0	3.8	10/04/16 13:44	
Dibenz(a,h)anthracene	ug/kg	<3.4	10.0	3.4	10/04/16 13:44	
Dibenzo(a,e)pyrene	ug/kg	<0.92	10.0	0.92	10/04/16 13:44	
Dibenzo(a,h)pyrene	ug/kg	<2.8	10.0	2.8	10/04/16 13:44	
Dibenzo(a,i)pyrene	ug/kg	<0.97	10.0	0.97	10/04/16 13:44	
Dibenzo(a,l)pyrene	ug/kg	<0.57	10.0	0.57	10/04/16 13:44	
Fluoranthene	ug/kg	<0.74	10.0	0.74	10/04/16 13:44	
Fluorene	ug/kg	<0.57	10.0	0.57	10/04/16 13:44	
Indeno(1,2,3-cd)pyrene	ug/kg	<3.0	10.0	3.0	10/04/16 13:44	
Naphthalene	ug/kg	<0.61	10.0	0.61	10/04/16 13:44	
Phenanthrene	ug/kg	<0.61	10.0	0.61	10/04/16 13:44	
Pyrene	ug/kg	<0.75	10.0	0.75	10/04/16 13:44	
2-Fluorobiphenyl (S)	%.	80	46-125		10/04/16 13:44	
p-Terphenyl-d14 (S)	%.	101	46-125		10/04/16 13:44	

LABORATORY CONTROL SAMPLE: 2380190

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/kg	100	70.1	70	41-125	
3-Methylcholanthrene	ug/kg	100	32.1	32	30-125	
5-Methylchrysene	ug/kg	100	89.5	90	67-125	
7,12-Dimethylbenz(a)anthracene	ug/kg	100	57.2	57	31-125	SS
7H-Dibenzo(c,g)carbazole	ug/kg	100	89.1	89	51-125	
Acenaphthene	ug/kg	100	76.0	76	49-125	
Acenaphthylene	ug/kg	100	75.5	76	48-125	
Anthracene	ug/kg	100	79.3	79	63-125	
Benzo(a)anthracene	ug/kg	100	86.0	86	60-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

LABORATORY CONTROL SAMPLE: 2380190

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzo(a)pyrene	ug/kg	100	90.2	90	63-125	
Benzo(g,h,i)perylene	ug/kg	100	85.6	86	59-125	
Benzofluoranthenes (Total)	ug/kg	300	281	94	67-125	
Chrysene	ug/kg	100	85.8	86	62-125	
Dibenz(a,h)acridine	ug/kg	100	89.3	89	61-125	
Dibenz(a,h)anthracene	ug/kg	100	87.5	88	59-125	
Dibenzo(a,e)pyrene	ug/kg	100	89.1	89	48-125	
Dibenzo(a,h)pyrene	ug/kg	100	96.7	97	41-128	
Dibenzo(a,i)pyrene	ug/kg	100	83.1	83	33-125	
Dibenzo(a,l)pyrene	ug/kg	100	66.2	66	30-125	
Fluoranthene	ug/kg	100	81.9	82	65-125	
Fluorene	ug/kg	100	77.5	77	58-125	
Indeno(1,2,3-cd)pyrene	ug/kg	100	88.1	88	60-125	
Naphthalene	ug/kg	100	65.6	66	38-125	
Phenanthrene	ug/kg	100	81.4	81	62-125	
Pyrene	ug/kg	100	97.9	98	61-125	
2-Fluorobiphenyl (S)	%.			64	46-125	
p-Terphenyl-d14 (S)	%.			86	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2380191 2380192

Parameter	Units	10364126001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2-Methylnaphthalene	ug/kg	4.7J	171	171	121J	81.4J	68	45	47-125		30	M6
3-Methylcholanthrene	ug/kg	23.5	171	171	74.8J	66.2J	30	25	30-150		30	M6
5-Methylchrysene	ug/kg	101	171	171	193	215	54	66	46-125	11	30	
7,12-Dimethylbenz(a)anthracene	ug/kg	<4.8	171	171	121J	90.0J	70	53	30-150		30	SS
7H-Dibenzo(c,g)carbazole	ug/kg	<2.9	171	171	76.9J	56.3J	45	33	30-130		30	
Acenaphthene	ug/kg	62.4	171	171	154J	138J	54	44	30-144		30	
Acenaphthylene	ug/kg	38.5	171	171	137J	115J	58	45	36-125		30	
Anthracene	ug/kg	168	171	171	187	279	11	65	34-125	39	30	M6,R1
Benzo(a)anthracene	ug/kg	634	171	171	559	923	-43	169	30-150	49	30	M6,R1
Benzo(a)pyrene	ug/kg	748	171	171	692	1190	-33	259	30-150	53	30	M6,R1
Benzo(g,h,i)perylene	ug/kg	280	171	171	294	456	8	103	30-148	43	30	M6,R1
Benzofluoranthenes (Total)	ug/kg	1890	514	514	1850	3010	-8	218	30-150	48	30	M6,R1
Chrysene	ug/kg	950	171	171	771	1290	-105	196	30-150	50	30	M6,R1
Dibenz(a,h)acridine	ug/kg	20.4	171	171	117J	98.7J	56	46	30-127		30	
Dibenz(a,h)anthracene	ug/kg	75.2	171	171	148J	169J	43	55	30-137		30	
Dibenzo(a,e)pyrene	ug/kg	55.1	171	171	105J	134J	29	46	30-150		30	M6
Dibenzo(a,h)pyrene	ug/kg	21.4	171	171	58.5J	62.0J	22	24	30-125		30	M6
Dibenzo(a,i)pyrene	ug/kg	6.2J	171	171	40.1J	32.7J	20	15	30-125		30	M6
Dibenzo(a,l)pyrene	ug/kg	3.9J	171	171	36.1J	32.4J	19	17	30-125		30	M6
Fluoranthene	ug/kg	2150	171	171	1530	2700	-364	321	30-150	56	30	M6,R1
Fluorene	ug/kg	72.4	171	171	160J	171	51	58	38-125		30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2380191 2380192

Parameter	Units	10364126001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Indeno(1,2,3-cd)pyrene	ug/kg	273	171	171	291	440	11	98	30-150	41	30	M6,R1
Naphthalene	ug/kg	5.6J	171	171	108J	78.6J	60	43	38-125		30	
Phenanthrene	ug/kg	1050	171	171	762	1300	-166	147	30-150	52	30	M6,R1
Pyrene	ug/kg	1550	171	171	1140	1920	-239	215	30-150	51	30	M6,R1
2-Fluorobiphenyl (S)	%.						91	98	46-125			D3
p-Terphenyl-d14 (S)	%.						83	89	46-125			

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

WORKORDER QUALIFIERS

WO: 10364126

[1]	Samples were received outside of the recommended temperature range of 0-6 degrees Celsius. The samples were received from the field on ice, indicating the cool down process had begun.

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H3	Sample was received or analysis requested beyond the recognized method holding time.
IS	The internal standard recovery associated with this result exceeds the lower control limit. The reported result should be considered an estimated value.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
R1	RPD value was outside control limits.
SS	This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 23270051.37 PND BassettCrk RE2
Pace Project No.: 10364126

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10364126005	**BCPP-1-4 Comp**	EPA 3010	446181	EPA 6010C	446348
10364126001	**BCPP-1 Comp**	EPA 3050	438500	EPA 6010C	439084
10364126002	**BCPP-2 Comp**	EPA 3050	438500	EPA 6010C	439084
10364126003	**BCPP-3 Comp**	EPA 3050	438500	EPA 6010C	439084
10364126004	**BCPP-4 Comp**	EPA 3050	438500	EPA 6010C	439084
10364126005	**BCPP-1-4 Comp**	EPA 7470A	446183	EPA 7470A	446370
10364126001	**BCPP-1 Comp**	ASTM D2974	439254		
10364126002	**BCPP-2 Comp**	ASTM D2974	439284		
10364126003	**BCPP-3 Comp**	ASTM D2974	439284		
10364126004	**BCPP-4 Comp**	ASTM D2974	439284		
10364126001	**BCPP-1 Comp**	EPA 3550	438145	EPA 8270D by SIM	438967
10364126002	**BCPP-2 Comp**	EPA 3550	438145	EPA 8270D by SIM	438967
10364126003	**BCPP-3 Comp**	EPA 3550	438145	EPA 8270D by SIM	438967
10364126004	**BCPP-4 Comp**	EPA 3550	438145	EPA 8270D by SIM	438967

10364126

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☐ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☑ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: ☒ MN ☐ SD

COC Number: 51923

COC 1 of 1

REPORT TO	INVOICE TO
Company: BARR ENGINEERING	Company: SAME
Address: 4300 MarketPointe Dr	Address:
Name:	Name:
email:	email:
Copy to: datamgt@barr.com	P.O.
Project Name: Bassett Creek Park Pond	Barr Project No: 23270051.37 PND

Matrix Code: GW = Groundwater, SW = Surface Water, WW = Waste Water, DW = Drinking Water, S = Soil/Solid, SD = Sediment, O = Other

Preservative Code: A = None, B = HCl, C = HNO_3, D = H_2SO_4, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, I = Ascorbic Acid, J = NH_4Cl, K = Zn Acetate, O = Other

	Location	Sample Depth Start	Sample Depth Stop	Sample Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water	Soil: Arsenic / Copper	Soil: cPAHs	Soil: TCLP Metals	Soil: % Solids	Preservative Code	Field Filtered Y (N)
1.	BCPP-1 Comp				09/28/2016	1210	S	N	2		1	1			see stormwater pond list for cPAHs	
2.	BCPP-2 Comp					1300		N	2		1	1				
3.	BCPP-3 Comp					1340		N	2		1	1			HOLD BCPP-1-4-Comp TCLP metals sample.	
4.	BCPP-4 Comp					1420		N	2		1	1				
5.	BCPP-1-4-Comp					1430		N	1				1			
6.																
7.																
8.																
9.																
10.																

BARR USE ONLY

Sampled by: KDM / PJM2

Barr Proj. Manager: KDM

Barr DQ Manager: TAD

Lab Name: PACE

Lab Location: Minneapolis, MN

Relinquished by: PJM 1530 — On Ice? (Y) N — Date 9/30/16 — Time — Received by: — Date 9.26.16 — Time 16:20

Relinquished by: — On Ice? Y N — Date — Time — Received by: — Date — Time

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☐ Sampler ☐ Other: _____ Air Bill Number:

Lab WO: Temperature on Receipt (°C): Custody Seal Intact? ☐ Y ☐ N ☐ None

Requested Due Date: ☐ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)

Distribution - **White-Original:** Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Barr Engineering

Project #: WO# : 10364126

10364126

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☒ Other: quicksilver

Tracking Number:

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermometer Used: ☐ 151401163 ☒ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 10.9 **Cooler Temp Corrected (°C):** 10.8 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** CM 9.29.16

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☒ No

Did samples originate from a foreign source (internationally including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: SL				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☒ N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☒ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Present?	☐ Yes	☒ No	☐ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution: Temp ok, received from field on ice.

Project Manager Review: **Date:** 09/29/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Appendix B

Sediment Sampling Memo—Winnetka Pond East

resourceful. naturally.
engineering and environmental consultants

BARR

Technical Memorandum

To: Bassett Creek Watershed Management Commission
From: Kevin Menken and Candice Kantor
Subject: Winnetka Pond East Sediment Characterization
Date: February 27, 2017
Project: 23/27-0051

Introduction

This memorandum summarizes sediment characterization for sediment samples collected from the Winnetka Pond East in the City of Crystal (City). Sediment samples were collected by Barr Engineering Co. (Barr) on September 28, 2016 on behalf of Bassett Creek Watershed Management Organization.

The purpose of sediment characterization is to determine whether the sediment in the pond, when excavated or dredged, could potentially be reused as fill, or if other management methods such as landfill disposal would be required. The use and/or disposal of excavated or dredged material is determined based on concentrations of potential contaminants in the sediments, including metals and polycyclic aromatic hydrocarbons (PAHs). Excavated sediment and soils that do not exhibit field screening impacts and do not exceed the Minnesota Pollution Control Agency's (MPCA) Soil Reference Values (SRV) or applicable Screening Soil Leaching Values (SLVs) may be considered Unregulated Fill that is suitable for off-site reuse according to the MPCA document *Best Management Practices for the Off-Site Reuse of Unregulated Fill* (MPCA, 2012). Sediment or soil excavated from stormwater ponds with constituents that exceed SRVs or applicable Screening SLVs are often disposed at a solid waste landfill, but other options involving specific land uses (e.g. non-residential) could be explored if there are suitable locations elsewhere at City-owned property.

Sediment Sample Collection

Sediment sampling was conducted in accordance with the MPCA's *Managing Stormwater Sediment, Best Management Practice Guidance* (MPCA, 2015). This document provides technical guidance for characterizing sediment in stormwater ponds, including the number of samples that should be collected and potential contaminants to be analyzed. Barr staff collected three sediment samples, consistent with MPCA guidance recommendations for ponds 2 to 3 acres in size. Sampling locations were recorded with a handheld GPS unit; locations are shown on Figure 1. Barr staff used aluminum coring tubes for collecting sediment cores. The entire depth of the sediment core was homogenized in a clean stainless steel bowl before transferring portions to sample containers provided by the laboratory. Samples were sent to Pace Analytical laboratory in Minneapolis for analyses of potential contaminants.

The MPCA guidance for stormwater pond sediment management lists the baseline parameters that should be tested for in order to determine whether excavated sediment is contaminated or could be considered Unregulated Fill (MPCA, 2015). The baseline parameters listed in the MPCA guidance are arsenic, copper, and polycyclic aromatic hydrocarbons (PAHs). PAHs are organic compounds that are formed by the incomplete combustion of organic materials, such as wood, oil, and coal. They are also naturally occurring in crude oil and coal. The MPCA determined that coal tar-based sealants are the largest source of PAHs to stormwater ponds, and a state-wide ban of coal tar-based sealants took effect January 1, 2014.

In addition to the baseline parameters, additional parameters may be appropriate with consideration of potential sources of other contaminants in the watershed. A query of MPCA's *What's in My Neighborhood* (WIMN) website was performed for the Winnetka Pond East watershed. *WIMN* is a database maintained by the MPCA that includes potentially contaminated sites (e.g. documented tank leaks), and environmental permits and registrations (e.g. small quantity hazardous waste generator). Based on the WIMN query results and the land uses in the watershed, the sediment samples were analyzed for the MPCA's baseline parameters for stormwater ponds – arsenic, copper, and PAHs. In addition, samples were field screened for potential impacts from chemical impacts, including examination for visual staining, oil sheen, and odors. If field screening indicated possible impacts, additional analytical testing would have been considered.

Laboratory Methodologies and Determination of BaP Equivalents

The parameters analyzed and their laboratory analytical methods are listed below:

- Metals: arsenic, copper (method EPA 6010C)
- Polycyclic aromatic hydrocarbons (PAHs) (method EPA 8270D by SIM)

The PAHs that were analyzed can be grouped into two categories: carcinogenic (i.e. cancer causing) and non-carcinogenic. In order to assess the contamination level of the carcinogenic PAHs in stormwater pond sediment, the MPCA requires the calculation of a "BaP equivalents value". The BaP equivalents value is a single value representing the combined potency of 17 individual carcinogenic PAH compounds with BaP (benzo[a]pyrene) acting as the reference compound. The list of compounds and their respective potency equivalents factors used to calculate the BaP equivalents value can be found in the MPCA guidance document, along with methods for addressing constituents at concentrations below the detection limit (MPCA 2015).

Laboratory analytical results for the sediment samples are summarized in Table 1. The detailed laboratory report is included in Attachment C.

Results of Sediment Characterization

Results of laboratory analytical testing on the sediment samples were compared to the MPCA's current SRVs and Screening SLVs on Table 1. Results of field screening for staining, sheen, or odor, were negative for all three sediment samples; therefore, no additional analytical testing was conducted beyond the baseline parameter list for stormwater pond sediment characterization. Results of arsenic, copper, and PAHs in the sediment of Winnetka Pond East were below Minnesota's SRVs and Screening SLVs for all three samples collected from the pond, with the exception of the arsenic Screening SLV. Sample WPE-01 had an arsenic concentration of 6.3 mg/kg, which is slightly above the SLV of 5.8 mg/kg. However, MPCA guidance for Screening SLVs states that SLVs for metals should only be applied if there has been a significant release of metals documented. Since no significant release of metals has been documented in the pond's watershed, the observed arsenic concentration of 6.3 mg/kg in sample WPE-01 should not preclude the reuse of the material as Unregulated Fill. Overall, the sediment sampling results indicate that the sediment to be removed from Winnetka Pond East is suitable for off-site reuse under MPCA's Unregulated Fill Best Practice (MPCA, 2012).

Results of sediment testing were also compared to the MPCA's proposed changes to SRVs in Table 1. Results of arsenic, copper, and PAHs were below the proposed changes to SRVs for all three of the sediment samples collected from Winnetka Pond East. The MPCA had originally intended that the SRV changes would be implemented later this year (2017), but recent conversations with MCPA staff indicated that the timing of these potential changes may not occur in 2017. The status of MPCA's SRV revisions should be reassessed prior to proceeding with the sediment excavation and management.

References

Minnesota Pollution Control Agency (MPCA), 2012. Best Management Practices for the Off-Site Reuse of Unregulated Fill. February 2012.

MPCA, 2015. Managing Stormwater Sediment, Best Management Practice Guidance, document wq-strm4-16, June 2015.

Tables

Table 1 – Winnetka Pond East Sediment Analytical Data Summary

Figures

Figure 1 – Winnetka Pond East Sediment Sampling Locations

Attachments

Attachment A – Sediment Core Field Logs

Attachment B – Photographs

Attachment C – Laboratory Analytical Data Report

Tables

Table 1
Winnetka Pond East Sediment Analytical Data Summary
Bassett Creek Watershed Management Commission

						Sample ID:	**WPE-01**	**WPE-02**	**WPE-03**
						Sample Date:	**9/23/2016**	**9/23/2016**	**9/23/2016**
Parameter	Units	Minnesota Screening Soil Leaching Values	Minnesota Residential Soil Reference Values	Proposed Minnesota Residential/ Recreational SRVs	Minnesota Industrial Soil Reference Values	Proposed Minnesota Commercial/ Industrial SRVs			
Effective Date		06/01/2013	06/22/2009	08/01/2016	06/22/2009	08/01/2016			
Exceedance Key		**Bold**	No Exceed	No Exceed	No Exceed	No Exceed			
General Parameters									
Moisture	%						64.7	19.6	28.8
Metals									
Arsenic	mg/kg	**5.8**	9	9	20	9	**6.3**	2.3	2.9
Copper	mg/kg	700	100	2200	9000	33000	33.1	24.5	15.3
Carcinogenic PAHs									
3-Methylcholanthrene	mg/kg	T	T	T	T	T	0.0062 j*	0.0088 j	0.0049 j
5-Methylchrysene	mg/kg	T	T	T	T	T	0.0258 j	0.0384	0.0289
7,12-Dimethylbenz(a)anthracene	mg/kg	T	T	T	T	T	< 0.0079	< 0.0035	< 0.0039
7h-Dibenzo(c,g)carbazole	mg/kg	T	T	T	T	T	< 0.0048	< 0.0021	< 0.0024
Benz(a)anthracene	mg/kg	T	T	T	T	T	0.114	0.192	0.112
Benzo(a)pyrene	mg/kg	T	T	T	T	T	0.182	0.256	0.171
Chrysene	mg/kg	T	T	T	T	T	0.207	0.298	0.198
Dibenz(a,h)acridine	mg/kg	T	T	T	T	T	< 0.0107	0.0080 j	0.0056 j
Dibenz(a,h)anthracene	mg/kg	T	T	T	T	T	0.0223 j	0.0238	0.0169
Dibenzo(a,e)pyrene	mg/kg	T	T	T	T	T	0.0237 j*	0.0193	< 0.0013
Dibenzo(a,h)pyrene	mg/kg	T	T	T	T	T	0.0114 j*	0.0075 j	0.0070 j
Dibenzo(a,i)pyrene	mg/kg	T	T	T	T	T	0.0040 j*	0.0026 j	0.0027 j
Dibenzo(a,l)pyrene	mg/kg	T	T	T	T	T	0.0046 j*	0.0024 j	0.0025 j
Indeno(1,2,3-cd)pyrene	mg/kg	T	T	T	T	T	0.0769	0.0791	0.0595
BaP Equivalents, calculated using Kaplan-Meier method	mg/kg	1.4 T	2 T	1 T	3 T	14 T	0.57 a^	0.60 a	0.43 a
% Non-detects	%						20.0 a	13.3 a	20.0 a
PAHs									
2-Methylnaphthalene	mg/kg		100	39	369	370	0.0019 j	0.0024 j	0.0023 j
Acenaphthene	mg/kg	81	1200	1300	5260	19000	0.0066 j	0.0139	0.0121 j
Acenaphthylene	mg/kg	NA					0.0091 j	0.0090 j	0.0110 j
Anthracene	mg/kg	1300	7880	6500	45400	97000	0.0222 j	0.0370	0.0321
Benzo(g,h,i)perylene	mg/kg	NA					0.0881 *	0.0764	0.0656
Benzofluoranthenes	mg/kg						0.478	0.635	0.453
Fluoranthene	mg/kg	670	1080	510	6800	6700	0.344	0.523	0.419
Fluorene	mg/kg	110	850	860	4120	13000	0.0093 j	0.0207	0.0151
Naphthalene	mg/kg	4.5	10	81	28	120	0.0021 j	0.0018 j	0.0020 j
Phenanthrene	mg/kg	NA					0.101	0.223	0.144
Pyrene	mg/kg	440	890	44	5800	44	0.254	0.361	0.252

Table 1 Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

*	Estimated value, QA/QC criteria not met.
a	Estimated value, calculated using some or all values that are estimates.
j	Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.
^	Possible low bias due to four BaP compounds having low MS/MSD (dibenz(a,e)pyrene,dibenz(a,h)pyrene, dibenz(a,i)pyrene, dibenz(a,l)pyrene) and one compound (3-methylcholanthrene with low LCS.

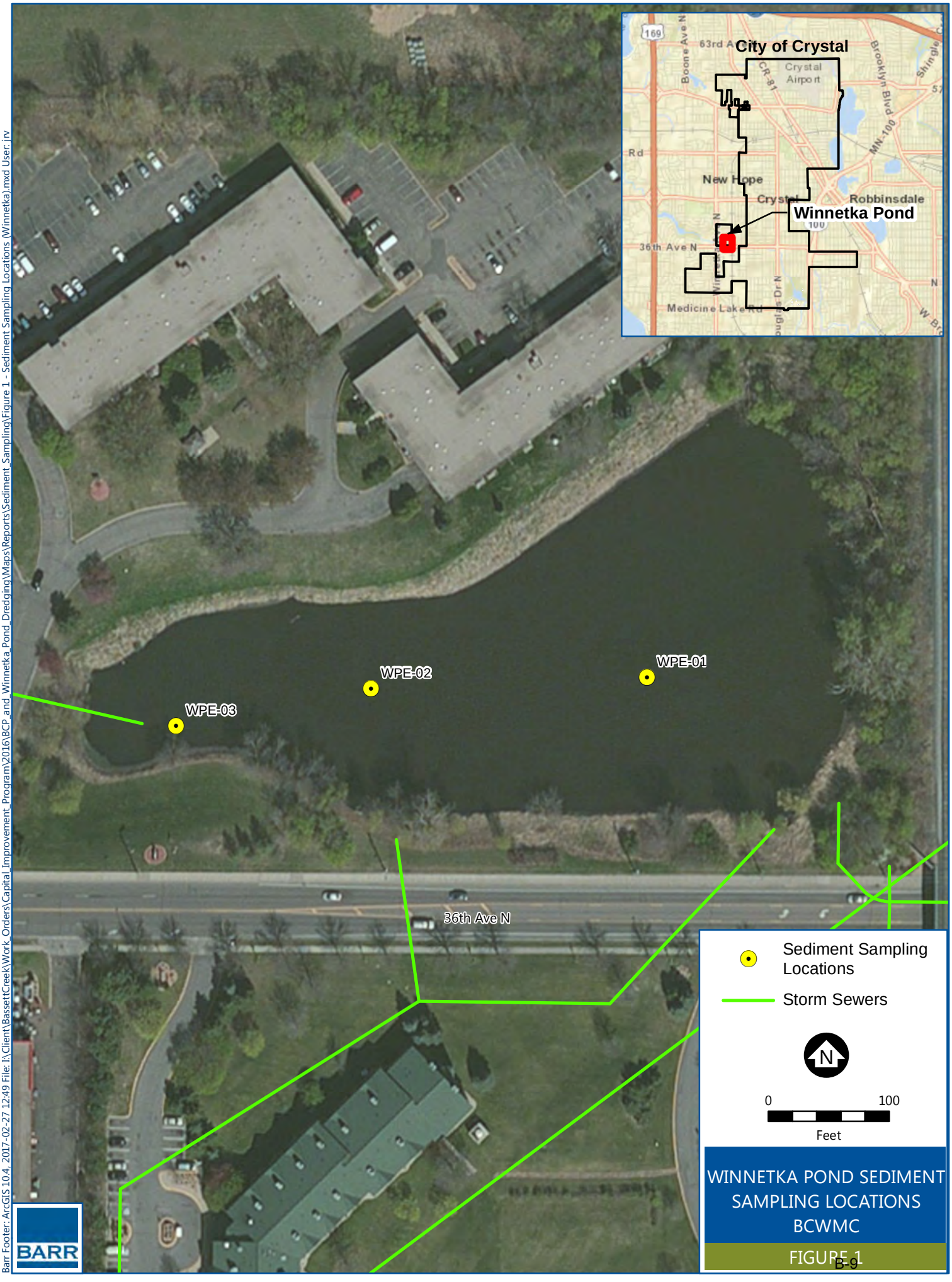
Minnesota Screening Soil Leaching Values

NA	Criterion value is not available for this analyte.
T	Value represents a criteria for the total carcinogenic PAHs as BaP.

Minnesota Soil Reference Values

T	Value represents a criteria for the total carcinogenic PAHs as BaP.

Figures



Barr Footer: ArcGIS 10.4, 2017-02-27 12:49 File: I:\Client\BassettCreek\Work_Orders\Capital_Improvement_Program\2016\BCP_and_Winnetka_Pond_Dredging\Maps\Reports\Sediment_Sampling\Figure 1 - Sediment Sampling Locations (Winnetka).mxd User: jrv

Attachment A

Sediment/Soil Coring Logs

Sediment Core/Boring Log

BARR

Project: Winnetka Pond East / Bassett Creek Ponds

Proj#: 23270051.

Collection Date(s): 9-23-16

Ice Thickness (feet): —

Water Depth (feet): 3.0

GPS X:

GPS Y: DNR GPS

GPS Z:

Length of Push (feet): 2.3'

Recovery (feet): 2.1

% Recovery:

Driller: Barr

Crew: JWJ/KDM

Observer: —

VC: vibracore
PC: push core

Core/Boring#: WPE-01

Drilling Method: VC

Logged by: JWJ

Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	1	0'-2.1'	W	Soft	N	Low	roots	N	N	N	OL/OH		0'-0.1' = loose Black organic silts 0.1'-1.0' = Soft Black organic silts
1	2.1			Spongy	N	Low	Fibrous	N	N	N	OL/OH (Peat)		1.0'-2.1' = Black to V dark brown organic peat spongy and fibrous
													Refusal @ 2.3'

Sediment Core/Boring Log

BARR

Proj#: 23270051. Project: Winnetka Pond East Bassett Creek Ponds

Collection Date(s): 9-23-16 GPS X:

Ice Thickness (feet): — GPS Y: ON GPS

Water Depth (feet): 2.0 GPS Z:

Length of Push (feet): 2.7' Recovery (feet): 2.3' % Recovery:

Driller: Barr Crew: JWJ/KDM Observer: —

VC: vibracore
PC: push core

Core/Boring#: WPE-02
Drilling Method: VC
Logged by: JWJ
Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	Description
0	1.3	0'-2.3'	W	loose	N	N	N	N	N	N	SM		0-1.3' = Black silty sand fg-cg w/ trace fine gravel
1.3'	2.3'		Sat	soft / med soft	Low	Yes	N	N	N	N	OL/OH & CL		1.3-2.3 = Black to olive blue color soft (Black) Organic silts grades to (olive blue) lean clay med soft trace coarse sand throughout
													Refusal @ 2.7'

Sediment Core/Boring Log

BARR

VC: vibracore
PC: push core

Proj#: 23270051 Project: Winnetka Pond East Core/Boring#: WPE-03

Collection Date(s): 9-23-16 GPS X: Length of Push (feet): 3.6 Driller: Barr Drilling Method: VC

Ice Thickness (feet): GPS Y: Recovery (feet): 3.6 Crew: JWJ/KDM Logged by: JWJ

Water Depth (feet): 2.4 GPS Z: % Recovery: Observer: Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties										Description
			Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	ASTM / USCS Classification	Graphic Log	
0	1.5	0-3.6	W	Loose	N	N	N	N	N	N	SM		0-1.5'= Black silty sand w/ roots fg-cg sand
1.5	2.5		W	Soft	N	Yes	N	N	N	N	OL/OH		1.5-2.5'= Black peaty silts w/ sand
2.5	3.6		W	Stiff	Low	Yes	N	N	N	N	CL		2.5-3.6'= Gray lean clay w/ gravel and sand fg-cg.

Attachment B

Photographs

Photograph #1: Sediment core WPE-01.

Photograph #2: Sediment core WPE-02.

Photograph #3: Sediment core WPE-03, 0-2.5’ interval.

Photograph #4: Sediment core WPE-03, 1.5-3.5’ interval.

Attachment C

Laboratory Analytical Data

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

October 11, 2016

Terri Olson
Barr Engineering
4300 MarketPointe Drive
Suite 200
Minneapolis, MN 55435

RE: Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Dear Terri Olson:
Enclosed are the analytical results for sample(s) received by the laboratory on September 23, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Amanda Albrecht
amanda.albrecht@pacelabs.com
Project Manager

Enclosures

cc: BarrDM, Barr Engineering
Kevin Menken, Barr Engineering

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10363579001	**WPE-01**	Solid	09/23/16 11:45	09/23/16 15:20
10363579002	**WPE-02**	Solid	09/23/16 12:00	09/23/16 15:20
10363579003	**WPE-03**	Solid	09/23/16 12:30	09/23/16 15:20
10363579004	**WPE-Comp**	Solid	09/23/16 12:38	09/23/16 15:20

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SAMPLE ANALYTE COUNT

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10363579001	**WPE-01**	EPA 6010C	DM	2	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10363579002	**WPE-02**	EPA 6010C	DM	2	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M
10363579003	**WPE-03**	EPA 6010C	DM	2	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	JLR	27	PASI-M

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PROJECT NARRATIVE

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Date: October 11, 2016

Case Narrative

Semi-Volatile Organics Analysis
8270D CPAH

Refering to data qualifiers that appear later in the report:

SS - The 7,12 dimethylbenz(a)anthracene result associated with batch QC did not meet secondary source verification criteria. It was recovered at 175% (recovery limits are 50-150%). The high recovery leads to a high bias in the QC but does not impact any results.

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ANALYTICAL RESULTS

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Sample: WPE-01 **Lab ID: 10363579001** Collected: 09/23/16 11:45 Received: 09/23/16 15:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050								
Arsenic	**6.3**	mg/kg	2.8	0.56	1	09/27/16 11:54	09/30/16 11:03	7440-38-2	
Copper	**33.1**	mg/kg	1.4	0.11	1	09/27/16 11:54	09/30/16 11:03	7440-50-8	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**64.7**	%	0.10	0.10	1		09/30/16 11:49		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**6.6J**	ug/kg	28.3	1.7	1	09/26/16 07:13	10/04/16 14:42	83-32-9	
Acenaphthylene	**9.1J**	ug/kg	28.3	1.6	1	09/26/16 07:13	10/04/16 14:42	208-96-8	
Anthracene	**22.2J**	ug/kg	28.3	1.6	1	09/26/16 07:13	10/04/16 14:42	120-12-7	
Benzo(a)anthracene	**114**	ug/kg	28.3	4.2	1	09/26/16 07:13	10/04/16 14:42	56-55-3	
Benzo(a)pyrene	**182**	ug/kg	28.3	3.7	1	09/26/16 07:13	10/04/16 14:42	50-32-8	
Benzo(g,h,i)perylene	**88.1**	ug/kg	28.3	8.2	1	09/26/16 07:13	10/04/16 14:42	191-24-2	M1
Benzofluoranthenes (Total)	**478**	ug/kg	84.8	31.1	1	09/26/16 07:13	10/04/16 14:42		
Chrysene	**207**	ug/kg	28.3	1.5	1	09/26/16 07:13	10/04/16 14:42	218-01-9	
Dibenz(a,h)acridine	**<10.7**	ug/kg	28.3	10.7	1	09/26/16 07:13	10/04/16 14:42	226-36-8	
Dibenz(a,h)anthracene	**22.3J**	ug/kg	28.3	9.6	1	09/26/16 07:13	10/04/16 14:42	53-70-3	
Dibenzo(a,e)pyrene	**23.7J**	ug/kg	28.3	2.6	1	09/26/16 07:13	10/04/16 14:42	192-65-4	M1
Dibenzo(a,h)pyrene	**11.4J**	ug/kg	28.3	7.9	1	09/26/16 07:13	10/04/16 14:42	189-64-0	M1
Dibenzo(a,i)pyrene	**4.0J**	ug/kg	28.3	2.7	1	09/26/16 07:13	10/04/16 14:42	189-55-9	M1
Dibenzo(a,l)pyrene	**4.6J**	ug/kg	28.3	1.6	1	09/26/16 07:13	10/04/16 14:42	191-30-0	M1
7H-Dibenzo(c,g)carbazole	**<4.8**	ug/kg	28.3	4.8	1	09/26/16 07:13	10/04/16 14:42	194-59-2	
7,12-Dimethylbenz(a)anthracene	**<7.9**	ug/kg	28.3	7.9	1	09/26/16 07:13	10/04/16 14:42	57-97-6	
Fluoranthene	**344**	ug/kg	28.3	2.1	1	09/26/16 07:13	10/04/16 14:42	206-44-0	
Fluorene	**9.3J**	ug/kg	28.3	1.6	1	09/26/16 07:13	10/04/16 14:42	86-73-7	
Indeno(1,2,3-cd)pyrene	**76.9**	ug/kg	28.3	8.5	1	09/26/16 07:13	10/04/16 14:42	193-39-5	
3-Methylcholanthrene	**6.2J**	ug/kg	28.3	4.2	1	09/26/16 07:13	10/04/16 14:42	56-49-5	L2
5-Methylchrysene	**25.8J**	ug/kg	28.3	3.4	1	09/26/16 07:13	10/04/16 14:42	3697-24-3	
2-Methylnaphthalene	**1.9J**	ug/kg	28.3	1.8	1	09/26/16 07:13	10/04/16 14:42	91-57-6	
Naphthalene	**2.1J**	ug/kg	28.3	1.7	1	09/26/16 07:13	10/04/16 14:42	91-20-3	
Phenanthrene	**101**	ug/kg	28.3	1.7	1	09/26/16 07:13	10/04/16 14:42	85-01-8	
Pyrene	**254**	ug/kg	28.3	2.1	1	09/26/16 07:13	10/04/16 14:42	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	65	%.	46-125		1	09/26/16 07:13	10/04/16 14:42	321-60-8	
p-Terphenyl-d14 (S)	65	%.	46-125		1	09/26/16 07:13	10/04/16 14:42	1718-51-0	

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ANALYTICAL RESULTS

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Sample: WPE-02 **Lab ID: 10363579002** Collected: 09/23/16 12:00 Received: 09/23/16 15:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050								
Arsenic	**2.3**	mg/kg	1.1	0.22	1	09/27/16 11:54	09/30/16 11:29	7440-38-2	
Copper	**24.5**	mg/kg	0.55	0.044	1	09/27/16 11:54	09/30/16 11:29	7440-50-8	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**19.6**	%	0.10	0.10	1		09/30/16 11:49		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**13.9**	ug/kg	12.4	0.76	1	09/26/16 07:13	10/04/16 16:09	83-32-9	
Acenaphthylene	**9.0J**	ug/kg	12.4	0.71	1	09/26/16 07:13	10/04/16 16:09	208-96-8	
Anthracene	**37.0**	ug/kg	12.4	0.72	1	09/26/16 07:13	10/04/16 16:09	120-12-7	
Benzo(a)anthracene	**192**	ug/kg	12.4	1.9	1	09/26/16 07:13	10/04/16 16:09	56-55-3	
Benzo(a)pyrene	**256**	ug/kg	12.4	1.6	1	09/26/16 07:13	10/04/16 16:09	50-32-8	
Benzo(g,h,i)perylene	**76.4**	ug/kg	12.4	3.6	1	09/26/16 07:13	10/04/16 16:09	191-24-2	
Benzofluoranthenes (Total)	**635**	ug/kg	186	68.2	5	09/26/16 07:13	10/05/16 14:56		
Chrysene	**298**	ug/kg	12.4	0.66	1	09/26/16 07:13	10/04/16 16:09	218-01-9	
Dibenz(a,h)acridine	**8.0J**	ug/kg	12.4	4.7	1	09/26/16 07:13	10/04/16 16:09	226-36-8	
Dibenz(a,h)anthracene	**23.8**	ug/kg	12.4	4.2	1	09/26/16 07:13	10/04/16 16:09	53-70-3	
Dibenzo(a,e)pyrene	**19.3**	ug/kg	12.4	1.1	1	09/26/16 07:13	10/04/16 16:09	192-65-4	
Dibenzo(a,h)pyrene	**7.5J**	ug/kg	12.4	3.5	1	09/26/16 07:13	10/04/16 16:09	189-64-0	
Dibenzo(a,i)pyrene	**2.6J**	ug/kg	12.4	1.2	1	09/26/16 07:13	10/04/16 16:09	189-55-9	
Dibenzo(a,l)pyrene	**2.4J**	ug/kg	12.4	0.71	1	09/26/16 07:13	10/04/16 16:09	191-30-0	
7H-Dibenzo(c,g)carbazole	**<2.1**	ug/kg	12.4	2.1	1	09/26/16 07:13	10/04/16 16:09	194-59-2	
7,12-Dimethylbenz(a)anthracene	**<3.5**	ug/kg	12.4	3.5	1	09/26/16 07:13	10/04/16 16:09	57-97-6	
Fluoranthene	**523**	ug/kg	62.0	4.6	5	09/26/16 07:13	10/05/16 14:56	206-44-0	
Fluorene	**20.7**	ug/kg	12.4	0.71	1	09/26/16 07:13	10/04/16 16:09	86-73-7	
Indeno(1,2,3-cd)pyrene	**79.1**	ug/kg	12.4	3.7	1	09/26/16 07:13	10/04/16 16:09	193-39-5	
3-Methylcholanthrene	**8.8J**	ug/kg	12.4	1.9	1	09/26/16 07:13	10/04/16 16:09	56-49-5	L2
5-Methylchrysene	**38.4**	ug/kg	12.4	1.5	1	09/26/16 07:13	10/04/16 16:09	3697-24-3	
2-Methylnaphthalene	**2.4J**	ug/kg	12.4	0.79	1	09/26/16 07:13	10/04/16 16:09	91-57-6	
Naphthalene	**1.8J**	ug/kg	12.4	0.76	1	09/26/16 07:13	10/04/16 16:09	91-20-3	
Phenanthrene	**223**	ug/kg	12.4	0.76	1	09/26/16 07:13	10/04/16 16:09	85-01-8	
Pyrene	**361**	ug/kg	62.0	4.6	5	09/26/16 07:13	10/05/16 14:56	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	67	%.	46-125		1	09/26/16 07:13	10/04/16 16:09	321-60-8	
p-Terphenyl-d14 (S)	90	%.	46-125		1	09/26/16 07:13	10/04/16 16:09	1718-51-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Sample: WPE-03 **Lab ID: 10363579003** Collected: 09/23/16 12:30 Received: 09/23/16 15:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050								
Arsenic	**2.9**	mg/kg	1.3	0.26	1	09/27/16 11:54	09/30/16 11:31	7440-38-2	
Copper	**15.3**	mg/kg	0.64	0.051	1	09/27/16 11:54	09/30/16 11:31	7440-50-8	
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**28.8**	%	0.10	0.10	1		09/30/16 11:49		
8270D MSSV CPAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**12.1J**	ug/kg	14.0	0.86	1	09/26/16 07:13	10/05/16 14:27	83-32-9	
Acenaphthylene	**11.0J**	ug/kg	14.0	0.80	1	09/26/16 07:13	10/05/16 14:27	208-96-8	
Anthracene	**32.1**	ug/kg	14.0	0.81	1	09/26/16 07:13	10/05/16 14:27	120-12-7	
Benzo(a)anthracene	**112**	ug/kg	14.0	2.1	1	09/26/16 07:13	10/05/16 14:27	56-55-3	
Benzo(a)pyrene	**171**	ug/kg	14.0	1.8	1	09/26/16 07:13	10/05/16 14:27	50-32-8	
Benzo(g,h,i)perylene	**65.6**	ug/kg	14.0	4.1	1	09/26/16 07:13	10/05/16 14:27	191-24-2	
Benzofluoranthenes (Total)	**453**	ug/kg	42.1	15.5	1	09/26/16 07:13	10/05/16 14:27		
Chrysene	**198**	ug/kg	14.0	0.74	1	09/26/16 07:13	10/05/16 14:27	218-01-9	
Dibenz(a,h)acridine	**5.6J**	ug/kg	14.0	5.3	1	09/26/16 07:13	10/05/16 14:27	226-36-8	
Dibenz(a,h)anthracene	**16.9**	ug/kg	14.0	4.8	1	09/26/16 07:13	10/05/16 14:27	53-70-3	
Dibenzo(a,e)pyrene	**<1.3**	ug/kg	14.0	1.3	1	09/26/16 07:13	10/05/16 14:27	192-65-4	
Dibenzo(a,h)pyrene	**7.0J**	ug/kg	14.0	3.9	1	09/26/16 07:13	10/05/16 14:27	189-64-0	
Dibenzo(a,i)pyrene	**2.7J**	ug/kg	14.0	1.4	1	09/26/16 07:13	10/05/16 14:27	189-55-9	
Dibenzo(a,l)pyrene	**2.5J**	ug/kg	14.0	0.80	1	09/26/16 07:13	10/05/16 14:27	191-30-0	
7H-Dibenzo(c,g)carbazole	**<2.4**	ug/kg	14.0	2.4	1	09/26/16 07:13	10/05/16 14:27	194-59-2	
7,12-Dimethylbenz(a)anthracene	**<3.9**	ug/kg	14.0	3.9	1	09/26/16 07:13	10/05/16 14:27	57-97-6	
Fluoranthene	**419**	ug/kg	14.0	1.0	1	09/26/16 07:13	10/05/16 14:27	206-44-0	
Fluorene	**15.1**	ug/kg	14.0	0.80	1	09/26/16 07:13	10/05/16 14:27	86-73-7	
Indeno(1,2,3-cd)pyrene	**59.5**	ug/kg	14.0	4.2	1	09/26/16 07:13	10/05/16 14:27	193-39-5	
3-Methylcholanthrene	**4.9J**	ug/kg	14.0	2.1	1	09/26/16 07:13	10/05/16 14:27	56-49-5	L2
5-Methylchrysene	**28.9**	ug/kg	14.0	1.7	1	09/26/16 07:13	10/05/16 14:27	3697-24-3	
2-Methylnaphthalene	**2.3J**	ug/kg	14.0	0.90	1	09/26/16 07:13	10/05/16 14:27	91-57-6	
Naphthalene	**2.0J**	ug/kg	14.0	0.86	1	09/26/16 07:13	10/05/16 14:27	91-20-3	
Phenanthrene	**144**	ug/kg	14.0	0.86	1	09/26/16 07:13	10/05/16 14:27	85-01-8	
Pyrene	**252**	ug/kg	14.0	1.1	1	09/26/16 07:13	10/05/16 14:27	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	74	%.	46-125		1	09/26/16 07:13	10/05/16 14:27	321-60-8	
p-Terphenyl-d14 (S)	69	%.	46-125		1	09/26/16 07:13	10/05/16 14:27	1718-51-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

QC Batch: 437522 Analysis Method: EPA 6010C
QC Batch Method: EPA 3050 Analysis Description: 6010C Solids
Associated Lab Samples: 10363579001, 10363579002, 10363579003

METHOD BLANK: 2377135 Matrix: Solid
Associated Lab Samples: 10363579001, 10363579002, 10363579003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.19	0.96	0.19	09/30/16 10:52	
Copper	mg/kg	<0.038	0.48	0.038	09/30/16 10:52	

LABORATORY CONTROL SAMPLE: 2377136

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	49.5	46.3	94	80-120	
Copper	mg/kg	49.5	49.3	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2377137 2377138

Parameter	Units	10363579001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	6.3	129	120	123	121	90	96	75-125	1	20	
Copper	mg/kg	33.1	129	120	162	147	100	95	75-125	10	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

QC Batch: 438463 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10363579001, 10363579002, 10363579003

SAMPLE DUPLICATE: 2381583

Parameter	Units	10364275001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.2	7.3	11	30	

SAMPLE DUPLICATE: 2381605

Parameter	Units	10363579003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	28.8	29.3	2	30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

QC Batch: 437411 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3550 Analysis Description: 8270D CPAH by SIM MSSV
Associated Lab Samples: 10363579001, 10363579002, 10363579003

METHOD BLANK: 2376626 Matrix: Solid
Associated Lab Samples: 10363579001, 10363579002, 10363579003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2-Methylnaphthalene	ug/kg	<0.64	10.0	0.64	10/04/16 12:45	
3-Methylcholanthrene	ug/kg	<1.5	10.0	1.5	10/04/16 12:45	
5-Methylchrysene	ug/kg	<1.2	10.0	1.2	10/04/16 12:45	
7,12-Dimethylbenz(a)anthracene	ug/kg	<2.8	10.0	2.8	10/04/16 12:45	
7H-Dibenzo(c,g)carbazole	ug/kg	<1.7	10.0	1.7	10/04/16 12:45	
Acenaphthene	ug/kg	<0.61	10.0	0.61	10/04/16 12:45	
Acenaphthylene	ug/kg	<0.57	10.0	0.57	10/04/16 12:45	
Anthracene	ug/kg	<0.58	10.0	0.58	10/04/16 12:45	
Benzo(a)anthracene	ug/kg	<1.5	10.0	1.5	10/04/16 12:45	
Benzo(a)pyrene	ug/kg	<1.3	10.0	1.3	10/04/16 12:45	
Benzo(g,h,i)perylene	ug/kg	<2.9	10.0	2.9	10/04/16 12:45	
Benzofluoranthenes (Total)	ug/kg	<11.0	30.0	11.0	10/04/16 12:45	
Chrysene	ug/kg	<0.53	10.0	0.53	10/04/16 12:45	
Dibenz(a,h)acridine	ug/kg	<3.8	10.0	3.8	10/04/16 12:45	
Dibenz(a,h)anthracene	ug/kg	<3.4	10.0	3.4	10/04/16 12:45	
Dibenzo(a,e)pyrene	ug/kg	<0.92	10.0	0.92	10/04/16 12:45	
Dibenzo(a,h)pyrene	ug/kg	<2.8	10.0	2.8	10/04/16 12:45	
Dibenzo(a,i)pyrene	ug/kg	<0.97	10.0	0.97	10/04/16 12:45	
Dibenzo(a,l)pyrene	ug/kg	<0.57	10.0	0.57	10/04/16 12:45	
Fluoranthene	ug/kg	<0.74	10.0	0.74	10/04/16 12:45	
Fluorene	ug/kg	<0.57	10.0	0.57	10/04/16 12:45	
Indeno(1,2,3-cd)pyrene	ug/kg	<3.0	10.0	3.0	10/04/16 12:45	
Naphthalene	ug/kg	<0.61	10.0	0.61	10/04/16 12:45	
Phenanthrene	ug/kg	<0.61	10.0	0.61	10/04/16 12:45	
Pyrene	ug/kg	<0.75	10.0	0.75	10/04/16 12:45	
2-Fluorobiphenyl (S)	%.	75	46-125		10/04/16 12:45	
p-Terphenyl-d14 (S)	%.	101	46-125		10/04/16 12:45	

LABORATORY CONTROL SAMPLE: 2376627

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/kg	100	52.9	53	41-125	
3-Methylcholanthrene	ug/kg	100	26.5	26	30-125	L0
5-Methylchrysene	ug/kg	100	94.0	94	67-125	
7,12-Dimethylbenz(a)anthracene	ug/kg	100	35.8	36	31-125	SS
7H-Dibenzo(c,g)carbazole	ug/kg	100	92.9	93	51-125	
Acenaphthene	ug/kg	100	59.5	60	49-125	
Acenaphthylene	ug/kg	100	57.8	58	48-125	
Anthracene	ug/kg	100	78.4	78	63-125	
Benzo(a)anthracene	ug/kg	100	89.5	90	60-125	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

LABORATORY CONTROL SAMPLE: 2376627

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzo(a)pyrene	ug/kg	100	93.4	93	63-125	
Benzo(g,h,i)perylene	ug/kg	100	86.7	87	59-125	
Benzofluoranthenes (Total)	ug/kg	300	292	97	67-125	
Chrysene	ug/kg	100	89.3	89	62-125	
Dibenz(a,h)acridine	ug/kg	100	93.6	94	61-125	
Dibenz(a,h)anthracene	ug/kg	100	90.2	90	59-125	
Dibenzo(a,e)pyrene	ug/kg	100	88.2	88	48-125	
Dibenzo(a,h)pyrene	ug/kg	100	100	100	41-128	
Dibenzo(a,i)pyrene	ug/kg	100	84.7	85	33-125	
Dibenzo(a,l)pyrene	ug/kg	100	64.2	64	30-125	
Fluoranthene	ug/kg	100	84.0	84	65-125	
Fluorene	ug/kg	100	67.7	68	58-125	
Indeno(1,2,3-cd)pyrene	ug/kg	100	90.4	90	60-125	
Naphthalene	ug/kg	100	51.1	51	38-125	
Phenanthrene	ug/kg	100	79.8	80	62-125	
Pyrene	ug/kg	100	102	102	61-125	
2-Fluorobiphenyl (S)	%.			48	46-125	
p-Terphenyl-d14 (S)	%.			91	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2376628 2376629

Parameter	Units	10363579001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2-Methylnaphthalene	ug/kg	1.9J	284	283	183	217	64	76	47-125	17	30	
3-Methylcholanthrene	ug/kg	6.2J	284	283	88.7	105	29	35	30-150	16	30	
5-Methylchrysene	ug/kg	25.8J	284	283	209	239	65	75	46-125	13	30	
7,12-Dimethylbenz(a)anthracene	ug/kg	<7.9	284	283	225	283	79	100	30-150	23	30	SS
7H-Dibenzo(c,g)carbazole	ug/kg	<4.8	284	283	104	110	37	39	30-130	5	30	
Acenaphthene	ug/kg	6.6J	284	283	197	229	67	79	30-144	15	30	
Acenaphthylene	ug/kg	9.1J	284	283	199	231	67	78	36-125	15	30	
Anthracene	ug/kg	22.2J	284	283	194	229	61	73	34-125	17	30	
Benzo(a)anthracene	ug/kg	114	284	283	283	334	60	78	30-150	17	30	
Benzo(a)pyrene	ug/kg	182	284	283	356	424	61	86	30-150	18	30	
Benzo(g,h,i)perylene	ug/kg	88.1	284	283	157	166	24	28	30-148	6	30	M1
Benzofluoranthenes (Total)	ug/kg	478	851	848	1180	1470	83	117	30-150	22	30	
Chrysene	ug/kg	207	284	283	348	413	50	73	30-150	17	30	
Dibenz(a,h)acridine	ug/kg	<10.7	284	283	152	168	51	57	30-127	10	30	
Dibenz(a,h)anthracene	ug/kg	22.3J	284	283	146	154	44	46	30-137	5	30	
Dibenzo(a,e)pyrene	ug/kg	23.7J	284	283	74.3	76.2	18	19	30-150	2	30	M1
Dibenzo(a,h)pyrene	ug/kg	11.4J	284	283	51.3	53.0	14	15	30-125	3	30	M1
Dibenzo(a,i)pyrene	ug/kg	4.0J	284	283	37.9	39.1	12	12	30-125	3	30	M1
Dibenzo(a,l)pyrene	ug/kg	4.6J	284	283	30.6	31.3	9	9	30-125	2	30	M1
Fluoranthene	ug/kg	344	284	283	450	540	37	69	30-150	18	30	
Fluorene	ug/kg	9.3J	284	283	195	225	65	76	38-125	14	30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2376628 2376629

Parameter	Units	10363579001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Indeno(1,2,3-cd)pyrene	ug/kg	76.9	284	283	176	191	35	40	30-150	8	30	
Naphthalene	ug/kg	2.1J	284	283	153	188	53	66	38-125	20	30	
Phenanthrene	ug/kg	101	284	283	238	282	48	64	30-150	17	30	
Pyrene	ug/kg	254	284	283	380	479	45	80	30-150	23	30	
2-Fluorobiphenyl (S)	%.						58	67	46-125			
p-Terphenyl-d14 (S)	%.						63	78	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
SS	This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 23270051.37 Pond Zoo Bassett
Pace Project No.: 10363579

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10363579001	**WPE-01**	EPA 3050	437522	EPA 6010C	437880
10363579002	**WPE-02**	EPA 3050	437522	EPA 6010C	437880
10363579003	**WPE-03**	EPA 3050	437522	EPA 6010C	437880
10363579001	**WPE-01**	ASTM D2974	438463		
10363579002	**WPE-02**	ASTM D2974	438463		
10363579003	**WPE-03**	ASTM D2974	438463		
10363579001	**WPE-01**	EPA 3550	437411	EPA 8270D by SIM	438966
10363579002	**WPE-02**	EPA 3550	437411	EPA 8270D by SIM	438966
10363579003	**WPE-03**	EPA 3550	437411	EPA 8270D by SIM	438966

10363579

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☐ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☒ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☒ MN ☐ ND ☐ SD ☐ MI Other: _____

COC Number: 51202

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Engineering	Company: Barr Eng.
Address:	Address:
Name: Kevin Menken	Name: Kevin Menken
email: kmenken@barr.com	email: kmenken@barr.com
Copy to: datamgt@barr.com	P.O.
Project Name: Bassett Ponds	Barr Project No: 23270051.37 POND200

Matrix Code: GW = Groundwater; SW = Surface Water; WW = Waste Water; DW = Drinking Water; S = Soil/Solid; SD = Sediment; O = Other

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; I = Ascorbic Acid; J = NH_4Cl; K = Zn Acetate; O = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water	Soil: arsenic, copper	Soil: cPAHs - stormwater pond list	Soil: Hold For TCLP RCRA metals	Soil: % Solids	Preservative Code	Field Filtered Y/N
										A	A	A			
1. WPE-01				9/23/16	11:45	SD		2		X	X		X		
2. WPE-02				9/23/16	12:00	SD		2		X	X		X		
3. WPE-03				9/23/16	12:30	SD		2		X	X		X		
4. WPE-COMP				9/23/16	12:38	SD		1				hold			hold for TCLP pending other analyses results. aq
5.															
6.															
7.															
8.															
9.															
10.															

BARR USE ONLY

Sampled by: Kevin Menken

Barr Proj. Manager: Candice Kantor

Barr DQ Manager: Terri Olson

Lab Name: Pace - Mpls

Lab Location: Mpls

Relinquished by: Kevin Menken — On Ice? (Y) N — Date 9/23/16 — Time 14:15

Received by: Shawn Wilke/Pace — Date 9/23/16 — Time 1615

Relinquished by: — On Ice? Y N — Date — Time

Received by: — Date — Time

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☐ Sampler ☐ Other: _____

Air Bill Number:

Lab WO: Temperature on Receipt (°C): 0.3 Custody Seal Intact? ☐ Y ☐ N ☐ None

Requested Due Date: ☐ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)

Page 1 of 1

Distribution - White-Original: Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Barr Engineering

Project #: WO# : 10363579

10363579

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☑ Commercial ☐ Pace ☐ SpeeDee ☐ Other:_____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☐ Yes ☑ No

Thermometer Used: ☑ 151401163 ☐ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.4 **Cooler Temp Corrected (°C):** 0.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** 9/23/16 SG

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present? 09/26/16 AAI	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: SL	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed:_____ Lot # of added preservative:_____
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):_____				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 09/26/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Appendix C

Wetland Delineation Report

Wetland Delineation Report

Basset Creek Park Pond & Winnetka Pond - East

Prepared for
Bassett Creek Watershed Management Commission

November 8, 2016

Wetland Delineation Report

November 8, 2016

Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

The Bassett Creek Watershed Management Commission is submitting a Wetland Delineation Report in preparation for a sediment dredging project within Basset Creek Park Pond and Winnetka Pond. The project sites are located in the City of Crystal, Hennepin County, Minnesota. Basset Creek Park Pond is located at 32nd Avenue North and Xenia Avenue North within Section 21 of Township 118 North, Range 21 West. Winnetka Pond is located south of the Winnetka Village Apartments at 7710 36th Avenue North within Section 17 of Township 118 North, Range 21 West. See **Figure 1** for a project location map depicting both pond locations.

Bassett Creek Park Pond and Winnetka Pond were field delineated to identify the wetland extent of each pond. Wetland plant communities within each delineated pond were also identified.

This Wetland Delineation Report has been prepared in accordance with the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual ("1987 Manual", USACE, 1987), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (USACE, 2010) and the requirements of the Minnesota Wetland Conservation Act (WCA) of 1991. Barr delineated the wetland boundary and determined wetland types within the evaluation area on October 11, 2016.

This report includes general environmental information (Section 2.0), descriptions of the delineated wetland area (Section 3.0), and a discussion of regulations and the administering authorities (Section 4.0). The **Tables** section includes the precipitation data. The **Figures** section includes the Site Location Map, Topography Maps, National Wetland Inventory (NWI) Maps, Public Waters Inventory (PWI), Soil Survey Maps, and Wetland Boundary Maps. **Appendix A** includes Wetland Data Forms, and site photographs are included in **Appendix B**.

2.0 General Environmental Setting

2.1 Site Description

The proposed dredging project sites are located in the City of Crystal. Bassett Creek Park Pond is located in Bassett Creek Park, which consists of open grassy fields used for sports and recreation, wooded uplands, and various wetland communities. Bassett Creek Park is surrounded by medium density residential area. Winnetka Pond is located south of the Winnetka Village Apartments and is partially surrounded by a narrow buffer of hardwood trees, and grasses with manicured lawn further upslope. Areas surrounding Winnetka Pond consist of commercial and industrial area with medium density residential area located further beyond (**Figure 1**).

2.2 Topography

The Bassett Creek Park Pond project site generally has steep topography in areas leading into the pond along the delineated edges. Topography within the basin generally has moderate undulations in areas that are not open water. Adjacent upland areas are generally flat or moderately undulating throughout most of the park area with the exception of some steep hilly areas to the west (**Figure 2**).

The Winnetka Pond project site generally has steep topography in areas leading into the pond along the delineated edges. Floodplain forest wetland has a more gradual topographic transition from upland to wetland and moderate undulations within it. Adjacent upland areas are generally flat in developed areas and hillier in areas of open greenspace (**Figure 3**).

2.3 Precipitation

Recent precipitation data were compared to historic data for evaluating annual and monthly deviations from normal conditions. Simulated precipitation data were obtained from the Minnesota Climatology Working Group, Wetland Delineation Precipitation Data Retrieval from a Gridded Database (http://climate.umn.edu/gridded_data/precip/wetland/wetland.asp) for wetlands in Hennepin County, Township 118 North, Range 21 West, Section 17.

Antecedent (preceding) moisture conditions were within the wetter than the normal range based on precipitation for the three months prior to the October 11, 2016 site visit. July through September were all within the wetter than the normal range. These data were obtained from NRCS climate station 215838, New Hope Weather Station (**Table 1**). The water year has varied between normal and wet for the past six years from 2011 through 2016 (**Table 2**).

2.4 National Wetland Inventory

The NWI Map has identified five wetland types at the Bassett Creek Park Pond project site: shallow open water community (PUBG), shrub swamp (PSS1A), floodplain forest (PFO1A), seasonally flooded basin (PEM1A), and deep marsh (PABG) (**Figure 4**). One wetland type was identified at the Winnetka Pond project site: shallow open water (PUBGx) (**Figure 5**).

2.5 Water Resources

The Minnesota Department of Natural Resources (MnDNR) Public Waters Inventory (PWI) has identified Basset Creek Park Pond (27-646P) and Winnetka Pond (27-629P) as public water wetlands, which are within the delineated wetland boundaries of both ponds (**Figure 6**). Bassett Creek Park Pond and Winnetka Pond are not identified by the Minnesota Pollution Control Agency (MPCA) as impaired waters.

2.6 Soil Resources

Soil information for the project site was obtained from the Natural Resources Conservation Service SSURGO Database. One soil map unit was identified within the Bassett Creek Park Pond project site: Udorthents, wet substratum, 0 to 2 percent slopes (U2A) (**Figure 7**). Four soil map units were identified within the Winnetka Pond project site: Udorthents wet substratum, complex, 0 to 2 percent slopes (U1A); Udorthents wet substratum, 0 to 2 percent slopes (U2A); Urban land-Udorthents (cut and fill) complex, 0 to 6 percent slopes (U6B); Urban land-Lester complex, 2 to 18 percent slopes (L52C) (**Figure 8**). Remaining areas within both pond sites are identified as Water (W) in the SSURGO Database. All soils within both of these project sites are identified as non-hydric.

3.0 Wetland Delineation

3.1 Wetland Delineation and Classification Methods

Wetlands within the Bassett Creek Park Pond and Winnetka Pond project sites were delineated and classified during a site visit on October 11, 2016. The wetland delineation was established according to the Routine On-Site Determination Method specified in the U.S. Army Corps of Engineers Wetlands Delineation Manual (1987 Edition) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (USACE, 2010).

The delineated wetland boundaries and sample points were surveyed using a Global Positioning System (GPS) with sub-meter accuracy (**Figures 9 & 10**).

Wetlands were classified using the U.S. Fish and Wildlife Service (USFWS) Cowardin System (Cowardin et al., 1979), the USFWS Circular 39 system (Shaw and Fredine, 1956), and the Eggers and Reed Wetland Classification System (Eggers and Reed, 1977).

Soil borings were placed in and around wetland areas, to a depth of at least 24 inches below the ground surface where possible. Representative soil samples from each boring were examined for the presence of hydric soil indicators using the Natural Resources Conservation Service (NRCS) hydric soil indicators (Version 7.0). Soil colors (e.g., 7.5YR 4/2, etc.) were determined using a Munsell® soil color chart and noted on the Wetland Data Forms **Appendix A**.

Hydrologic conditions were evaluated at each soil boring, and this information was also noted on the Wetland Data Forms. The dominant plant species were identified, and the corresponding wetland indicator status of each plant species was determined and noted on the Wetland Data Forms (**Appendix A**). Photographs taken at the time of the site visit are provided in **Appendix B**.

3.2 Wetland Descriptions

One wetland boundary was delineated within the Bassett Creek Park Pond project site consisting of five wetland communities. One wetland boundary was delineated within the Winnetka Pond project site consisting of two wetland communities. Descriptions and assessments of these wetland areas are provided below, with representative photographs in **Appendix B**.

3.2.1 Bassett Creek Park Pond

Bassett Creek Park Pond is an 11.3 acre wetland complex made up of five wetland communities (**Figure 9**). Each wetland community type within Bassett Creek Park Pond is identified below using Eggers & Reed, Circular 39, and Cowardin wetland classification systems respectively:

- Shallow Open Water, Type 5, PUBG
- Shrub Swamp, Type 6, PSS1A
- Shallow Marsh, Type 3, PEMC
- Floodplain Forest, Type 1L, PFO1A
- Deep Marsh, Type 4, PUBGx

Shallow open water community is the dominant wetland type within Bassett Creek Park Pond and totals approximately 9.3 acres. Shallow open water community is mostly located in the central and southern areas of Bassett Creek Park Pond and generally has a steep and abrupt wetland boundary. Dominant vegetation observed was lesser duckweed (*Lemna minor*) near the shoreline in some areas, but no other emergent, floating-leaf, or submerged aquatic vegetation was observed from the shoreline within shallow open water community. Reed canary grass (*Phalaris arundinacea*) was dominant along the periphery of shallow open water community.

Shrub swamp community is located on the northwest side of Bassett Creek Park Pond (0.9 acres); and in the west-central (0.3 acres) and southwest-central (0.1 acres) areas of the pond surrounded by shallow open water community. The total area of shrub swamp community located in Bassett Creek Park Pond is 1.2 acres. Dominant shrubs observed were sand-bar willow (*Salix interior*). Topography within both areas is generally flat or moderately undulating. Bassett Creek extends south through floodplain forest community and then through shrub swamp community toward the shallow open water areas of Bassett Creek Park Pond.

Floodplain forest community is located at the northwest tip of Bassett Creek Park Pond and totals approximately 0.3 acres. Dominant trees within the floodplain forest are ash-leaf maple (*Acer negundo*), quaking aspen (*Populus tremuloides*), and Eastern cottonwood (*Populus deltoides*). There is moderately undulating topography throughout the floodplain forest community but steep and abrupt slopes leading into it from the east side. Bassett Creek extends south through floodplain forest community and then through shrub swamp community toward the shallow open water areas of Bassett Creek Park Pond.

Shallow marsh community fringes portions of Bassett Creek Park Pond on the northeast, and western sides. The two shallow marsh areas are approximately 0.1 acres each totaling 0.2 acres. Both shallow marsh areas are dominated by narrow-leaf cattail (*Typha angustifolia*) and have flat topography.

Deep marsh community is located within the shrub swamp community on the northwest side of Bassett Creek Park Pond and totals approximately 0.2 acres. This area was likely excavated based on the steep and abrupt slopes leading into it from the shrub swamp community and its regular oval shape. Lesser duckweed covers the entire surface water area of the deep marsh community.

Sample data was collected along the delineated wetland boundary of Bassett Creek Park Pond. Sample data was collected within shallow marsh community on the northeast side, shrub swamp community on the north-central side, and floodplain forest area on the northwest side.

Dominant vegetation within shallow marsh community at wetland Sample Point B-1w was narrow-leaf cattail, stinging nettle (*Urtica dioica*), and fowl blue grass (*Poa palustris*). Primary hydrology indicators included high water table (A2) at 3 inches below the soil surface, and saturation (A3) at the soil surface. Secondary indicators of hydrology present were geomorphic position (D2), and a positive FAC-neutral test (D5). Soils had loamy textures with peat intermixed throughout the soil profile and a low chroma and value matrix with prominent redox features at the surface down to 8 inches. Hydric soil indicators identified were loamy mucky mineral (F1) and redox dark surface (F6). The transition to upland was defined by an absence of hydrology and hydric soil indicators at upland Sample Point B-1u.

Dominant vegetation within shrub swamp community at wetland Sample Point B-2w was sandbar willow, reed canary grass, water smartweed (*Persicaria amphibia*), and late goldenrod (*Solidago gigantea*). Saturation (A3) at the soil surface was the only primary indicator of hydrology present. Secondary indicators of hydrology present were geomorphic position (D2), and a positive FAC-neutral test (D5). Soil textures included silt loams at the surface and transitioned to peat soils. Low chroma and value matrix colors were present throughout the profile with prominent redox concentrations from 8 to 15 inches below the soil surface. The identified hydric soil indicator was redox dark surface (F6). The transition to upland was defined by an absence of vegetation, hydrology and hydric soil indicators at upland Sample Point B-2u.

Dominant trees and herbaceous vegetation within floodplain forest community at wetland Sample Point B-3w was Eastern cottonwood, quaking aspen, ash-leaf maple, reed canary grass and stinging nettle. There were no primary hydrology indicators, but secondary indicators of hydrology included geomorphic position (D2), and a positive FAC-neutral test (D5). Soils had silt loam textures with a low chroma and value matrix colors throughout the 40-inch soil profile and prominent redox concentrations from 7 to 40 inches. The identified hydric soil indicator was redox dark surface (F6). The transition to upland was defined by an absence of hydrology and hydric soil indicators at upland Sample Point B-3u.

3.2.2 Winnetka Pond

Winnetka Pond is a 3.5 acre wetland complex made up of two wetland communities (**Figure 10**). Both wetland community types within Winnetka Pond are identified below using Eggers & Reed, Circular 39, and Cowardin wetland classification systems respectively:

- Shallow Open Water, Type 5, PUBGx
- Floodplain Forest, Type 1L, PFO1A

Shallow open water community is the dominant wetland type within Winnetka Pond and totals approximately 3.2 acres. Topography is generally steep and abrupt along the wetland boundary leading into the pond. No emergent, floating-leaf, or submerged aquatic vegetation was observed within shallow open water community during the time of the site visit. Reed canary grass and Canada goldenrod was present along the fringes of the shallow open water community mostly in uplands.

Floodplain forest community is located along the eastern fringe of Winnetka Pond and totals approximately 0.3 acres. Dominant trees within the floodplain forest are ash-leaf maple, quaking aspen, and Eastern cottonwood. Topography is mostly flat throughout the floodplain forest community but is steep and abrupt leading into it from upland areas on the east side.

Dominant trees and herbaceous vegetation within floodplain forest community at wetland Sample Point W-1w was quaking aspen, ash-leaf maple, reed canary grass and river club-rush (*Schoenoplectus fluviatilis*). Primary hydrology indicators included high water table (A2) at 9 inches below the soil surface, saturation (A3) at 2 inches below the soil surface, and aquatic fauna (B13). Secondary indicators of hydrology present were geomorphic position (D2), and a positive FAC-neutral test (D5). Soils had clay loam textures at the surface and transitioned to clay textures from 10 inches to 24 inches. Soil matrix colors had a low chroma and value and had prominent redox concentrations throughout the 24-inch soil profile. The identified hydric soil indicator was redox dark surface (F6). The transition to upland was defined by an absence of hydrology and hydric soil indicators at upland Sample Point B-3u.

4.0 Regulatory Overview

The USACE regulates the placement of dredge or fill materials into wetlands that are located adjacent to or are hydrologically connected to interstate or navigable waters under the authority of Section 404 of the Clean Water Act. If the USACE has jurisdiction over any portion of a project, they may also review impacts to wetlands under the authority of the National Environmental Policy Act.

Filling, excavating, and draining wetlands are also regulated by the Minnesota Wetland Conservation Act (WCA), and the Minnesota Public Waters Work Permit Program, which are administered by the City of Crystal and the Minnesota Department of Natural Resources (MnDNR) respectively. The USACE, the City of Crystal and the DNR should be contacted before altering any wetlands. In addition, delineated wetland boundaries may be reviewed by a Technical Evaluation Panel (TEP) consisting of representatives from the City of Crystal, Minnesota Board of Water and Soil Resources, and Hennepin County. Representatives from the MnDNR, and the USACE may also review this wetland delineation and make a determination as to whether they will take jurisdiction.

5.0 References

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Tables

Table 1
Antecedent Moisture Conditions Prior to October 11, 2016 Site Visit Bassett Creek Park Pond & Winnetka Pond Wetland Delineation
Crystal, MN

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
County: Hennepin **Township Number**: 118N
Township Name: Brooklyn Center **Range Number**: 21W
Nearest Community: Crystal **Section Number**: 17

Aerial photograph or site visit date:
Tuesday, October 11, 2016

Score using 1981-2010 Summary Statistics

(value are in inches)	first prior month: **September 2016**	second prior month: **August 2016**	third prior month: **July 2016**
estimated precipitation total for this location:	6.58R	7.48R	6.53
there is a 30% chance this location will have less than:	2.34	3.48	2.82
there is a 30% chance this location will have more than:	3.91	5.07	4.39
type of month: **dry** **normal** **wet**	**wet**	**wet**	**wet**
monthly score	**3 * 3 = 9**	**2 * 3 = 6**	**1 * 3 = 3**
multi-month score: 6 to 9 (**dry**) 10 to 14 (**normal**) 15 to 18 (**wet**)	**18 (Wet)**		

Table 2
Precipitation in Comparison to WETS Data
Bassett Creek Park Pond & Winnetka Pond Wetland
Delineation Crystal, MN

Precipitation data for target wetland location:

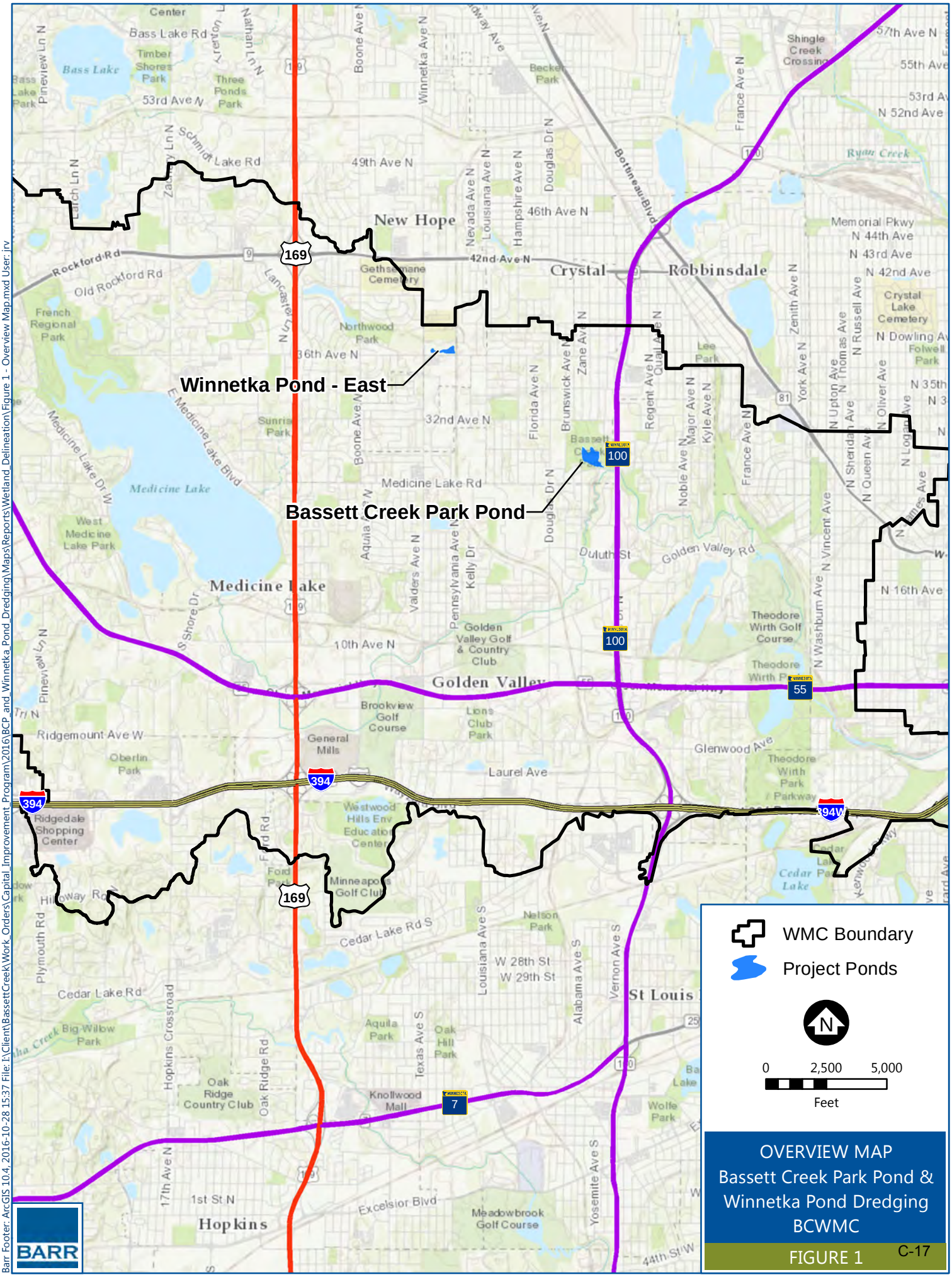
County: Hennepin **Township Number**: 118N
Township Name: Brooklyn Center **Range Number**: 21W
Nearest Community: Crystal **Section Number**: 17

Precipitation Totals are in Inches	
Color Key	**Multi-month Totals**:
total is in lowest 30th percentile of the period-of-record distribution	**WARM** = warm season (May thru September)
total is => 30th and <= 70th percentile	**ANN** = calendar year (January thru December)
total is in highest 30th percentile of the period-of-record distribution	**WAT** = water year (Oct. previous year thru Sep. present year)

A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.

Period-of-Record Summary Statistics															
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
30%	0.53	0.50	1.14	1.63	2.61	3.23	2.38	2.75	1.89	1.20	0.74	0.57	16.16	26.01	26.07
70%	1.10	1.19	2.07	2.78	4.37	5.55	4.37	4.47	3.84	2.72	1.92	1.35	21.34	32.30	32.02
mean	0.89	0.90	1.66	2.44	3.69	4.48	3.85	3.66	3.08	2.21	1.53	1.03	18.76	29.35	29.45
1981-2010 Summary Statistics															
	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
30%	0.54	0.42	1.38	2.28	2.83	3.52	2.82	3.48	2.34	1.32	1.06	0.70	18.51	30.76	28.63
70%	1.21	1.03	2.10	3.14	4.61	5.77	4.39	5.07	3.91	3.60	2.15	1.40	22.46	35.08	35.77
mean	0.87	0.80	1.92	2.89	3.79	4.68	4.30	4.22	3.47	2.57	1.81	1.23	20.45	32.53	32.34
Year-to-Year Data															
Year	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*WARM*	*ANN*	*WAT*
2016	0.31	0.79	1.60	3.66	2.38	2.84	6.53	7.48R	6.58R				25.81		40.86
2015	0.33	0.27	0.63	2.07	4.40	3.31	6.95	3.48	3.94	2.82	4.19	1.68	22.08	34.07	28.80
2014	1.15	1.37	0.80	7.26	4.26	10.16	3.31	3.12	1.50	1.16	1.20	1.06	22.35	36.35	39.62
2013	0.68	1.20	2.12	4.60	4.80	7.81	4.21	1.31	1.27	4.44	0.61	1.64	19.40	34.69	32.00
2012	0.53	2.05	1.32	2.87	9.61	4.21	4.24	1.33	0.54	1.44	0.90	1.66	19.93	30.70	28.65
2011	0.93	0.89	2.20	3.21	6.38	3.92	7.83	4.46	0.49	0.91	0.17	0.87	23.08	32.26	37.66
2010	0.59	0.85	0.93	2.02	2.86	6.25	3.64	5.85	5.69	1.96	2.14	3.25	24.29	36.03	37.47
2009	0.48	1.02	1.87	1.53	0.45	3.90	1.07	6.41	0.71	5.95	0.57	2.27	12.54	26.23	21.76
2008	0.14	0.52	2.08	4.05	2.64	4.41	2.15	2.53	2.19	1.64	1.17	1.51	13.92	25.03	28.02
2007	0.59	1.40	3.53	2.51	3.22	2.10	2.32	5.89	5.02	5.39	0.06	1.86	18.55	33.89	30.89
2006	0.64	0.41	1.88	3.83	4.61	4.32	1.84	5.13	3.41	0.68	1.07	2.56	19.31	30.38	33.67
2005	1.27	1.06	1.32	2.53	3.62	6.26	2.52	4.00	7.54	4.34	1.86	1.40	23.94	37.72	35.23
2004	0.55	1.54	2.14	2.67	5.87	5.02	3.66	1.69	4.95	3.57	1.05	0.49	21.19	33.20	31.19
2003	0.27	0.98	1.66	3.05	5.61	8.29	1.74	0.35	2.43	1.00	1.12	0.98	18.42	27.48	28.65
2002	0.58	0.56	1.98	4.18	4.73	8.80	7.69	6.32	4.08	3.94	0.08	0.25	31.62	43.19	43.74
2001	1.38	1.49	1.01	7.52	5.30	4.66	2.59	3.61	3.84	0.97	3.22	0.63	20.00	36.22	37.78
2000	0.97	1.23	1.04	1.56	3.54	3.64	6.43	3.75	2.55	0.97	4.06	1.35	19.91	31.09	26.50
1999	1.34	0.35	1.75	3.40	5.94	5.57	4.87	3.88	2.40	0.63	0.80	0.36	22.66	31.29	34.89
1998	1.31	0.85	3.94	2.30	4.17	4.40	2.92	5.23	1.33	2.88	1.82	0.69	18.05	31.84	29.44
1997	1.79	0.23	1.40	1.13	1.85	2.95	10.93	4.39	2.61	1.98	0.75	0.26	22.73	30.27	38.08

Figures



OVERVIEW MAP
Bassett Creek Park Pond & Winnetka Pond Dredging
BCWMC

FIGURE 1 C-17

BARR

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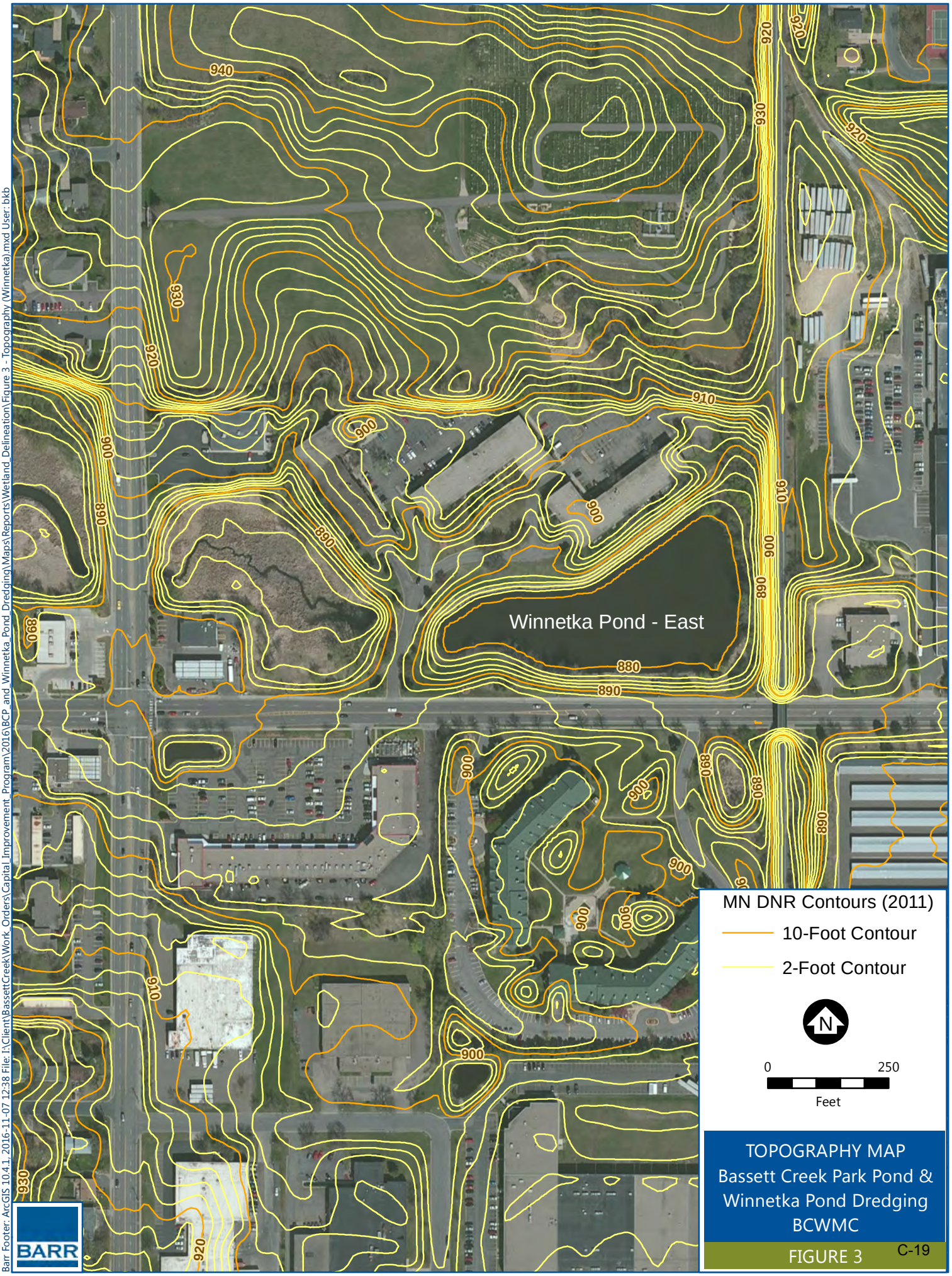
TOPOGRAPHY MAP
Bassett Creek Park Pond &
Winnetka Pond Dredging
BCWMC

FIGURE 2

BARR

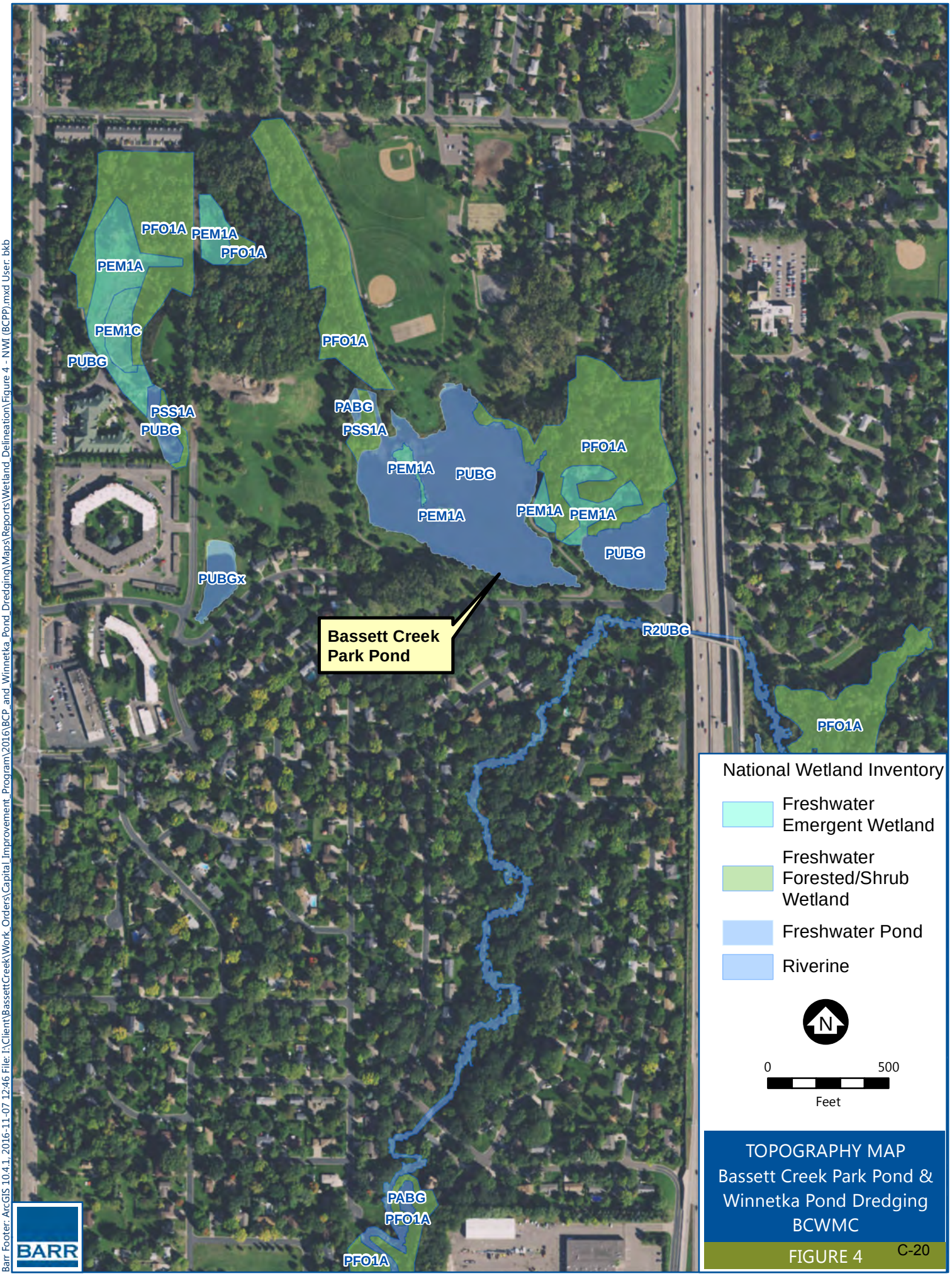


TOPOGRAPHY MAP
Bassett Creek Park Pond & Winnetka Pond Dredging
BCWMC

FIGURE 3

C-19

BARR



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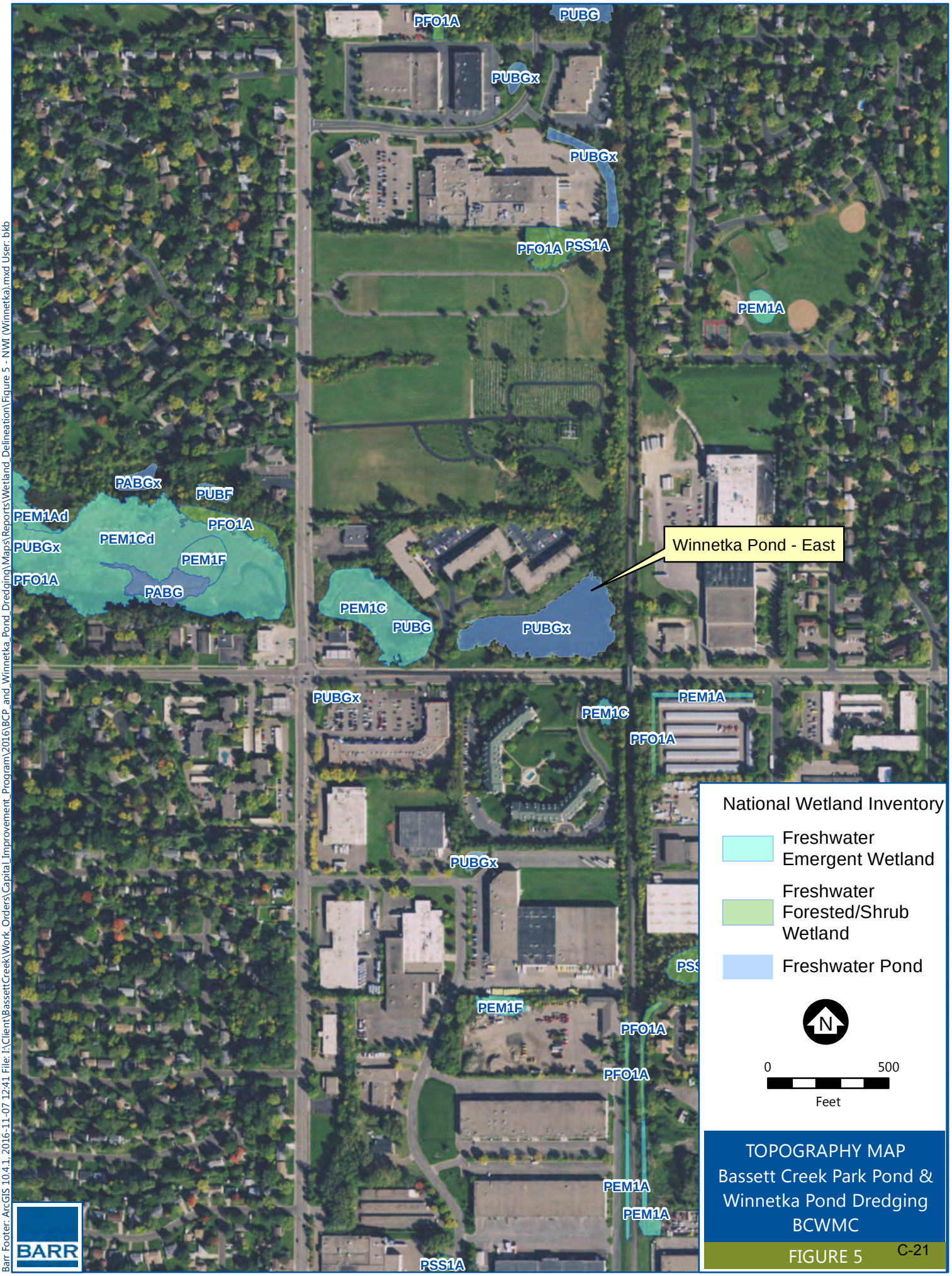

TOPOGRAPHY MAP
Bassett Creek Park Pond & Winnetka Pond Dredging
BCWMC

FIGURE 5

BARR

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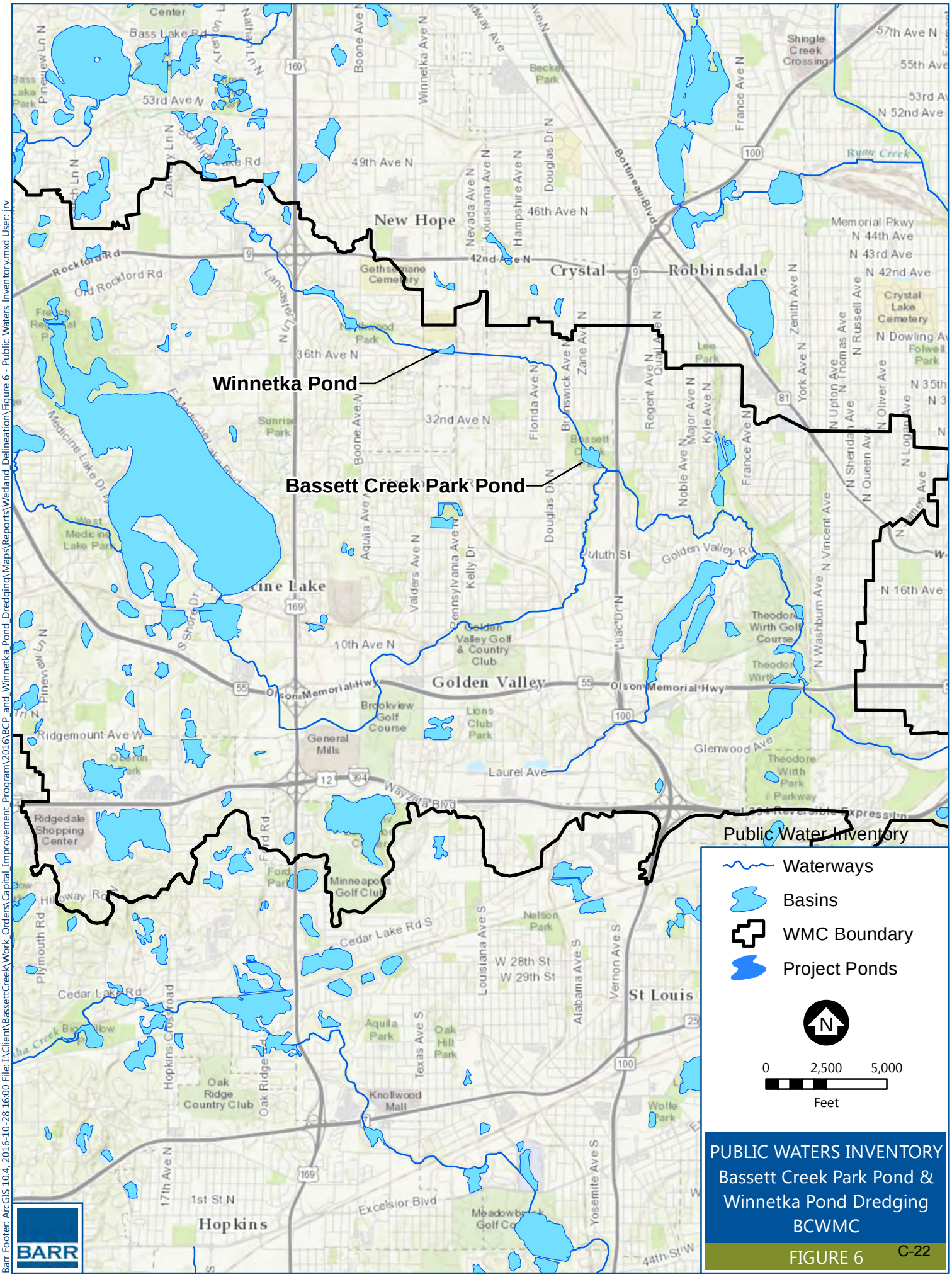


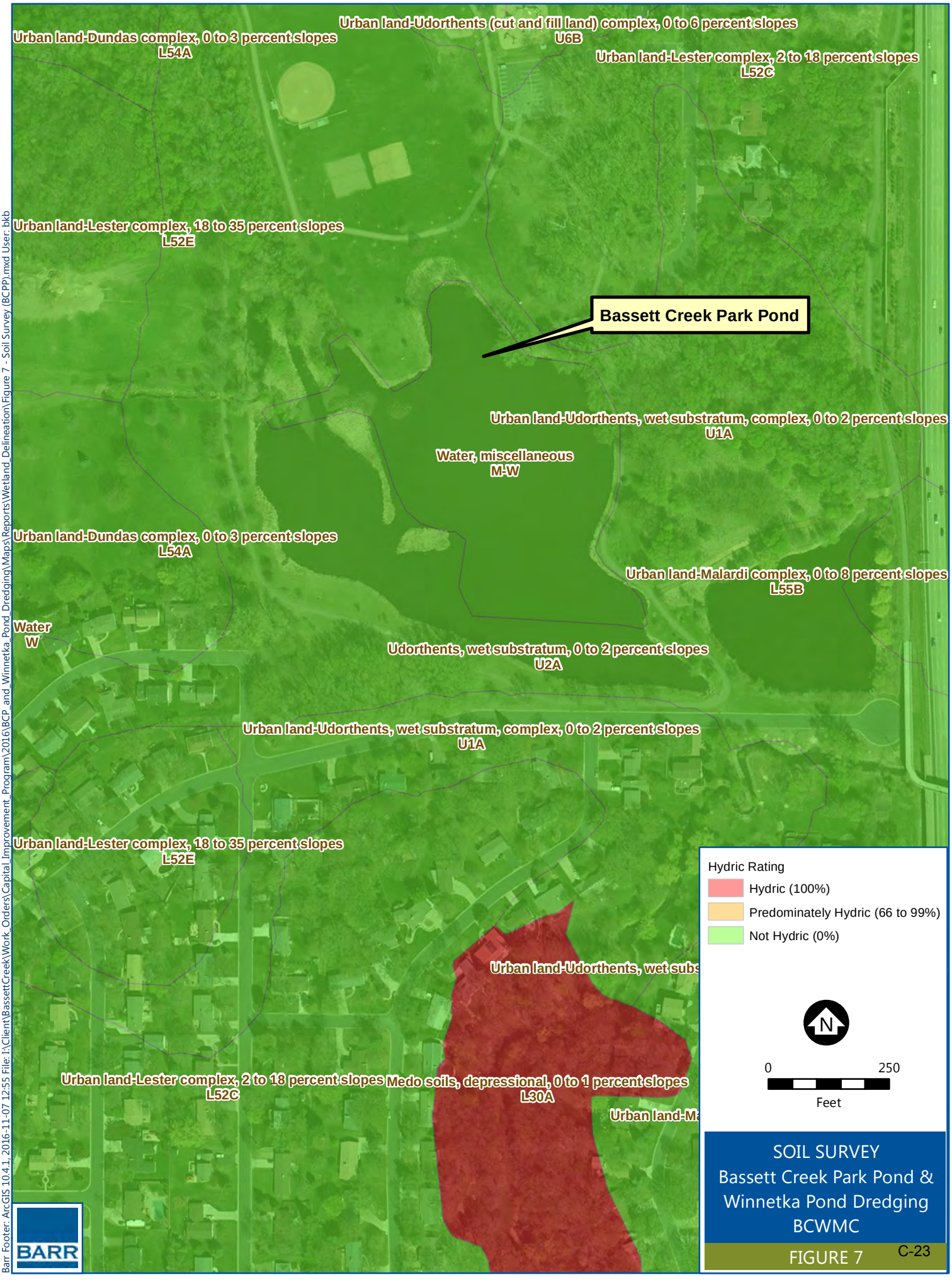
PUBLIC WATERS INVENTORY
Bassett Creek Park Pond & Winnetka Pond Dredging
BCWMC

FIGURE 6

C-22

BARR

Barr Footer: ArcGIS 10.4, 2016-10-28 16:00 File: I:\Client\BassettCreek\Work_Orders\Capital_Improvement_Program\2016\BCP_and_Winnetka_Pond_Dredging\Maps\Reports\Wetland_Delineation\Figure 6 - Public Waters Inventory.mxd User: jrv



SOIL SURVEY
Bassett Creek Park Pond &
Winnetka Pond Dredging
BCWMC

FIGURE 7

BARR

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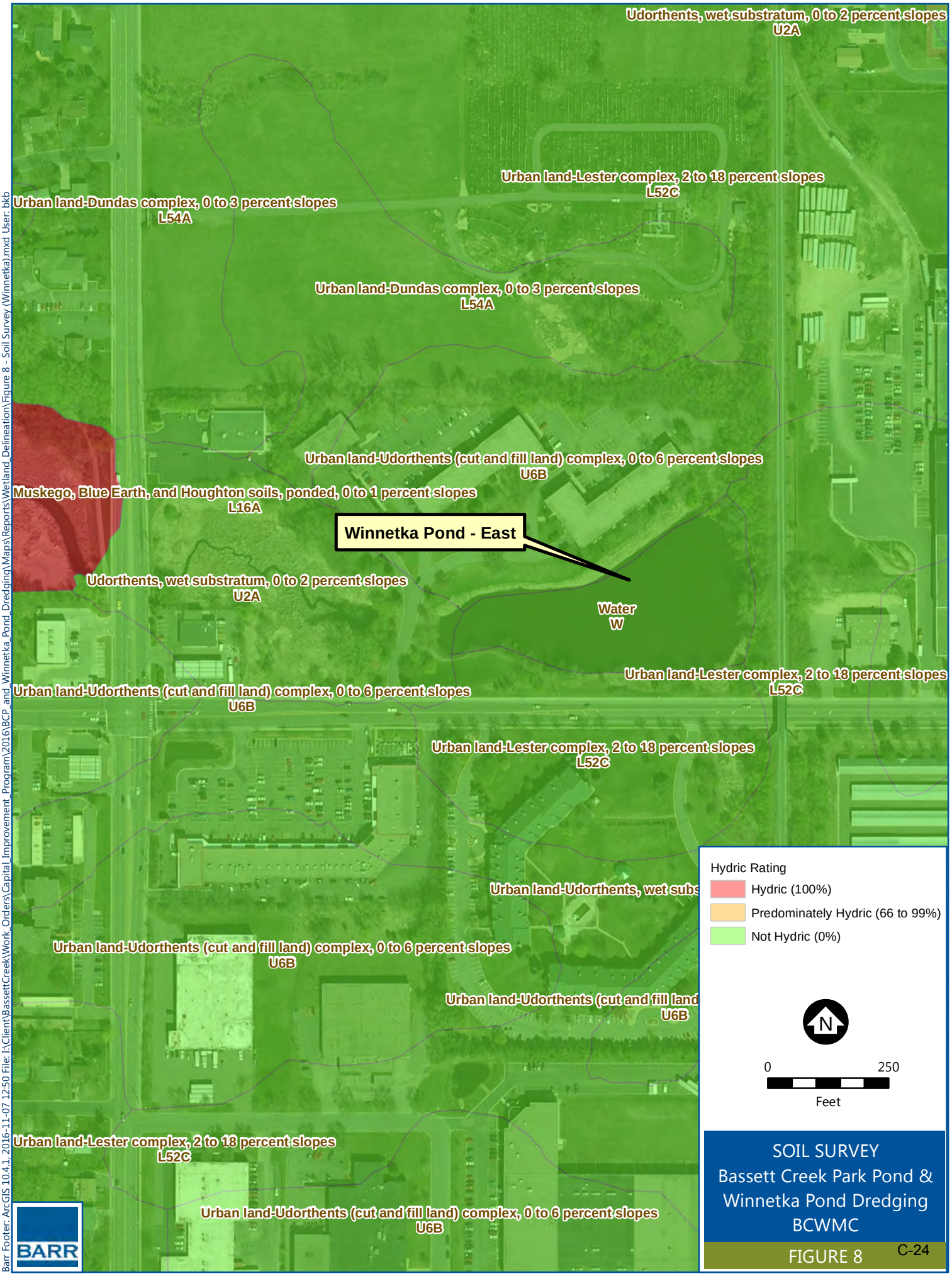
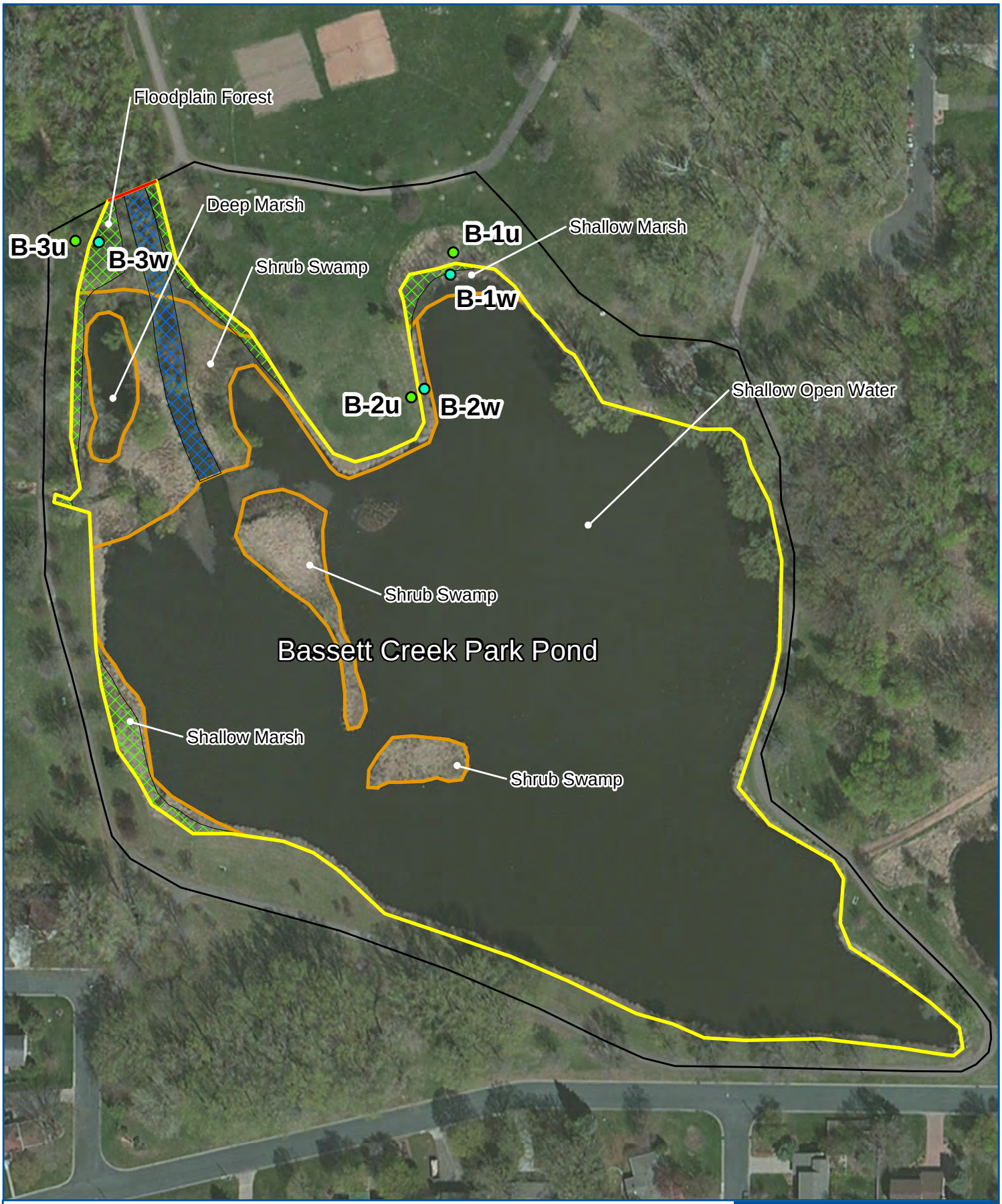


SOIL SURVEY
Bassett Creek Park Pond & Winnetka Pond Dredging
BCWMC

FIGURE 8

BARR

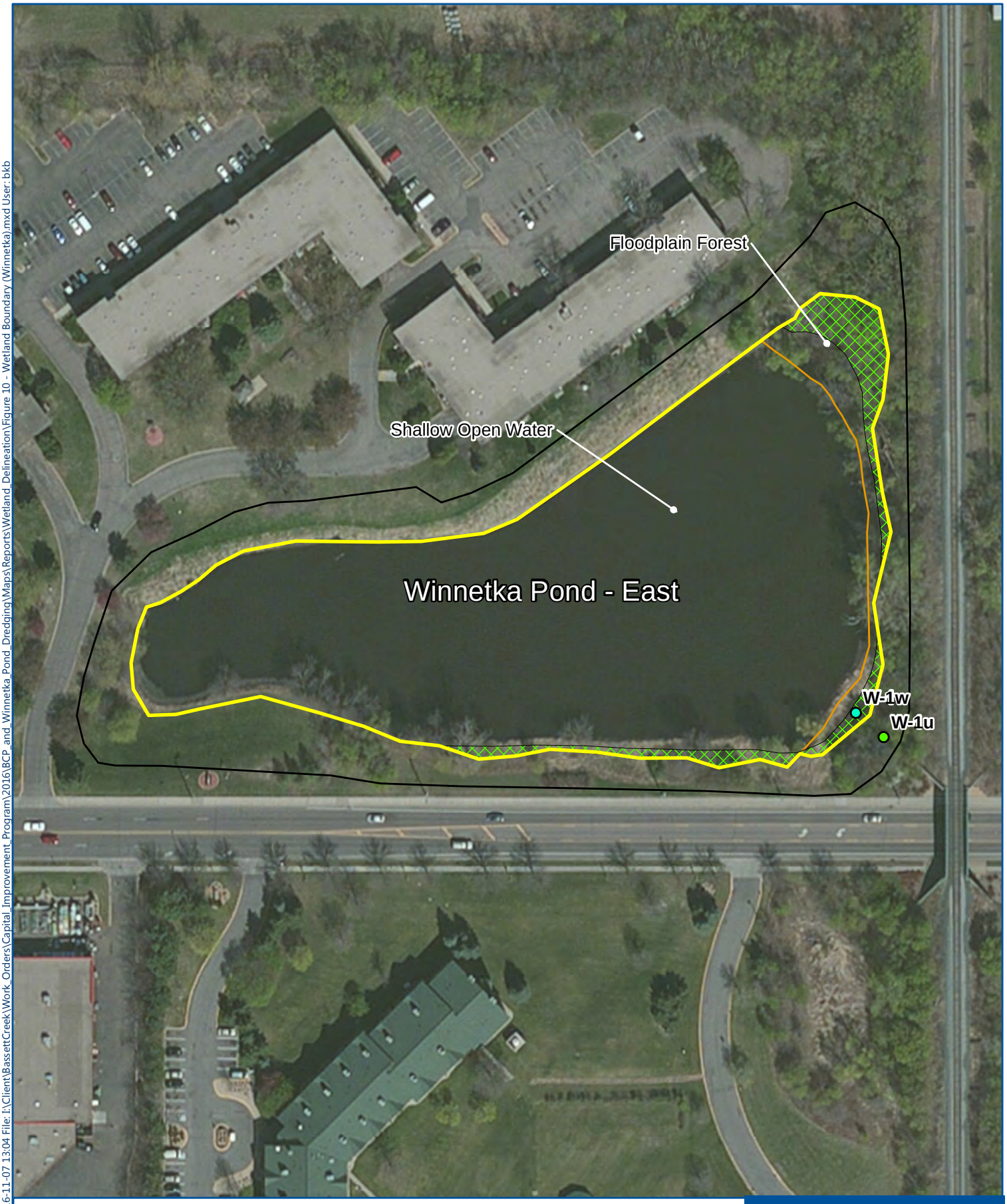


Upland Sample
Wetland Sample
Delineated Wetland Boundary
Foot Bridge
Wetland community Boundary
Bassett Creek
WCA Wetland Above OHW
Evaluation Area
N
0
100
Feet

BARR

DELINEATED WETLAND
Bassett Creek Park Pond & Winnetka Pond Dredging
BCWMC

FIGURE 9



Upland Sample
Wetland Sample
Delineated Wetland Boundary
Wetland Community Boundary
WCA Wetland Above OHW
Evaluation Area
N
0
100
Feet

DELINEATED WETLAND
Bassett Creek Park Pond & Winnetka Pond Dredging
BCWMC

FIGURE 10

Appendix A

Wetland Data Forms

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 21 | Township: 118N | Range: 21W | Sampling Point: B-1u

Land Form: Hillslope | Local Relief: Convex | Slope %: 7 | Soil Map Unit Name: Udorthents, wet sub, 0-2% slopes

Subregion (LRR): M | Latitude: 4984296 | Longitude: 472147 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	Yes	General Remarks (explain any answers if needed):	Conditions are wetter than normal within the three months prior to the site visit.
Hydric soil present?	No		
Indicators of wetland hydrology present?	No		
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:	Upland

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		
	Herb Stratum (Plot Size: 5 ft)			
1.	Alliaria petiolata	35	Yes	FAC
2.	Urtica dioica	25	Yes	FACW
3.	Cirsium arvense	20	Yes	FACU
4.	Parthenocissus quinquefolia	10	No	FACU
5.	Taraxacum officinale	1	No	FACU
6.	Arctium minus	1	No	FACU
7.		0		
8.		0		
	Total Cover:	92		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.	Vitis riparia	5	Yes	FACW
2.		0		
	Total Cover:	5		

% Bare Ground in Herb Stratum: | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	18.4	46
Woody Vine Stratum	1	2.5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	75.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	30	X 2	60	
FAC Species	35	X 3	105	
FACU Species	32	X 4	128	
UPL Species	0	X 5	0	
Column Totals:	97	(A)	293	(B)
Prevalence Index = B/A =			3.02	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: B-1u

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	10YR 3/2	98	10YR 4/3	2	C	M	Sandy Loam	
2.	10 - 16	10YR 3/1	100						
3.	16 - 25	10YR 3/1	100					Sand	gravelly
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches):

Water table present? ☐ Water Table Depth (inches):

Saturation present? (includes capillary fringe) ☑ Saturation Depth (inches): 15

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 21 | Township: 118N | Range: 21W | Sampling Point: B-1w

Land Form: Toeslope | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: Udorthents, wet sub, 0-2% slopes

Subregion (LRR): M | Latitude: 4984289 | Longitude: 472146 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: PEMC | Circular 39 Classification: Type 3 | Mapped NWI Classification: PUBG

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Shallow Marsh

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Conditions are wetter than normal within the three months prior to the site visit.

If yes, optional Wetland Site ID: Bassett Cr Park Pond

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		
	Herb Stratum (Plot Size: 5 ft)			
1.	Typha angustifolia	20	Yes	OBL
2.	Urtica dioica	15	Yes	FACW
3.	Poa palustris	15	Yes	FACW
4.	Phalaris arundinacea	10	No	FACW
5.	Cirsium arvense	10	No	FACU
6.	Lemna minor	10	No	OBL
7.	Alliaria petiolata	5	No	FAC
8.		0		
	Total Cover:	85		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.	Vitis riparia	15	Yes	FACW
2.		0		
	Total Cover:	15		

% Bare Ground in Herb Stratum:

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	17	42.5
Woody Vine Stratum	3	7.5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW or FAC: **100.00%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	30	X 1	30	
FACW Species	55	X 2	110	
FAC Species	5	X 3	15	
FACU Species	10	X 4	40	
UPL Species	0	X 5	0	
Column Totals:	**100**	(A)	**195**	(B)

Prevalence Index = B/A = **1.95**

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ***≤ 3.0 [1]***
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: B-1w

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 8	10YR 2/1	98	10YR 4/3	2	C	M	Sandy Loam	mucky
2.	8 - 20	N 2.5/0	100					Silt Loam	peat intermixed
3.	20 - 30	10YR 3/1	100					Silt Loam	shells present
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☑ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches):

Water table present? ☑ Water Table Depth (inches): 3

Saturation present? (includes capillary fringe) ☑ Saturation Depth (inches): 0

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 21 | Township: 118N | Range: 21W | Sampling Point: B-2u

Land Form: Summit | Local Relief: None | Slope %: 3 | Soil Map Unit Name: Udorthents, wet sub, 0-2% slopes

Subregion (LRR): M | Latitude: 4984248 | Longitude: 472133 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present?	No	General Remarks (explain any answers if needed):	Conditions are wetter than normal within the three months prior to the site visit.
Hydric soil present?	No		
Indicators of wetland hydrology present?	No		
Is the sampled area within a wetland?	No	If yes, optional Wetland Site ID:	Upland

VEGETATION

Tree Stratum (Plot Size: 30 ft)		Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
Sapling/Shrub Stratum (Plot Size: 15 ft)				
1.	Salix interior	1	No	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	1		
Herb Stratum (Plot Size: 5 ft)				
1.	Glechoma hederacea	70	Yes	FACU
2.	Poa pratensis	30	Yes	FAC
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	100		
Woody Vine Stratum (Plot Size: 30 ft)				
1.				
2.		0		
	Total Cover:			

% Bare Ground in Herb Stratum: | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0.2	0.5
Herb Stratum	20	50
Woody Vine Stratum		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	50.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	1	X 2	2	
FAC Species	30	X 3	90	
FACU Species	70	X 4	280	
UPL Species	0	X 5	0	
Column Totals:	101	(A)	372	(B)
Prevalence Index = B/A =			3.68	

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
No	Dominance Test is >50%
No	Prevalence Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? No

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WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: B-2u

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	N 2.5/0	100					Silt Loam	
2.	10 - 24	N 2.5/0	98	10YR 3/3	2	C	M	Silt Loam	Peat intermixed
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches): _____

Water table present? ☐ Water Table Depth (inches): _____

Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 21 | Township: 118N | Range: 21W | Sampling Point: B-2w

Land Form: Footslope | Local Relief: Concave | Slope %: 1 | Soil Map Unit Name: Udorthents, wet sub, 0-2% slopes

Subregion (LRR): M | Latitude: 4984251 | Longitude: 472137 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: PSS1A | Circular 39 Classification: Type 6 | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Shrub-Carr

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Conditions are wetter than normal within the three months prior to the site visit.

If yes, optional Wetland Site ID: Bassett Cr Park Pond

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Salix interior	15	Yes	FACW
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	15		
	Herb Stratum (Plot Size: 5 ft)			
1.	Phalaris arundinacea	40	Yes	FACW
2.	Persicaria amphibia	20	Yes	OBL
3.	Solidago gigantea	20	Yes	FACW
4.	Urtica dioica	10	No	FACW
5.	Geranium maculatum	10	No	FACU
6.	Alliaria petiolata	5	No	FAC
7.		0		
8.		0		
	Total Cover:	105		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum:

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	3	7.5
Herb Stratum	21	52.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW or FAC: **100.00%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	20	X 1	20	
FACW Species	85	X 2	170	
FAC Species	5	X 3	15	
FACU Species	10	X 4	40	
UPL Species	0	X 5	0	
Column Totals:	**120**	(A)	**245**	(B)

Prevalence Index = B/A = **2.04**

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ***≤ 3.0 [1]***
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: B-2w

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 8	N 2.5/0						Silt Loam	
2.	8 - 15	N 2.5/0	98	10YR 3/3	2	C	M	Silt Loam	Peat intermixed
3.	15 - 30	N 2.5/0							Peat
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

- Surface water present? ☐ Surface Water Depth (inches):
- Water table present? ☐ Water Table Depth (inches):
- Saturation present? (includes capillary fringe) ☑ Saturation Depth (inches): 6

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 21 | Township: 118N | Range: 21W | Sampling Point: B-3u

Land Form: Hillslope | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: Udorthents, wet sub, 0-2% slopes

Subregion (LRR): M | Latitude: 4984301 | Longitude: 472021 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: Upland | Circular 39 Classification: Upland | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Upland

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Conditions are wetter than normal within the three months prior to the site visit.

If yes, optional Wetland Site ID: Upland

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Acer negundo	10	Yes	FAC
2.	Populus tremuloides	10	Yes	FAC
3.		0		
4.		0		
	Total Cover:	20		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		
	Herb Stratum (Plot Size: 5 ft)			
1.	Glechoma hederacea	65	Yes	FACU
2.	Taraxacum officinale	5	No	FACU
3.	Poa pratensis	5	No	FAC
4.	Parthenocissus quinquefolia	5	No	FACU
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	80		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	4	10
Sapling/Shrub Stratum	0	0
Herb Stratum	16	40
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 66.67% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	25	X 3	75	
FACU Species	75	X 4	300	
UPL Species	0	X 5	0	
Column Totals:	100	(A)	375	(B)

Prevalence Index = B/A = 3.75

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- No — Prevalence Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

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WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: B-3u

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 15	N 2.5/0						Silt Loam	
2.	15 - 30	N 2.5/0	95	10YR 3/3	5	C	M	Silt Loam	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches): _____

Water table present? ☐ Water Table Depth (inches): _____

Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 21 | Township: 118N | Range: 21W | Sampling Point: B-3w

Land Form: Toeslope | Local Relief: Concave | Slope %: 4 | Soil Map Unit Name: Udorthents, wet sub, 0-2% slopes

Subregion (LRR): M | Latitude: 4984300 | Longitude: 472029 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: PFO1A | Circular 39 Classification: Type 1L | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Floodplain Forest

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Conditions are wetter than normal within the three months prior to the site visit.

If yes, optional Wetland Site ID: Bassett Cr Park Pond

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus deltoides	10	Yes	FAC
2.	Populus tremuloides	5	Yes	FAC
3.	Acer negundo	5	Yes	FAC
4.		0		
	Total Cover:	20		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		
	Herb Stratum (Plot Size: 5 ft)			
1.	Phalaris arundinacea	75	Yes	FACW
2.	Urtica dioica	20	Yes	FACW
3.	Parthenocissus quinquefolia	5	No	FACU
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	100		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum:

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	4	10
Sapling/Shrub Stratum	0	0
Herb Stratum	20	50
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: **5** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW or FAC: **100.00%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	95	X 2	190	
FAC Species	20	X 3	60	
FACU Species	5	X 4	20	
UPL Species	0	X 5	0	
Column Totals:	**120**	(A)	**270**	(B)

Prevalence Index = B/A = **2.25**

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ***≤ 3.0 [1]***
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: B-3w

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 7	N 2.5/0	100					Silt Loam	
2.	7 - 40	N 2.5/0	95	10YR 3/3	5	C	M	Silt Loam	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches):

Water table present? ☐ Water Table Depth (inches):

Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches):

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

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WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 17 | Township: 118N | Range: 21W | Sampling Point: W-1u

Land Form: Shoulder | Local Relief: Convex | Slope %: 18 | Soil Map Unit Name: Urban land-Udorthents, wet sub, complex

Subregion (LRR): M | Latitude: 4985483 | Longitude: 470427 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: | Circular 39 Classification: | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary):
Eggers & Reed (secondary):
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? No
Indicators of wetland hydrology present? No
Is the sampled area within a wetland? No

General Remarks (explain any answers if needed): Conditions are wetter than normal within the three months prior to the site visit.

If yes, optional Wetland Site ID: Upland

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Acer negundo	50	Yes	FAC
2.		0		
3.		0		
4.		0		
	Total Cover:	50		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Rhamnus cathartica	40	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	40		
	Herb Stratum (Plot Size: 5 ft)			
1.	Glechoma hederacea	35	Yes	FACU
2.	Rhamnus cathartica	20	Yes	FAC
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	55		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: | % Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	10	25
Sapling/Shrub Stratum	8	20
Herb Stratum	11	27.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW or FAC: **75.00%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	0	X 1	0	
FACW Species	0	X 2	0	
FAC Species	110	X 3	330	
FACU Species	35	X 4	140	
UPL Species	0	X 5	0	
Column Totals:	**145**	(A)	**470**	(B)
Prevalence Index = B/A =			**3.24**	

Hydrophytic Vegetation Indicators:

No — Rapid Test for Hydrophytic Vegetation
Yes — Dominance Test is >50%
No — Prevalence Index ≤ 3.0 [1]
No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

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WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: W-1u

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 6	10YR 2/1	100					Loam	
2.	6 - 18	10YR 5/3	100					Loamy Sand	
3.	18 - 24	10YR 3/1	98	10YR 3/3	2	C	M	Sandy Clay Loam	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** _____ Hydric soil present? No

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches): _____

Water table present? ☐ Water Table Depth (inches): _____

Saturation present? (includes capillary fringe) ☐ Saturation Depth (inches): _____

Indicators of wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Bassett Creek Park Pond & Winnetka Pond (East) | Applicant/Owner: BCWMC | City/County: Crystal/Hennepin | State: MN | Sampling Date: 10/11/16

Investigator(s): BKB | Section: 17 | Township: 118N | Range: 21W | Sampling Point: W-1w

Land Form: Footslope | Local Relief: Concave | Slope %: 8 | Soil Map Unit Name: Water

Subregion (LRR): M | Latitude: 4985483 | Longitude: 470427 | Datum: UTM Nad 83 Zone 15N

Cowardin Classification: PFO1A | Circular 39 Classification: Type 1L | Mapped NWI Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no, explain in remarks) | Eggers & Reed (primary): Floodplain Forest

Are vegetation No Soil No Hydrology No significantly disturbed? | Are "normal circumstances" present? Yes | Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology No naturally problematic? | Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Indicators of wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

General Remarks (explain any answers if needed): Conditions are wetter than normal within the three months prior to the site visit.

If yes, optional Wetland Site ID: Winnetka Pond - East

VEGETATION

	Tree Stratum (Plot Size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus tremuloides	15	Yes	FAC
2.	Acer negundo	10	Yes	FAC
3.		0		
4.		0		
	Total Cover:	25		
	Sapling/Shrub Stratum (Plot Size: 15 ft)			
1.	Rhamnus cathartica	10	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	10		
	Herb Stratum (Plot Size: 5 ft)			
1.	Phalaris arundinacea	75	Yes	FACW
2.	Schoenoplectus fluviatilis	10	No	OBL
3.	Solidago canadensis	10	No	FACU
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	95		
	Woody Vine Stratum (Plot Size: 30 ft)			
1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum:

% Sphagnum Moss Cover:

Vegetation Remarks: (include photo numbers here or on a separate sheet)

50/20 Thresholds:	20%	50%
Tree Stratum	5	12.5
Sapling/Shrub Stratum	2	5
Herb Stratum	19	47.5
Woody Vine Stratum	0	0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW or FAC: **100.00%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	10	X 1	10	
FACW Species	75	X 2	150	
FAC Species	35	X 3	105	
FACU Species	10	X 4	40	
UPL Species	0	X 5	0	
Column Totals:	**130**	(A)	**305**	(B)
Prevalence Index = B/A =			**2.35**	

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevalence Index ***≤ 3.0 [1]***
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: W-1w

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type [1]	Redox Features Loc [2]	Texture	Remarks
1.	0 - 10	10YR 3/1	96	10YR 4/3	2	C	M	Sandy Clay Loam	
2.	0 - 10			10YR 5/2	2	D	M		
3.	10 - 18	10YR 2/1	98	10YR 4/3	2	C	M	Sandy Clay	
4.	18 - 24	10Y 3/1	98	10YR 5/2	2	D	M	Sandy Clay	
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** **Depth (inches):** Hydric soil present? Yes

Soil Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ Surface Water Depth (inches):

Water table present? ☑ Water Table Depth (inches): 9

Saturation present? (includes capillary fringe) ☑ Saturation Depth (inches): 2

Indicators of wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks:

12/9/2016 2:13:35 PM

Appendix B

Site Photographs

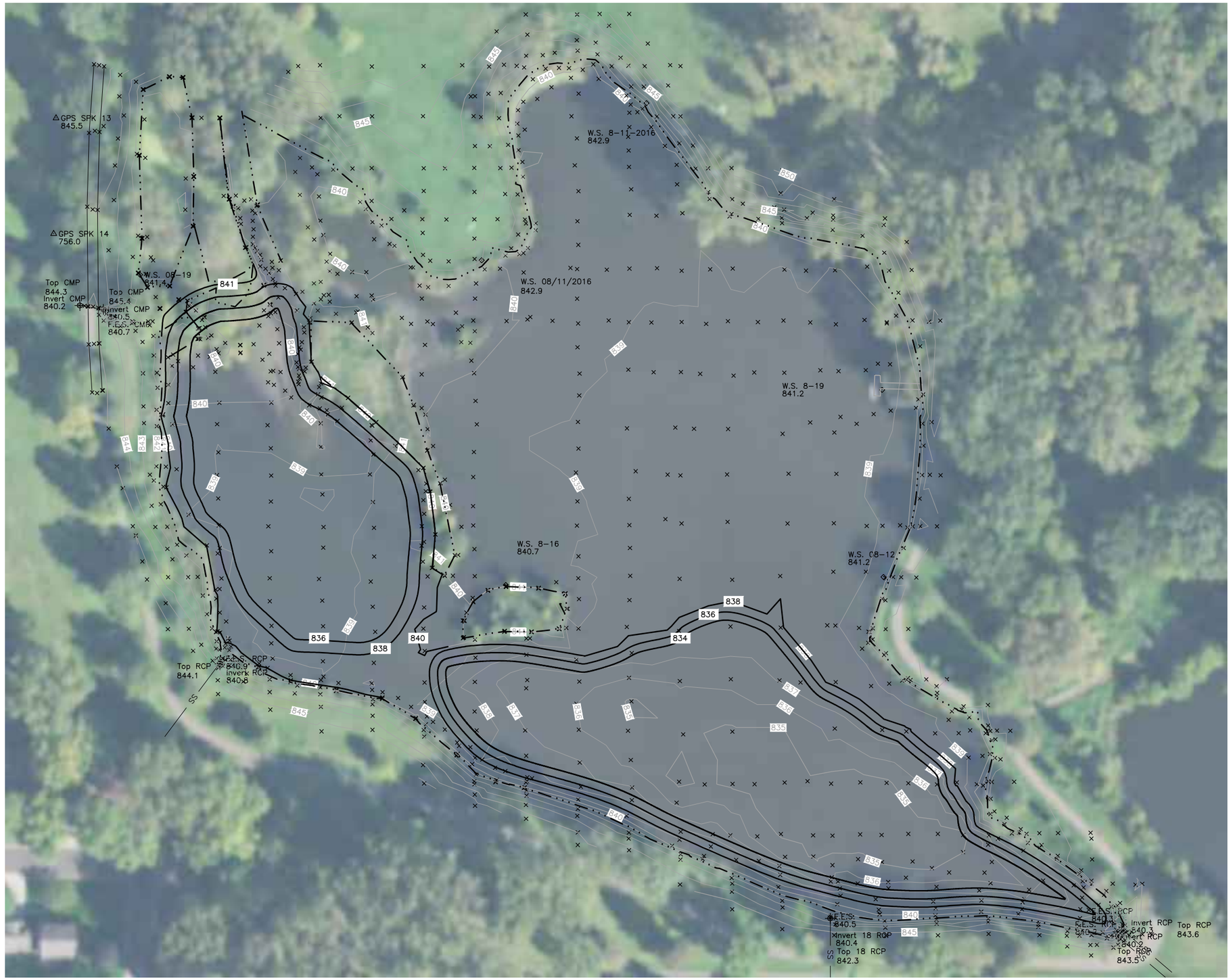
Photo 1 – October 11, 2016 Bassett Creek Park Pond General view of the shallow open water community of Bassett Creek Park Pond.	
Photo 2 – October 11, 2016 Bassett Creek Park Pond Shallow marsh fringe area located on the west side of the pond.	
Photo 3 – October 11, 2016 Bassett Creek Park Pond Excavated deep marsh community located on the northwest side of the basin within shrub swamp.	

Photo 4 – October 11, 2016 Bassett Creek Park Pond Shrub swamp "island" community surrounded by shallow open water community located beyond open water.	
Photo 5 – October 11, 2016 Bassett Creek Park Pond Bassett Creek extending through floodplain forest community on the northwest side of the basin.	
Photo 6 – October 11, 2016 Winnetka Pond Typical view of the shallow open water community.	

Photo 7 – October 11, 2016 Winnetka Pond Steep and abrupt wetland edge leading into shallow open water community on the north side.	
Photo 8 – October 11, 2016 Winnetka Pond Typical view of floodplain forest community on the west side of the basin.	

Appendix D

Bathymetric Survey Figures



LEGEND:

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOURS
- SURVEYED WATER LEVEL

BASIS OF DRAWING FILE:

DATE OF SURVEY: **08-11-2016**

ORIGIN/DATE OF BASE: **08-11-2016**

COORDINATE SYSTEM: **HENNEPIN COUNTY**

HORIZONTAL DATUM: **NAD83 (2011) REF. VRS**

VERTICAL DATUM: **NAVD88 REF. VRS**

ADDITIONAL FILE INFORMATION:

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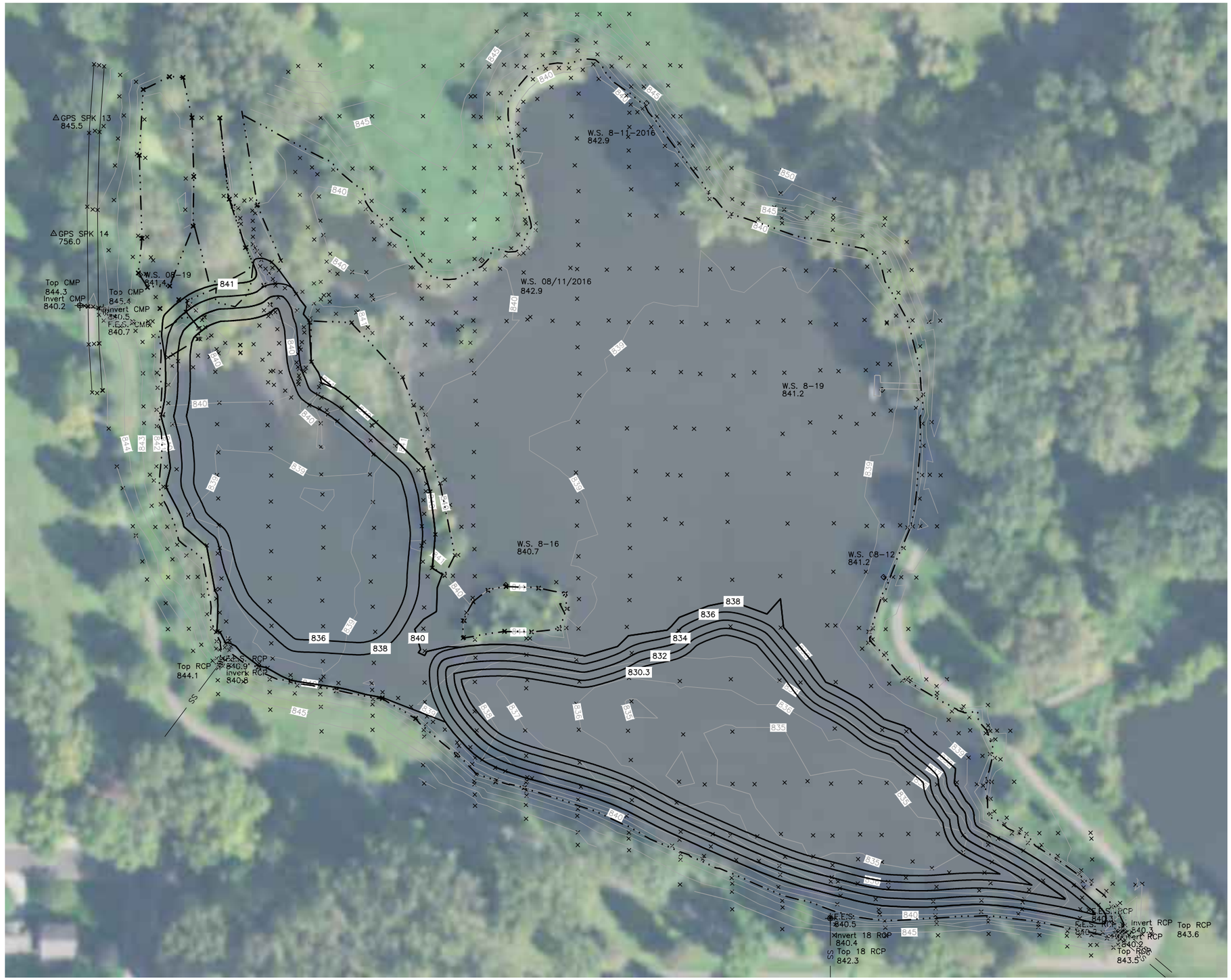
Designed	
Approved	

BASSETT CREEK WATERSHED
MINNEAPOLIS, MINNESOTA

BASSETT CREEK PARK
CRYSTAL, MINNESOTA

BASSETT CREEK PARK POND
EXISTING CONTOUR COMPARISON

BARR PROJECT No. 23/27-0051.37
CLIENT PROJECT No.
DWG. No.
REV. No.



LEGEND:

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOURS
- SURVEYED WATER LEVEL

BASIS OF DRAWING FILE:

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ORIGIN/DATE OF BASE: **08-11-2016**

COORDINATE SYSTEM: **HENNEPIN COUNTY**

HORIZONTAL DATUM: **NAD83 (2011) REF. VRS**

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BASSETT CREEK WATERSHED
MINNEAPOLIS, MINNESOTA

BASSETT CREEK PARK
CRYSTAL, MINNESOTA

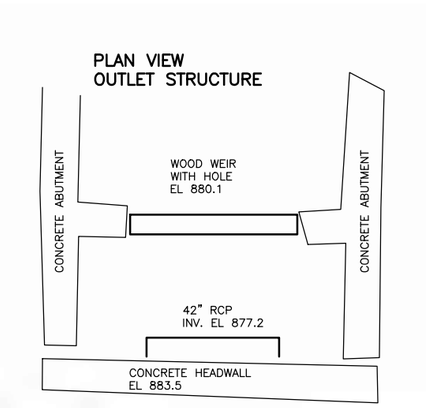
BASSETT CREEK PARK POND ALTERNATIVE 2
EXISTING CONTOUR COMPARISON

BARR PROJECT No. 23/27-0051.37
CLIENT PROJECT No.
DWG. No.
REV. No.

0 40 80
SCALE IN FEET

LEGEND

- GPS CONTROL POINT
- SS SS STORM SEWER LINE
- POND WATER LINE
- PROPOSED DESIGN CONTOURS
- EXISTING CONDITION MAJOR CONTOUR
- EXISTING CONDITION MINOR CONTOUR
- RIPRAP



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DATE OF SURVEY: **08-03-2016**

ORIGIN/DATE OF BASE: **08-03-2016**

COORDINATE SYSTEM: **HENNEPIN COUNTY**

HORIZONTAL DATUM: **NAD83(2011) REF. VRS**

VERTICAL DATUM: **NAVD88 REF. VRS (SPIKE 1)**

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BASSETT CREEK WATERSHED
MINNEAPOLIS, MINNESOTA

BASSET CREEK & WINNETKA PONDS
CRYSTAL, MINNESOTA

WINNETKA POND EAST
EXISTING CONDITIONS COMPARISON

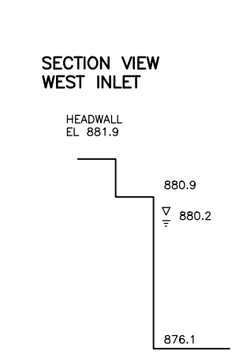
BARR PROJECT No. 23/27-0051.37
CLIENT PROJECT No.
DWG. No.
REV. No.

0 40 80
SCALE IN FEET

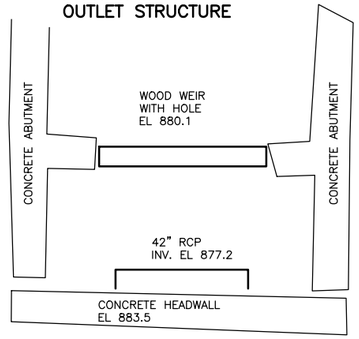
LEGEND

- GPS CONTROL POINT
- SS SS STORM SEWER LINE
- POND WATER LINE
- PROPOSED DESIGN CONTOURS
- EXISTING CONDITION MAJOR CONTOUR
- EXISTING CONDITION MINOR CONTOUR
- RIPRAP

SECTION VIEW WEST INLET



PLAN VIEW OUTLET STRUCTURE



BASIS OF DRAWING FILE:

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ORIGIN/DATE OF BASE: **08-03-2016**

COORDINATE SYSTEM: **HENNEPIN COUNTY**

HORIZONTAL DATUM: **NAD83(2011) REF. VRS**

VERTICAL DATUM: **NAVD88 REF. VRS (SPIKE 1)**

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BASSETT CREEK WATERSHED
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BASSET CREEK & WINNETKA PONDS
CRYSTAL, MINNESOTA

WINNETKA POND EAST ALTERNATIVE 2
EXISTING CONDITIONS COMPARISON

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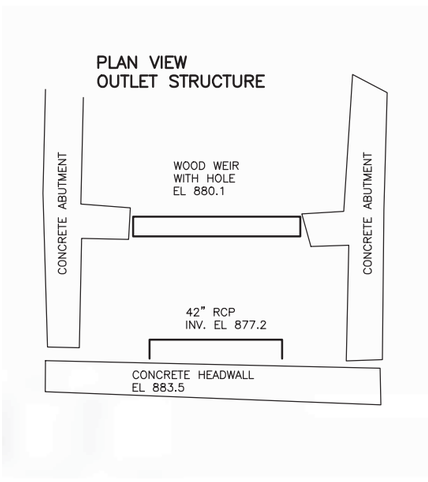
CLIENT PROJECT No.
DWG. No.
REV. No.

0 40 80
SCALE IN FEET

LEGEND

- GPS CONTROL POINT
- SS SS STORM SEWER LINE
- POND WATER LINE
- PROPOSED DESIGN CONTOURS
- EXISTING CONDITION MAJOR CONTOUR
- EXISTING CONDITION MINOR CONTOUR
- RIPRAP



BASIS OF DRAWING FILE:

DATE OF SURVEY: **08-03-2016**

ORIGIN/DATE OF BASE: **08-03-2016**

COORDINATE SYSTEM: **HENNEPIN COUNTY**

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VERTICAL DATUM: **NAVD88 REF. VRS (SPIKE 1)**

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BASSET CREEK & WINNETKA PONDS
CRYSTAL, MINNESOTA

WINNETKA POND EAST ALTERNATIVE 3
EXISTING CONDITIONS COMPARISON

BARR PROJECT No. 23/27-0051.37
CLIENT PROJECT No.
DWG. No.
REV. No.

Appendix E

Detailed Cost Estimates

Table E-2. Cost Estimate, Bassett Creek Park Pond - Alternative 2: Deepen Southeast Section

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$88,100	$88,100	10% of project cost
Erosion Control	L.S.	1	$18,000	$18,000	
Clearing and Grubbing	L.S.	1	$5,000	$5,000	
Floatation Silt Curtain	L.F.	450	$15	$6,548	
Control of Water, Dewatering	L.S.	1	$20,000	$20,000	
Pond Dreding of MPCA Dredged Material Level 1- Removal and Disposal	C.Y.	15,461	$25	$386,525	unit price based on RWMWD Dec 2016 Markham Pond bid prices
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	C.Y.	6,755	$55	$371,525	unit price based on RWMWD 2016 CIP bid prices - Dec 2015 bid
Site Grading	S.Y.	800	$4	$3,200	
Top Soil Borrow	C.Y.	67	$26	$1,733	
Flexterra HP-FGM	S.Y.	800	$5	$4,000	
Trail Replacement	S.Y.	2,000	$30	$60,000	10' width
Traffic Control/Pedestrian Control/Trail Closure	L.S.	1	$4,000	$4,000	
Subtotal				$968,631	
Contingency (30%)				$290,589	
Total				**$1,259,220**	
Engineering (30%)				$290,589	
Total w/Engineering				**$1,549,809**	

1. This assumes half of the material is Level 1 and half is Level 3 based on the sampling completed to date. Additional sampling will be needed to determine the break point between unregulated fill and contaminated material.

Erosion Control

Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	5	194.00	970
Erosion Control Siltation Logs	L.F.	2000	7.50	15000

Total 18015

Restoration (6 access points, 24' wide, 50' long) 800 SY

30-yr and Annualized Cost analysis

Estimated life span (years)	30	
Expected annual maintenance	$ -	
End of life span maintenance	$ 256,000	based on sediment accumulation rate of 35 CY per year (from P8 model) (35*30=1050cy)
Future Capital Cost	$ 3,761,800	
Future annual maintenance	$ -	
Future end of life span cost	$ 622,000	
Total Future Worth	**$ 4,383,800**	
Annualized Cost	**$ 92,100**	

Table E-1. Cost Estimate, Bassett Creek Park Pond - Baseline Alternative: Remove Accumulated Sediment

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$66,300	$66,300	10% of project cost
Erosion Control	L.S.	1	$18,000	$18,000	
Clearing and Grubbing	L.S.	1	$5,000	$5,000	
Floatation Silt Curtain	L.F.	450	$15	$6,548	
Control of Water, Dewatering	L.S.	1	$20,000	$20,000	
Pond Dreding of MPCA Dredged Material Level 1- Removal and Disposal	C.Y.	6,755	$25	$168,875	unit price based on RWMWD Dec 2016 Markham Pond bid prices
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	C.Y.	6,755	$55	$371,525	unit price based on RWMWD 2016 CIP bid prices - Dec 2015 bid
Site Grading	S.Y.	800	$4	$3,200	
Top Soil Borrow	C.Y.	67	$26	$1,733	
Flexterra HP-FGM	S.Y.	800	$5	$4,000	
Trail Replacement	S.Y.	2,000	$30	$60,000	10' width
Traffic Control/Pedestrian Control/Trail Closure	L.S.	1	$4,000	$4,000	
Subtotal				$729,181	
Contingency (30%)				$218,754	
Total				**$947,935**	
Engineering (30%)				$218,754	
Total w/Engineering				**$1,166,689**	

1. This assumes half of the material is Level 1 and half is Level 3 based on the sampling completed to date. Additional sampling will be needed to determine the break point between unregulated fill and contaminated material.

Erosion Control				
Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	5	194.00	970
Erosion Control Siltation Logs	L.F.	2000	7.50	15000
Total				18015

Restoration (6 access points, 24' wide, 50' long) 800 SY

30-yr and Annualized Cost analysis

Estimated life span (years)	30	
Expected annual maintenance	$ -	
End of life span maintenance	$ 256,335	based on sediment accumulation rate of 35 CY per year (from P8 model) (35*30=1050 cy)
Future Capital Cost	$ 2,831,900	
Future annual maintenance	$ -	
Future end of life span cost	$ 623,000	
Total Future Worth	**$ 3,454,900**	
Annualized Cost	**$ 72,600**	

Table E-3. Cost Estimate, Bassett Creek Park Pond - Add-on 1: Create Sediment Forebay in Northern Section of Pond

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$10,400	$10,400	10% of project cost
Erosion Control	L.S.	0	$18,000	$0	
Clearing and Grubbing	L.S.	0	$5,000	$0	
Floatation Silt Curtain	L.F.	0	$15	$0	
Control of Water, Dewatering	L.S.	0	$20,000	$0	
Pond Dreding of MPCA Dredged Material Level 1- Removal and Disposal	C.Y.	0	$25	$0	unit price based on RWMWD Dec 2016 Markham Pond bid prices
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	C.Y.	1,604	$55	$88,216	unit price based on RWMWD 2016 CIP bid prices - Dec 2015 bid
Berm Construction (Rock Gabions)	Each	35	$450	$15,750	
Site Grading	S.Y.	0	$4	$0	
Top Soil Borrow	C.Y.	0	$26	$0	
Flexterra HP-FGM	S.Y.	0	$5	$0	
Trail Replacement	S.Y.	0	$30	$0	10' width
Traffic Control/Pedestrian Control/Trail Closure	L.S.	0	$4,000	$0	
Subtotal				$114,366	
Contingency (30%)				$34,310	
Total				**$148,676**	
Engineering (30%)				$34,310	
Total w/Engineering				**$182,985**	

1. This assumes half of the material is Level 1 and half is Level 3 based on the sampling completed to date. Additional sampling will be needed to determine the break point between unregulated fill and contaminated material.

Erosion Control				
Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	5	194.00	970
Erosion Control Siltation Logs	L.F.	2000	7.50	15000
Total				18015

Restoration (6 access points, 24' wide, 50' long)

800 SY

30-yr and Annualized Cost analysis

Estimated life span (years)		30	
			based on sediment accumulation rate of 35 CY per year (from P8 model)
Expected annual maintenance	$	10,900	(35*30=1050cy)
End of life span maintenance	$	-	
Future Capital Cost	$	444,200	
Future annual maintenance	$	518,570	
Future end of life span cost	$	-	
Total Future Worth	**$**	**962,800**	
Annualized Cost	**$**	**20,200**	

Annual Maintenance	Estimated Quantity	Unit Price	Extension
Mobilization/Demobilization	1	992.5	992.5
Erosion Control	1	3000	3000
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	35	55	1925
Restoration	1	2000	2000
Sediment Sampling	1	3000	3000
Total			10917.5

Table E-4. Cost Estimate, Bassett Creek Park Pond - Add-on 1: Create Sediment Forebay in Northern Section of Pond (No Other Pond Excavation)

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$54,300	$54,300	10% of project cost
Erosion Control	L.S.	1	$8,500	$8,500	
Clearing and Grubbing	L.S.	1	$5,000	$5,000	
Floatation Silt Curtain	L.F.	145	$15	$2,110	
Control of Water, Dewatering	L.S.	1	$15,000	$15,000	
Pond Dreding of MPCA Dredged Material Level 1- Removal and Disposal	C.Y.	0	$25	$0	unit price based on RWMWD Dec 2016 Markham Pond bid prices
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	C.Y.	8,221	$55	$452,151	unit price based on RWMWD 2016 CIP bid prices - Dec 2015 bid
Berm Construction (Rock Gabions)	Each	35	$450	$15,750	
Site Grading	S.Y.	400	$4	$1,600	
Top Soil Borrow	C.Y.	33	$26	$867	
Flexterra HP-FGM	S.Y.	400	$5	$2,000	
Trail Replacement	S.Y.	1,200	$30	$36,000	10' width
Traffic Control/Pedestrian Control/Trail Closure	L.S.	1	$4,000	$4,000	
Subtotal				$597,277	
Contingency (30%)				$179,183	
Total				**$776,461**	
Engineering (30%)				$179,183	
Total w/Engineering				**$955,644**	

1. This assumes half of the material is Level 1 and half is Level 3 based on the sampling completed to date. Additional sampling will be needed to determine the break point between unregulated fill and contaminated material.

Erosion Control				
Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	5	194.00	970
Erosion Control Siltation Logs	L.F.	700	7.50	5250
Total				8265

Restoration (6 access points, 24' wide, 50' long)

800 SY

30-yr and Annualized Cost analysis

Estimated life span (years)	30	
Expected annual maintenance	$ 10,900	based on sediment accumulation rate of 35 CY per year (from P8 model)(35*30=1050 cy)
End of life span maintenance	$ -	
Future Capital Cost	$ 2,319,600	
Future annual maintenance	$ 518,570	
Future end of life span cost	$ -	
Total Future Worth	**$ 2,838,200**	
Annualized Cost	**$ 59,700**	

Annual Maintenance	Estimated Quantity	Unit Price	Extension
Mobilization/Demobilization	1	992.5	992.5
Erosion Control	1	3000	3000
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	35	55	1925
Restoration	1	2000	2000
Sediment Sampling	1	3000	3000
Total			10917.5

Table E-5. Cost Estimate, Bassett Creek Park Pond - Add-on 2: Create Native Vegetation Buffer Around Pond

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$4,800	$4,800	10% of project cost
Vegetation Establishment and Maintenance	Acre	4	$11,000	$47,980	
					10' width
Subtotal				$52,780	
Contingency (30%)				$15,834	
Total				**$68,614**	
Engineering (30%)				$15,834	
Total w/Engineering				**$84,448**	

Erosion Control				
Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	5	194.00	970
Erosion Control Siltation Logs	L.F.	2000	7.50	15000
Total				18015

Restoration (6 access points, 24' wide, 50' long)

800 SY

30-yr and Annualized Cost analysis

Estimated life span (years)		30	
Expected annual maintenance	$	8,724	assume $2,000/ac based on information from Golden Valley (avg of $1,500/yr over 20 years)
End of life span maintenance	$	21,112	assume 25% of total project cost, based on Plymouth Creek cost estimate
Future Capital Cost	$	205,000	
Future annual maintenance	$	415,030	
Future end of life span cost	$	39,000	
Total Future Worth	**$**	**659,000**	
Annualized Cost	**$**	**13,900**	

Annual Maintenance	Estimated Quantity	Unit Price	Extension
Mobilization/Demobilization	1	4650	4650
Erosion Control	1	3000	3000
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	700	55	38500
Restoration	1	2000	2000
Sediment Sampling	1	3000	3000
Total			51150

Table E-6. Cost Estimate, Winnetka Pond East - Baseline Alternative: Remove Accumulated Sediment

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$14,700	$14,700	10% of project cost
Erosion Control	L.S.	1	$12,000	$12,000	
Clearing and Grubbing	L.S.	0	$5,000	$0	
Floatation Silt Curtain	L.F.	70	$14.55	$1,018.50	
Control of Water, Dewatering	L.S.	1	$15,000	$15,000	
Pond Dreding of MPCA Dredged Material Level 1- Removal and Disposal	C.Y.	4,090	$25	$102,250	unit price based on RWMWD Dec 2016 Markham Pond bid prices
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	C.Y.	0	$55	$0	unit price based on RWMWD 2016 CIP bid prices - Dec 2015 bid
Site Grading	S.Y.	1,300	$4	$5,200	
Top Soil Borrow	C.Y.	108	$26	$2,817	
Flexterra HP-FGM	S.Y.	1,300	$5	$6,500	
Trail Replacement	S.Y.	0	$30	$0	10' width
Traffic Control/Pedestrian Control/Trail Closure	L.S.	1	$2,000	$2,000	
Subtotal				$161,485	
Contingency (30%)				$48,446	
Total				**$209,931**	
Engineering (30%)				$48,446	
Total w/Engineering				**$258,376**	

Erosion Control				
Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	4	194.00	776
Erosion Control Siltation Logs	L.F.	1200	7.50	9000

Total 11821

Restoration (3 access points, 24' wide, 50' long, one 260'x24' access to ne corner) 1293.333 SY

30-yr and Annualized Cost analysis

Estimated life span (years)		20	
Expected annual maintenance	$	-	
End of life span maintenance	$	80,000	based on sediment accumulation rate of 10 CY per year (fromP8 model)(10*30=300 cy)
Future Capital Cost	$	627,100	
Future annual maintenance	$	-	
Future end of life span cost	$	195,000	
Total Future Worth	**$**	**822,100**	
Annualized Cost	**$**	**17,300**	

Table E-7. Cost Estimate, Winnetka Pond East - Alternative 2: Deepen Entire Pond to 4.2 feet

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$35,100	$35,100	10% of project cost
Erosion Control	L.S.	1	$12,000	$12,000	
Clearing and Grubbing	L.S.	0	$5,000	$0	
Floatation Silt Curtain	L.F.	70	$15	$1,019	
Control of Water, Dewatering	L.S.	1	$15,000	$15,000	
Pond Dreding of MPCA Dredged Material Level 1- Removal and Disposal	C.Y.	12,234	$25	$305,850	bottom elev 875.9 (4.2 ft deep) - quantity revised per 5/02/17 calculations; unit price based on RWMWD Dec 2016 Markham Pond bid prices
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	C.Y.	0	$55	$0	unit price based on RWMWD 2016 CIP bid prices - Dec 2015 bid
Site Grading	S.Y.	1,300	$4	$5,200	
Top Soil Borrow	C.Y.	108	$26	$2,817	
Flexterra HP-FGM	S.Y.	1,300	$5	$6,500	
Trail Replacement	S.Y.	0	$30	$0	10' width
Traffic Control/Pedestrian Control/Trail Closure	L.S.	1	$2,000	$2,000	
Subtotal				$385,485	
Contingency (30%)				$115,646	
Total				**$501,131**	
Engineering (30%)				$115,646	
Total w/Engineering				**$616,776**	

Erosion Control

Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	4	194.00	776
Erosion Control Siltation Logs	L.F.	1200	7.50	9000

Total

11821

Restoration (3 access points, 24' wide, 50' long, one 260'x24' access to ne corner) 1293.333 SY

30-yr and Annualized Cost analysis

Estimated life span (years)	30	
Expected annual maintenance	$ -	
End of life span maintenance	$ 80,000	based on sediment accumulation rate of 10 CY per year (fromP8 model) (30*10=300 cy)
Future Capital Cost	$ 1,497,100	
Future annual maintenance	$ -	
Future end of life span cost	$ 195,000	
Total Future Worth	**$ 1,692,100**	
Annualized Cost	**$ 35,600**	

Table E-8. Cost Estimate, Winnetka Pond East - Alternative 3: Deepen Entire Pond to 6.0 feet

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$50,500	$50,500	10% of project cost
Erosion Control	L.S.	1	$12,000	$12,000	
Clearing and Grubbing	L.S.	0	$5,000	$0	
Floatation Silt Curtain	L.F.	70	$15	$1,019	
Control of Water, Dewatering	L.S.	1	$15,000	$15,000	
Pond Dreding of MPCA Dredged Material Level 1- Removal and Disposal	C.Y.	18,394	$25	$459,850	bottom elevation 874.1 = 6.0 feet deep; unit price based on RWMWD Dec 2016 Markham Pond bid prices
Pond Dreding of MPCA Dredged Material Level 3- Removal and Disposal	C.Y.	0	$55	$0	unit price based on RWMWD 2016 CIP bid prices - Dec 2015 bid
Site Grading	S.Y.	1,300	$4	$5,200	
Top Soil Borrow	C.Y.	108	$26	$2,817	
Flexterra HP-FGM	S.Y.	1,300	$5	$6,500	
Trail Replacement	S.Y.	0	$30	$0	10' width
Traffic Control/Pedestrian Control/Trail Closure	L.S.	1	$2,000	$2,000	
Subtotal				$554,885	
Contingency (30%)				$166,466	
Total				**$721,351**	
Engineering (30%)				$166,466	
Total w/Engineering				**$887,816**	

Erosion Control

Item	Unit	Est. Quanti	Unit Price	Extension
Erosion Control Construction Entrance	Each	1	1,045.00	1045
Street Sweeping	L.S.	1	1,000.00	1000
Inlet Protection	Each	4	194.00	776
Erosion Control Siltation Logs	L.F.	1200	7.50	9000

Total 11821

Restoration (3 access points, 24' wide, 50' long, one 260'x24' access to ne corner) 1293.333 SY

30-yr and Annualized Cost analysis

Estimated life span (years)		30	
Expected annual maintenance	$	-	
End of life span maintenance	$	80,000	based on sediment accumulation rate of 10 CY per year (fromP8 model) (10*30 = 300 cy)
Future Capital Cost	$	2,155,000	
Future annual maintenance	$	-	
Future end of life span cost	$	195,000	
Total Future Worth	**$**	**2,350,000**	
Annualized Cost	**$**	**49,400**	

Table E-9. Cost Estimate, Winnetka Pond - Add-on 1: Create Native Vegetation Buffer Around Pond (50-foot buffer)

Description	Unit	Estimated Quantity	Unit Price	Extension	
Mobilization/Demobilization	L.S.	1	$1,000	$1,000	10% of project cost
Vegetation Establishment and Maintenance	Acre	0.85	$11,000	$9,350	
Subtotal				$10,350	
Contingency (30%)				$3,105	
Total				**$13,455**	
Engineering (30%)				$3,105	
Total w/Engineering				**$16,560**	

30-yr and Annualized Cost analysis

Estimated life span (years)		30	
Expected annual maintenance	$	1,700	assume $2,000/ac based on information from Golden Valley (avg of $1,500/yr over 20 years)
End of life span maintenance	$	4,140	assume 25% of total project cost, based on Plymouth Creek cost estimate
Future Capital Cost	$	40,200	
Future annual maintenance	$	80,880	
Future end of life span cost	$	8,000	
Total Future Worth	**$**	**129,100**	
Annualized Cost	**$**	**2,700**	

Table E-10. Cost Estimate, Winnetka Pond - Add-on 2: Goose Management

Description	Unit	Estimated Quantity	Unit Price	Extension
Goose Management	L.S.	1	$5,000	$5,000
Subtotal				$5,000
Contingency (30%)				$1,500
Total				**$6,500**
Engineering (30%)				$1,500
Total w/Engineering				**$8,000**

30-yr and Annualized Cost analysis		
Estimated life span (years)		30
Expected annual maintenance	$	5,000
End of life span maintenance	$	-
Future Capital Cost	$	-
Future annual maintenance	$	237,880
Future end of life span cost	$	-
Total Future Worth	**$**	**237,900**
Annualized Cost	**$**	**5,000**