Item 5B.
BCWMC 6-17-21
Main Document Posted Separately

Appendix A

Sediment Sampling and Bathymetric Supplementary Information (2020)

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BARR

Technical Memorandum

To: Bassett Creek Watershed Management Commission
From: Kevin Menken & Katie Turpin-Nagel, Barr Engineering
Subject: Medley Pond Sediment Characterization
Date: January 26, 2021
Project: 23/27-0051.51

Introduction

This memorandum summarizes sediment characterization for sediment samples and bathymetric measurements collected from Medley Pond in the City of Golden Valley (City).

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 exceed 100 mg/kg total petroleum hydrocarbons (TPH); 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, or have TPH greater than 100 mg/kg, are often disposed at a solid waste landfill.

Sediment Sample Collection Methodology

Sediment samples were collected by Barr Engineering Co. (Barr) on October 13, 2020 on behalf of Bassett Creek Watershed Management Commission (BCWMC). Sediment sampling was conducted in accordance with the MPCA's *Managing Stormwater Sediment, Best Management Practice Guidance* (MPCA, 2017). The MPCA guidance 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 two sediment samples, consistent with MPCA guidance recommendations for an excavation area less than 2 acres in size. Barr staff used a 3-inch diameter aluminum tube with vibracoring equipment to collect the sediment cores. A GPS unit was used to record the sediment sampling locations. Sediment samples were placed in containers provided by the laboratory, and 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 to determine whether excavated sediment is contaminated or could be considered

Unregulated Fill (MPCA, 2017). 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 were the largest source of PAHs to stormwater ponds, and a state-wide ban of coal tar-based sealants took effect January 1, 2014.

Based on Barr's experience with characterizing sediment in stormwater ponds, Barr recommended the following additional parameters be analyzed beyond the baseline parameters: the full list of RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver); diesel range organics (DRO); gasoline range organics (GRO); and benzene, toluene, ethylbenzene, and xylene (BTEX). There is not an analytical test directly measuring TPH; therefore, the sum of DRO and GRO are compared to the MPCA's Unregulated Fill threshold value. Field screening was conducted for signs of impacts from petroleum hydrocarbons, such as an oily sheen, petroleum odor, or visible staining. Field staff did not observe oily sheen or petroleum odor during sediment sampling.

Laboratory Methodologies and Determination of BaP Equivalents

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

- Metals: arsenic, barium, cadmium, chromium, copper, lead, selenium (method EPA 6010D); mercury: EPA 7471B
- Polycyclic aromatic hydrocarbons (PAHs) (method EPA 8270D by SIM)
- Diesel range organics (DRO) (method WI modified DRO, with silica gel cleanup)
- Gasoline range organics (method WI modified GRO)
- Benzene, toluene, ethylbenzene, and xylene (BTEX) (method EPA 8260D)

The PAHs that were analyzed can be grouped into two categories: carcinogenic (i.e. cancer causing) and general. 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 2017).

Laboratory analytical results for the sediment samples are summarized in Table 1. Field logs of the sediment cores are included in Attachment A, and photographs of the sediment cores are included in Attachment B. The detailed laboratory reports are included in Attachment C.

Bathymetric Survey and Sediment Core Logs

Barr conducted a bathymetric survey of Medley Pond on September 16, 2020. Pond bottom elevations were collected using Real Time Kinematic (RTK) GPS and robotic total station survey equipment, with a horizontal accuracy of 0.03 feet and vertical accuracy of 0.1 feet. The current bathymetry of Medley Pond

is shown on Figure 1 attached to this memo. Current bottom elevations generally range from 897 feet (NAVD88) in the center of Medley Pond to 898 feet at the northeastern channel inlet.

In addition to surveying the pond bottom, the survey crew recorded the depth of "soft sediment" by measuring the depth they could push a pole by hand into the sediment. The measured soft sediment depth may represent the survey rod hitting a firm substrate like sand or clay, or may represent increasingly dense or cohesive sediments that resists further push of the survey rod by hand. The soft sediment depths are shown on Figure 2. The corresponding elevations of the bottom of soft sediment are shown on Figure 3. The soft sediment depths recorded by the survey crew ranged from approximately 0.5 - 1.5 feet in the northeast area of the pond to as much as 5 feet in the southern and northwestern areas of the pond (push depth elevation of 893.0 feet, NAVD88). The average soft sediment push depth was approximately 3.0 feet. It is hypothesized that smaller soft sediment depths were recorded in the northeast portion of the pond because larger diameter sediment, such as gravel and sand, settles more readily at the channel outlet to the pond and would restrict the depth that the rod could be pushed down by hand.

Sediment cores were collected at two locations as shown on Figure 1. The sediment cores were visually logged in the field, and sediment core logs are included in Attachment A. At location SED-01, the water depth was 0.6 feet at the time of sampling and the approximate sediment elevation was 897.7 feet, NAVD88; the sediment coring tube was pushed 4.0 feet into sediment, and 2.7 feet of sediment was recovered. Core SED-01 consisted of soft organic silt with plant matter and sand lenses over interval 0-2.6 feet, and peat 2.6-2.7 feet. At location SED-02, the water depth was 1.0 foot at the time of sampling and the approximate sediment elevation was 897.3 feet, NAVD88; the sediment core tube was pushed 5.6 feet into sediment, and 4.0 feet of sediment was recovered. Core SED-02 consisted of soft organic silt with trace sand over interval 0-2.5 feet, and peat 2.5-4.0 feet. Based on sediment coring logs at the two locations, there is a transition from soft organic silt to peat at a depth of approximately 4.5-5.0 feet below the pond water surface (assuming that the difference between sediment core push length and recovered core length is due to displacement of soft sediment and not the displacement or loss of underlying peat). Thus, the soil transition elevation is approximately 893.5 feet, NAVD88.

Unfortunately, there is no available as-built drawing for Medley Pond that would show a constructed pond bottom. However, there is a construction plan set from September 2005 that shows a proposed bottom excavation elevation of 895.0 feet (NAVD88) at the northeast inlet channel. If the northeastern portion of Medley Pond was dredged to elevation 895.0 feet as shown in the plan set, then based on the bathymetric survey, over the past 15 years approximately 3.0 feet of sediment has accumulated at the channel inlet to Medley Pond.

Since no as-built survey of Medley Pond is available, it is difficult to approximate the original, native bottom elevation before the watershed was urbanized. However, based on the soft sediment push methodology conducted during bathymetric survey and analysis of the sediment cores, we can approximate that a sediment layer transition occurs at approximately elevation 893.5 feet.

For the purpose of estimating a sediment excavation volume for this memo, excavation to elevation 894.0 feet was selected. Excavation to this elevation would correspond to a maximum water depth of 4.6 feet post-excavation, and remove the organic silt while generally avoiding the underlying peat. Avoiding the underlying peat layer is recommended as disturbance and exposure of the underlying peat could result in the release of dissolved organic carbon (DOC), which could result in the water turning brown. Peat also has a lower density, which can correlate to enhanced wind driven sediment resuspension. The estimated sediment removal required to restore the pond bottom to an elevation of 894.0 ft is 1.0 ac-ft (~1,640 cubic yards). The dredge depth and proposed pond bottom elevation will be investigated in further detail during the Medley Park Stormwater Retrofit Feasibility Study.

Results of Sediment Characterization - BaP Equivalents

Table 1 compares the results of the laboratory analytical testing on the sediment samples to the MPCA's current SRVs and Screening SLVs. Results of DRO and GRO testing were compared to the MPCA's Unregulated Fill guidance for gross contamination of total petroleum hydrocarbons (TPH). **The BaP equivalents values in Medley Pond sediment samples ranged from 4.6 mg/kg to 6.5 mg/kg, which are greater than the Residential SRV (2mg/kg) but lower than the Industrial SRV (23 mg/kg)**. DRO results ranged from 79 mg/kg to 129 mg/kg, while GRO results were non-detect; therefore, TPH results for Medley Pond sediment samples range from 79 mg/kg to 129 mg/kg – the MPCA's total petroleum hydrocarbons threshold for Unregulated Fill is 100 mg/kg. The Medley Pond sediment could not be reused as Unregulated Fill due to BaP equivalents results exceeding the MN Residential SRV. Potential management options for Medley Pond sediment include reuse as Regulated Fill on property with a commercial or industrial land use designation, or disposal at a municipal solid waste landfill. If the sediment were reused as Regulated Fill, the costs associated with finding a suitable property to receive the sediment, conducting additional environmental investigations, and obtaining approval from the MPCA for reuse as Regulated Fill may negate any cost savings when compared to landfill disposal. Therefore, it is Barr's recommendation that the Medley Pond sediment, if excavated, be disposed in a landfill. The MPCA's current soil criteria, as well as current guidance documents and regulations, should be reviewed at the time of sediment excavation.

References

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

MPCA, 2017. Managing Stormwater Sediment, Best Management Practice Guidance, document wq-strm4-16, May 2017.

Tables

Table 1 – Medley Park Pond Sediment Characterization Analytical Summary

Figures

Figure 1 – Medley Park Bathymetry Survey & Sediment Core Locations

Figure 2 – Medley Park Pond Sediment Push Depths

Figure 3 – Medley Park Pond Soft Sediment Bottom Elevations

Attachments

Attachment A – Sediment Core Field Logs

Attachment B – Photographs

Attachment C – Laboratory Analytical Data Report

Tables

Table 1
Medley Park Pond Sediment Characterization Analytical Summary

					Location	SED-01		SED-02
					Date	10/13/2020		10/13/2020
					Depth	0 - 2.7 ft		0 - 4 ft
					Sample Type	N	FD	N
Parameter	Units	MPCA Screening Soil Leaching Values	MPCA Residential Soil Reference Values	MPCA Industrial Soil Reference Values	MPCA Criteria for Unregulated Fill			
Effective Date		06/01/2013	12/30/2019	12/30/2019	06/22/2009			
Exceedance Key		**Bold**	Underline	No Exceed	*Italic*			
General Parameters								
Moisture	%					42.0	45.7	58.9
Metals								
Arsenic	mg/kg	**5.8**	9	20	*5.8*	3.6	3.9	***6.1***
Barium	mg/kg	1700	1100	18000	1100	94.2	97.8	131
Cadmium	mg/kg	8.8	25	200	8.8	0.48	0.54	0.62
Chromium	mg/kg	36 CR6	87 CR6	650 CR6	36	20.8	20.3	23.9
Copper	mg/kg	700	100	9000	100	29.6	28.2	42.3
Lead	mg/kg	2700	300	700	300	54.8	48.7	59.0
Mercury	mg/kg	3.3 MC	0.5	1.5	0.5	0.050	0.053	0.080
Selenium	mg/kg	2.6	160	1300	2.6	< 0.54 U	< 0.56 U	< 0.75 U
Silver	mg/kg	7.9	160	1300	7.9	< 0.060 U	< 0.063 U	< 0.083 U
PAHs (carcinogenic)								
3-Methylcholanthrene	mg/kg	T	T	T		0.0380 J	0.0365 J	0.0608 J
5-Methylchrysene	mg/kg	T	T	T		0.206	0.204	0.209 J
7,12-Dimethylbenz(a)anthracene	mg/kg	T	T	T		< 0.0629 U	< 0.0673 U	< 0.0890 U
7h-Dibenzo(c,g)carbazole	mg/kg	T	T	T		< 0.0225 U	< 0.0241 U	< 0.0319 U
Benz(a)anthracene	mg/kg	T	T	T		1.27	1.24	1.98
Benzo(a)pyrene	mg/kg	T	T	T		1.41	1.38	1.98
Benzofluoranthenes	mg/kg	T	T	T		3.38	3.43	4.78
Chrysene	mg/kg	T	T	T		1.91	1.88	2.84
Dibenz(a,h)acridine	mg/kg	T	T	T		< 0.0106 U	< 0.0114 U	0.0848 J
Dibenz(a,h)anthracene	mg/kg	T	T	T		0.263	0.234	0.338
Dibenzo(a,e)pyrene	mg/kg	T	T	T		0.346	0.281	0.383
Dibenzo(a,h)pyrene	mg/kg	T	T	T		0.142 J	0.123 J	0.17 J
Dibenzo(a,i)pyrene	mg/kg	T	T	T		0.0366 J	0.0278 J	0.0361 J
Dibenzo(a,l)pyrene	mg/kg	T	T	T		< 0.0395 U	< 0.0423 U	< 0.0559 U
Indeno(1,2,3-cd)pyrene	mg/kg	T	T	T		0.806	0.686	0.972
BaP Equivalent, Kaplan-Meier	mg/kg	**1.4 T**	2 T(BTV)	23 T	*1.4*	***5.1 a***	***4.6 a***	***6.5 a***
% Non-detects	%					26.7 a	26.7 a	20.0 a
PAHs (general)								
2-Methylnaphthalene	mg/kg		100	369		0.0220 J	0.0215 J	0.0904 J
Acenaphthene	mg/kg	81	1200	5260		0.13 J	0.122 J	0.431
Acenaphthylene	mg/kg	NA				0.0691 J	0.0815 J	0.0732 J
Anthracene	mg/kg	1300	7880	45400		0.37	0.373	0.796
Benzo(g,h,i)perylene	mg/kg	NA				0.139 J	0.118 J	0.165 J
Fluoranthene	mg/kg	670	1080	6800		4.06	4.11	6.65
Fluorene	mg/kg	110	850	4120		0.195	0.185	0.49
Naphthalene	mg/kg	4.5	10	28		< 0.0509 U	< 0.0545 U	0.292
Phenanthrene	mg/kg	NA				2.28	2.21	4.92
Pyrene	mg/kg	440	890	5800		2.92	2.86	4.64
Volatile Organic Compounds								
Benzene	mg/kg	0.017	6	10		< 0.0388 U	< 0.0436 U	< 0.0556 U
Ethyl benzene	mg/kg	1.0	200	200		< 0.0388 U	< 0.0436 U	< 0.0556 U
Toluene	mg/kg	2.5	107	305		< 0.0388 U	< 0.0436 U	< 0.0556 U
Xylene, total	mg/kg	5.4 M	45 M	130 M		< 0.116 U	< 0.131 U	< 0.167 U
Total Petroleum Hydrocarbons								
Diesel Range Organics, silica gel cleanup	mg/kg				*100*	*129 J*	79.4 J	89.6
Gasoline Range Organics, C6-C10	mg/kg					< 5.0 U	< 5.3 U	< 6.9 U

Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

N	Sample Type: Normal
FD	Sample Type: Field Duplicate
a	Estimated value, calculated using some or all values that are estimates.
J	Estimated detected value. Either certain QC criteria were not met or the concentration is between the laboratory's detection and quantitation limits.
U	The analyte was analyzed for, but was not detected.

MPCA Screening Soil Leaching Values

CR6	Value represents the criteria for Chromium, hexavalent.
M	Value represents the criteria for mixed Xylenes.
MC	Mercury as Mercuric Chloride.
NA	Criterion value is not available for this analyte.
T	Value represents a criteria for the total carcinogenic PAHs as B(a)P.

MPCA Soil Reference Values

CR6	Value represents the criteria for Chromium, hexavalent.
M	Value represents the criteria for mixed Xylenes.
T	Value represents a criteria for the total carcinogenic PAHs as B(a)P.
T(BTV)	Value represents a criteria for the total carcinogenic PAHs as B(a)P; SRV set to the Background Threshold Value for BaP equivalent.

Figures

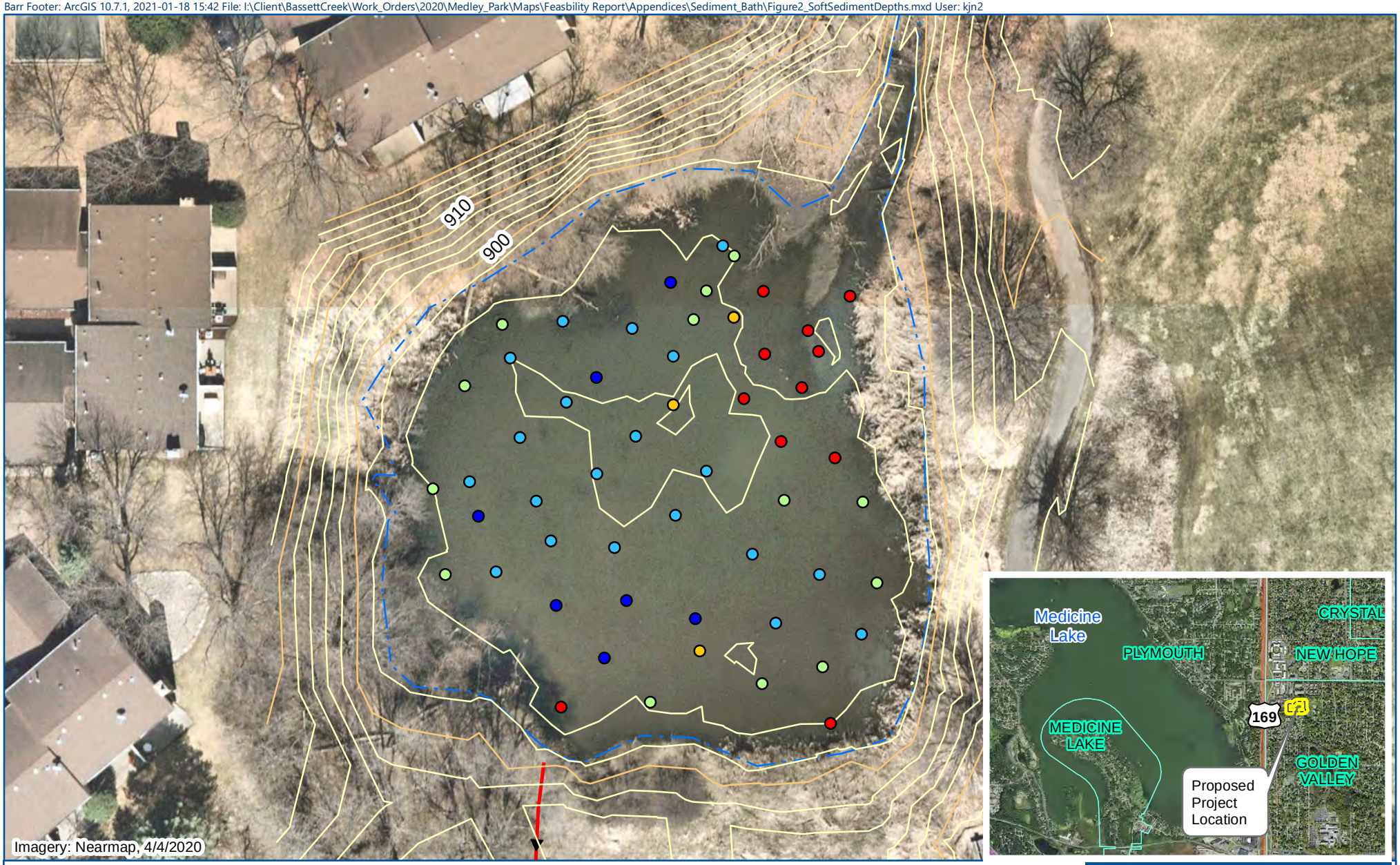
Barr Footer: ArcGIS 10.7.1, 2021-01-25 14:55 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Feasbility Report\Appendices\Sediment_Bath\Figure1_Contours_SedCoreLocations.mxd User: kjn2

BARR

MEDLEY PARK
Bathmetric Survey & Sediment Core Locations

FIGURE 1

Barr Footer: ArcGIS 10.7.1, 2021-01-18 15:42 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Feasbility Report\Appendices\Sediment_Bath\Figure2_SoftSedimentDepths.mxd User: kjn2



Soft Sediment Push Depth (ft)

- 0.5 - 1.5
- 1.5 - 2.5
- 2.5 - 3.5
- 3.5 - 4.0
- 4.0 - 5.0

- Major Contour 5ft
- Minor Contour 1ft
- Water Line
- Storm Pipe

*Soft sediment push depth estimated by pressing survey rod through soft sediment to stable, subsurface sediment.

N

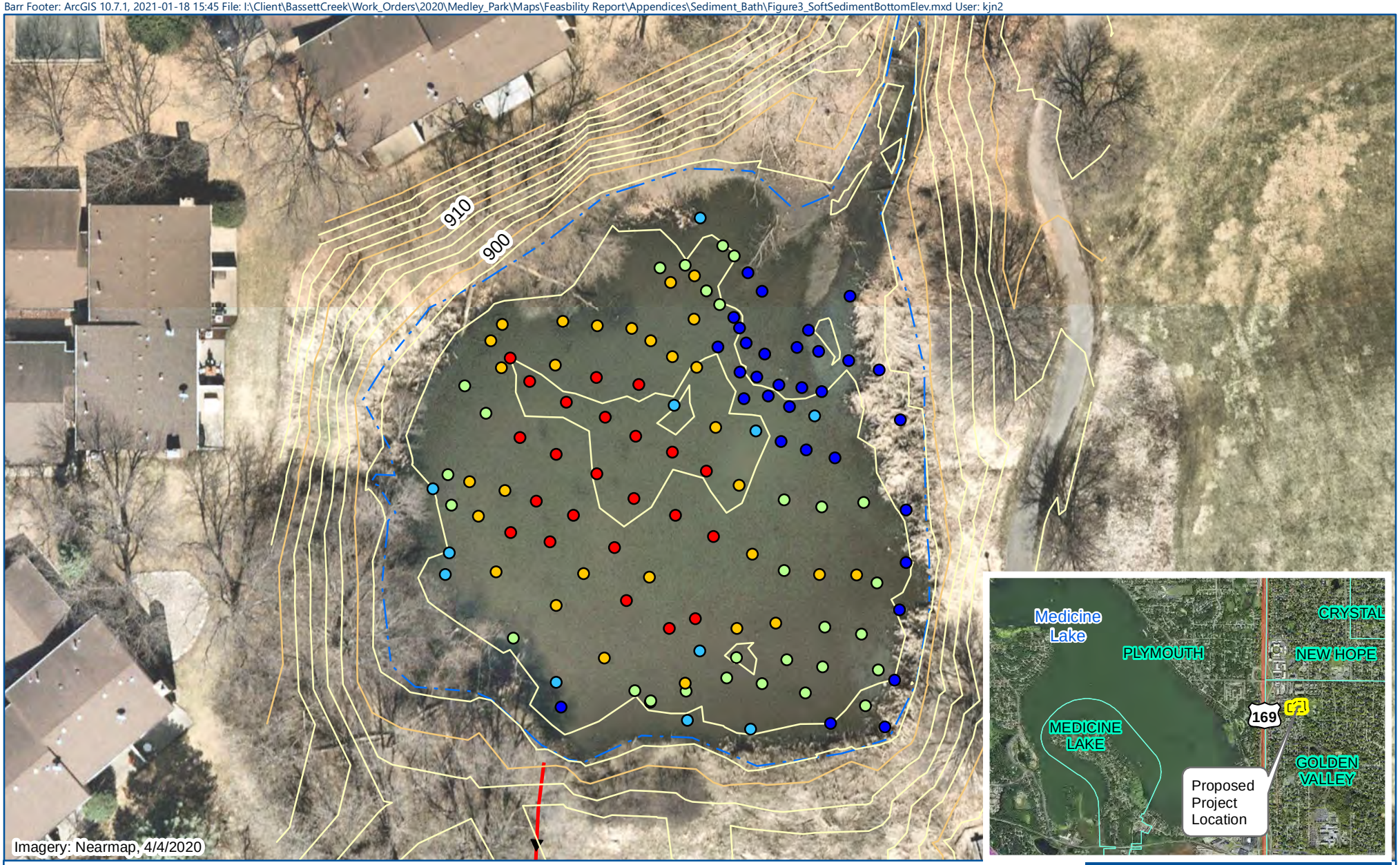
40 0 40

Feet

MEDLEY PARK
Soft Sediment Push Depths

FIGURE 2

Barr Footer: ArcGIS 10.7.1, 2021-01-18 15:45 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Feasbility Report\Appendices\Sediment_Bath\Figure3_SoftSedimentBottomElev.mxd User: kjn2



Soft Sediment Bottom Elev (NAVD88, ft)

- 892.8 - 893.5
- 893.5 - 894.0
- 894.0 - 895.0
- 895.0 - 896.0
- 896.0- 898.0

- Major Contour 5ft
- Minor Contour 1ft
- Water Line
- Storm Pipe

*Soft sediment bottom elevation estimated by pressing survey rod through soft sediment to stable, subsurface sediment.

N

40 0 40

Feet

MEDLEY PARK
Soft Sediment Bottom Elevations (NAVD88, feet)

FIGURE 3

Attachment A

Sediment Core Field Logs

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING DUP-01

Project: Medly Park
Project No.: 23270051.51
Location: Golden Valley, MN
Coordinates:
Datum: NAD83

Surface Elevation:
Drilling Method: Vibracore
Sampling Method: Vibracore
Completion Depth: 4.2 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0		1	**D/O/S:**None/ None/ None	OL-OH		ORGANIC SOIL (OL-OH): black and dark gray; moist; soft; organic silts with leaves and small roots, cohesive; non-plastic; no odor; no sheen; no discoloration.	
						Very fine grained sand leses at 1'-1.5'.	
2.5				PT		PEAT (PT): dark brown; moist; soft; organic peat, cohesive; non-plastic; no odor; no sheen; no discoloration; non-plastic plasticity.	
						End of boring 4.2 feet	
5.0							
7.5							
10.0							
12.5							
15.0							

Date Boring Started: 10/13/20
Date Boring Completed: 10/13/20
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig: John Boat Vibracore

Remarks: Duplicate core of SED-01. Pond water depth at sediment coring location was 0.6 feet.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING SED-01

Project: Medly Park
Project No.: 23270051.51
Location: Golden Valley, MN
Coordinates:
Datum: NAD83

Surface Elevation:
Drilling Method: Vibracore
Sampling Method: Vibracore
Completion Depth: 4.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0		1	**D/O/S:**None/ None/ None	OL-OH		ORGANIC SOIL (OL-OH): black and dark grey; wet; soft; organic silts with leaves and small roots, cohesive; non-plastic; no odor; no sheen; no discoloration.	
						Fine grained sand lenses.	
						Fine grained sand lenses.	
2.5				PT		PEAT (PT): dark brown; wet; soft; organic peat, soft, decayed, cohesive; non-plastic; no odor; no sheen; no discoloration.	
						End of boring 4.0 feet	
5.0							
7.5							
10.0							
12.5							
15.0							

Date Boring Started: 10/13/20
Date Boring Completed: 10/13/20
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig: John Boat Vibracore

Remarks: Pond water depth at sediment coring location was 0.6 feet.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING SED-02

Project: Medly Park
Project No.: 23270051.51
Location: Golden Valley, MN
Coordinates:
Datum: NAD83

Surface Elevation:
Drilling Method: Vibracore
Sampling Method: Vibracore
Completion Depth: 5.6 ft

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0				OL-OH		ORGANIC SOIL (OL-OH): Black and dark grey; wet; soft; organic silts with leaves and trace roots, trace very fine grained sand, cohesive; non-plastic; no odor; no sheen; no discoloration.	
2.5		1	**D/O/S:**None/ None/ None	PT		PEAT (PT): Dark brown; moist; soft; organic peats with tiny roots, trace black organic silts, cohesive; non-plastic; no odor; no sheen; no discoloration.	
5.0						End of boring 5.6 feet	
7.5							
10.0							
12.5							
15.0							

Date Boring Started: 10/13/20
Date Boring Completed: 10/13/20
Logged By: JWJ
Drilling Contractor: Barr
Drill Rig: John Boat Vibracore

Remarks: Pond water depth at sediment coring location was 1.0 feet.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

6.0 - 2.0

page 1 of 1

Sediment Core/Boring Log

BARR

CS: Cyre sampler
VC: vibracore
PC: push core

Proj#: _____ Project: _____ Core/Boring#: SED-01

Collection Date(s): 10-13-2020 GPS X: _____ Length of Push (feet): 4.0 Driller: _____ Drilling Method: VC

Ice Thickness (feet): — GPS Y: _____ Recovery (feet): 2.7 Crew: _____ Logged by: JWS

Water Depth (feet): 0.6 GPS Z: _____ % Recovery: _____ Observer: _____ Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	USCS Classification	Graphic Log	Description
0	1	0-2.7	W	Soft	No	Yes	Organic leafs & roots				OL/OH		0-2.6' = Black and dark gray organic silts w/ leafs and small roots. Vfg sand lenses @ 0.8, 1.7'
1	2												
2	2.7												2.6'-2.7' = Dark brown organic peat, soft decayed

Sampled 0'-2.7' @ 10:30

6.0 - 1.8 = 4.2

Sediment Core/Boring Log

CS: Cyre sampler
VC: vibracore
PC: push core

(@SED-01)

Proj#: 23270051.57 Project: Medley Park Pond
Collection Date(s): 10-13-2020 GPS X:
Ice Thickness (feet): — GPS Y:
Water Depth (feet): 0.6 GPS Z:
Length of Push (feet): 4.2 Driller: Barr
Recovery (feet): 2.9 Crew:
% Recovery: Observer:
Core/Boring#: DUP-01
Drilling Method: VC
Logged by: JWS
Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	USCS Classification	Graphic Log	Description
0			M	soft	N	Yes	leaves + roots	N	N	N	OL/OH		0-2.5 = Black and dark gray organic silts w/ leafs + roots (small) Sand vfg lenses @ 1'-1.5'
1	1	0'-2.9'	↓	↓	↓	↓		↓	↓	↓	↓		
2	2												2.5-2.9 = Dark brown organic Peat, soft
	2.9						No						
													Sampled 0'-2.9' No sample time for dup

8.0-2.4

BARR

Sediment Core/Boring Log

CS: Cyre sampler
VC: vibracore
PC: push core

Proj#: 23270051.51 Project: Medley Park Pond Core/Boring#: SED-02

Collection Date(s): 10-13-2020 GPS X: Length of Push (feet): 5.6 Driller: Barr Drilling Method: VC

Ice Thickness (feet): — GPS Y: Recovery (feet): 4.0 Crew: JWS/KDM Logged by: JWS

Water Depth (feet): 1.0 GPS Z: % Recovery: Observer: Checked by: KDM

Depth (ft.)		Sample Interval and number	Properties: Moisture	Density or Consistency	Plasticity	Cohesiveness	Particles	Odor	Staining	Sheen	USCS Classification	Graphic Log	Description
0			W	Soft	N	Yes	leafs	N	N	N	OL/OH		0'-2.5' = Black and Dark gray organic silts w/ leafs and fine roots trace vfg sand
1	1	0'-4'	M										
	2												2.5'-4.0' = Dark Brown organic fibrous peats w/ fine roots trace Black organic silts
2							No						
	3												
3													
	4												

Sampled 0'-4' @ 11:30

Attachment B

Photographs

Photograph #1: Medley Pond, northeast shoreline facing southwest.

Photograph #2: Medley Pond, sediment core SED-01.

Photograph #3: Medley Pond, sediment core SED-02.

Attachment C

Laboratory Analytical Data Report

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

October 23, 2020

Kevin Menken
Barr Engineering
4300 MarketPointe Drive
Suite 200
Minneapolis, MN 55435

RE: Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Dear Kevin Menken:

Enclosed are the analytical results for sample(s) received by the laboratory on October 13, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis
- Pace Analytical Services - Montana

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

Sincerely,

Amanda J Albrecht

Amanda Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: BarrDM, Barr Engineering Company
Data Management, Barr Engineering
Terri Olson, Barr Engineering Company
Accounts Payable, Barr Engineering

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

CERTIFICATIONS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Massachusetts DWP Certification #: via MN 027-053-137
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Certifcation #: via MN 027-053-137
Minnesota Petrofund Certification #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

Pace Analytical Services Montana

150 N. 9th Street, Billings, MT 59101
A2LA Certification: # 3590.01
EPA Region 8 Certification #: 8TMS-L
Idaho Certification #: MT00012
Minnesota Dept of Health Certification #: 030-999-442
Montana Certification #: MT CERT0040
North Dakota Dept. Of Health #: R-209
Washington Department of Ecology #: C993
Nevada Certificate # : MT00012

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10535359001	**SED-01**	Solid	10/13/20 10:30	10/13/20 16:00
10535359002	**SED-02**	Solid	10/13/20 11:30	10/13/20 16:00
10535359003	**DUP-01**	Solid	10/13/20 00:00	10/13/20 16:00
10535359004	**Tip Blank**	Solid	10/13/20 00:00	10/13/20 16:00

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10535359001	**SED-01**	WI MOD DRO	JVM	2	PASI-M
		WI MOD GRO	NS1	2	PASI-M
		EPA 6010D	DCF	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	CH3	27	PASI-M
		EPA 8260D	MAM	8	PASI-MT
10535359002	**SED-02**	WI MOD DRO	JVM	2	PASI-M
		WI MOD GRO	NS1	2	PASI-M
		EPA 6010D	DCF	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	CH3	27	PASI-M
		EPA 8260D	MAM	8	PASI-MT
10535359003	**DUP-01**	WI MOD DRO	JVM	2	PASI-M
		WI MOD GRO	NS1	2	PASI-M
		EPA 6010D	DCF	8	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	CH3	27	PASI-M
		EPA 8260D	MAM	8	PASI-MT
10535359004	**Tip Blank**	WI MOD GRO	NS1	2	PASI-M
		EPA 8260D	MAM	8	PASI-MT

PASI-M = Pace Analytical Services - Minneapolis
PASI-MT = Pace Analytical Services - Montana

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Sample: SED-01 **Lab ID: 10535359001** Collected: 10/13/20 10:30 Received: 10/13/20 16:00 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
WIDRO GCS Silica Gel	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO Pace Analytical Services - Minneapolis								
WDRO C10-C28	**129**	mg/kg	11.3	3.0	1	10/15/20 14:48	10/17/20 20:49		T6
Surrogates									
n-Triacontane (S)	56	%.	30-150		1	10/15/20 14:48	10/17/20 20:49	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil Pace Analytical Services - Minneapolis								
Gasoline Range Organics	**<5.0**	mg/kg	17.5	5.0	1	10/14/20 11:00	10/15/20 00:59		
Surrogates									
a,a,a-Trifluorotoluene (S)	98	%.	80-150		1	10/14/20 11:00	10/15/20 00:59	98-08-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**3.6**	mg/kg	1.7	0.34	1	10/15/20 16:13	10/16/20 12:21	7440-38-2	
Barium	**94.2**	mg/kg	0.83	0.13	1	10/15/20 16:13	10/16/20 12:21	7440-39-3	
Cadmium	**0.48**	mg/kg	0.25	0.050	1	10/15/20 16:13	10/16/20 12:21	7440-43-9	
Chromium	**20.8**	mg/kg	0.83	0.17	1	10/15/20 16:13	10/16/20 12:21	7440-47-3	
Copper	**29.6**	mg/kg	0.83	0.23	1	10/15/20 16:13	10/16/20 12:21	7440-50-8	
Lead	**54.8**	mg/kg	0.83	0.19	1	10/15/20 16:13	10/16/20 12:21	7439-92-1	
Selenium	**<0.54**	mg/kg	1.7	0.54	1	10/15/20 16:13	10/16/20 12:21	7782-49-2	
Silver	**<0.060**	mg/kg	0.83	0.060	1	10/15/20 16:13	10/16/20 12:21	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.050**	mg/kg	0.031	0.013	1	10/15/20 16:31	10/15/20 18:16	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**42.0**	%	0.10	0.10	1		10/21/20 11:19		N2
8270E MSSV CPAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
2-Methylnaphthalene	**22.0J**	ug/kg	172	15.7	10	10/14/20 13:07	10/15/20 22:07	91-57-6	
3-Methylcholanthrene	**38.0J**	ug/kg	172	19.2	10	10/14/20 13:07	10/15/20 22:07	56-49-5	
5-Methylchrysene	**206**	ug/kg	172	11.9	10	10/14/20 13:07	10/15/20 22:07	3697-24-3	M6
7,12-Dimethylbenz(a)anthracene	**<62.9**	ug/kg	172	62.9	10	10/14/20 13:07	10/15/20 22:07	57-97-6	M6
7H-Dibenzo(c,g)carbazole	**<22.5**	ug/kg	172	22.5	10	10/14/20 13:07	10/15/20 22:07	194-59-2	
Acenaphthene	**130J**	ug/kg	172	54.0	10	10/14/20 13:07	10/15/20 22:07	83-32-9	
Acenaphthylene	**69.1J**	ug/kg	172	44.5	10	10/14/20 13:07	10/15/20 22:07	208-96-8	
Anthracene	**370**	ug/kg	172	27.7	10	10/14/20 13:07	10/15/20 22:07	120-12-7	
Benzo(a)anthracene	**1270**	ug/kg	172	19.9	10	10/14/20 13:07	10/15/20 22:07	56-55-3	
Benzo(a)pyrene	**1410**	ug/kg	172	15.5	10	10/14/20 13:07	10/15/20 22:07	50-32-8	M6
Benzo(g,h,i)perylene	**139J**	ug/kg	172	22.3	10	10/14/20 13:07	10/15/20 22:07	191-24-2	M6
Benzofluoranthenes (Total)	**3380**	ug/kg	515	41.8	10	10/14/20 13:07	10/15/20 22:07		N2
Chrysene	**1910**	ug/kg	172	24.4	10	10/14/20 13:07	10/15/20 22:07	218-01-9	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Sample: SED-01 **Lab ID: 10535359001** Collected: 10/13/20 10:30 Received: 10/13/20 16:00 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
8270E MSSV CPAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Dibenz(a,h)acridine	**<10.6**	ug/kg	172	10.6	10	10/14/20 13:07	10/15/20 22:07	226-36-8	
Dibenz(a,h)anthracene	**263**	ug/kg	172	20.6	10	10/14/20 13:07	10/15/20 22:07	53-70-3	
Dibenzo(a,e)pyrene	**346**	ug/kg	172	22.0	10	10/14/20 13:07	10/15/20 22:07	192-65-4	M6
Dibenzo(a,h)pyrene	**142J**	ug/kg	172	12.4	10	10/14/20 13:07	10/15/20 22:07	189-64-0	M6
Dibenzo(a,i)pyrene	**36.6J**	ug/kg	172	17.5	10	10/14/20 13:07	10/15/20 22:07	189-55-9	M6
Dibenzo(a,l)pyrene	**<39.5**	ug/kg	172	39.5	10	10/14/20 13:07	10/15/20 22:07	191-30-0	M6
Fluoranthene	**4060**	ug/kg	172	34.9	10	10/14/20 13:07	10/15/20 22:07	206-44-0	
Fluorene	**195**	ug/kg	172	36.1	10	10/14/20 13:07	10/15/20 22:07	86-73-7	
Indeno(1,2,3-cd)pyrene	**806**	ug/kg	172	18.9	10	10/14/20 13:07	10/15/20 22:07	193-39-5	M6
Naphthalene	**<50.9**	ug/kg	172	50.9	10	10/14/20 13:07	10/15/20 22:07	91-20-3	
Phenanthrene	**2280**	ug/kg	172	29.0	10	10/14/20 13:07	10/15/20 22:07	85-01-8	M6
Pyrene	**2920**	ug/kg	172	20.4	10	10/14/20 13:07	10/15/20 22:07	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	67	%.	42-125		10	10/14/20 13:07	10/15/20 22:07	321-60-8	D3
p-Terphenyl-d14 (S)	64	%.	46-125		10	10/14/20 13:07	10/15/20 22:07	1718-51-0	
8260D MSV UST	Analytical Method: EPA 8260D Preparation Method: EPA 5035/5030B Pace Analytical Services - Montana								
Benzene	**<38.8**	ug/kg	77.6	38.8	1	10/20/20 12:33	10/20/20 18:24	71-43-2	
Ethylbenzene	**<38.8**	ug/kg	77.6	38.8	1	10/20/20 12:33	10/20/20 18:24	100-41-4	
Toluene	**<38.8**	ug/kg	77.6	38.8	1	10/20/20 12:33	10/20/20 18:24	108-88-3	
Xylene (Total)	**<116**	ug/kg	233	116	1	10/20/20 12:33	10/20/20 18:24	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	93	%.	75-125		1	10/20/20 12:33	10/20/20 18:24	1868-53-7	
1,2-Dichloroethane-d4 (S)	94	%.	75-125		1	10/20/20 12:33	10/20/20 18:24	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1	10/20/20 12:33	10/20/20 18:24	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1	10/20/20 12:33	10/20/20 18:24	460-00-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Sample: SED-02 **Lab ID: 10535359002** Collected: 10/13/20 11:30 Received: 10/13/20 16:00 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
WIDRO GCS Silica Gel	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO Pace Analytical Services - Minneapolis								
WDRO C10-C28	**89.6**	mg/kg	13.6	3.6	1	10/15/20 14:48	10/17/20 20:42		T6
Surrogates									
n-Triacontane (S)	80	%.	30-150		1	10/15/20 14:48	10/17/20 20:42	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil Pace Analytical Services - Minneapolis								
Gasoline Range Organics	**<6.9**	mg/kg	24.2	6.9	1	10/14/20 11:00	10/15/20 01:27		
Surrogates									
a,a,a-Trifluorotoluene (S)	102	%.	80-150		1	10/14/20 11:00	10/15/20 01:27	98-08-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**6.1**	mg/kg	2.3	0.47	1	10/15/20 16:13	10/16/20 12:26	7440-38-2	
Barium	**131**	mg/kg	1.1	0.18	1	10/15/20 16:13	10/16/20 12:26	7440-39-3	
Cadmium	**0.62**	mg/kg	0.34	0.068	1	10/15/20 16:13	10/16/20 12:26	7440-43-9	
Chromium	**23.9**	mg/kg	1.1	0.23	1	10/15/20 16:13	10/16/20 12:26	7440-47-3	
Copper	**42.3**	mg/kg	1.1	0.32	1	10/15/20 16:13	10/16/20 12:26	7440-50-8	
Lead	**59.0**	mg/kg	1.1	0.26	1	10/15/20 16:13	10/16/20 12:26	7439-92-1	
Selenium	**<0.75**	mg/kg	2.3	0.75	1	10/15/20 16:13	10/16/20 12:26	7782-49-2	
Silver	**<0.083**	mg/kg	1.1	0.083	1	10/15/20 16:13	10/16/20 12:26	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.080**	mg/kg	0.043	0.018	1	10/15/20 16:31	10/15/20 18:18	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**58.9**	%	0.10	0.10	1		10/21/20 11:20		N2
8270E MSSV CPAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
2-Methylnaphthalene	**90.4J**	ug/kg	243	22.2	10	10/14/20 13:07	10/15/20 23:28	91-57-6	
3-Methylcholanthrene	**60.8J**	ug/kg	243	27.2	10	10/14/20 13:07	10/15/20 23:28	56-49-5	
5-Methylchrysene	**209J**	ug/kg	243	16.8	10	10/14/20 13:07	10/15/20 23:28	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<89.0**	ug/kg	243	89.0	10	10/14/20 13:07	10/15/20 23:28	57-97-6	
7H-Dibenzo(c,g)carbazole	**<31.9**	ug/kg	243	31.9	10	10/14/20 13:07	10/15/20 23:28	194-59-2	
Acenaphthene	**431**	ug/kg	243	76.3	10	10/14/20 13:07	10/15/20 23:28	83-32-9	
Acenaphthylene	**73.2J**	ug/kg	243	63.0	10	10/14/20 13:07	10/15/20 23:28	208-96-8	
Anthracene	**796**	ug/kg	243	39.1	10	10/14/20 13:07	10/15/20 23:28	120-12-7	
Benzo(a)anthracene	**1980**	ug/kg	243	28.2	10	10/14/20 13:07	10/15/20 23:28	56-55-3	
Benzo(a)pyrene	**1980**	ug/kg	243	22.0	10	10/14/20 13:07	10/15/20 23:28	50-32-8	
Benzo(g,h,i)perylene	**165J**	ug/kg	243	31.6	10	10/14/20 13:07	10/15/20 23:28	191-24-2	
Benzofluoranthenes (Total)	**4780**	ug/kg	729	59.1	10	10/14/20 13:07	10/15/20 23:28		N2
Chrysene	**2840**	ug/kg	243	34.5	10	10/14/20 13:07	10/15/20 23:28	218-01-9	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Sample: SED-02 **Lab ID: 10535359002** Collected: 10/13/20 11:30 Received: 10/13/20 16:00 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
8270E MSSV CPAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Dibenz(a,h)acridine	**84.8J**	ug/kg	243	15.1	10	10/14/20 13:07	10/15/20 23:28	226-36-8	
Dibenz(a,h)anthracene	**338**	ug/kg	243	29.2	10	10/14/20 13:07	10/15/20 23:28	53-70-3	
Dibenzo(a,e)pyrene	**383**	ug/kg	243	31.1	10	10/14/20 13:07	10/15/20 23:28	192-65-4	
Dibenzo(a,h)pyrene	**170J**	ug/kg	243	17.6	10	10/14/20 13:07	10/15/20 23:28	189-64-0	
Dibenzo(a,i)pyrene	**36.1J**	ug/kg	243	24.8	10	10/14/20 13:07	10/15/20 23:28	189-55-9	
Dibenzo(a,l)pyrene	**<55.9**	ug/kg	243	55.9	10	10/14/20 13:07	10/15/20 23:28	191-30-0	
Fluoranthene	**6650**	ug/kg	243	49.4	10	10/14/20 13:07	10/15/20 23:28	206-44-0	
Fluorene	**490**	ug/kg	243	51.1	10	10/14/20 13:07	10/15/20 23:28	86-73-7	
Indeno(1,2,3-cd)pyrene	**972**	ug/kg	243	26.7	10	10/14/20 13:07	10/15/20 23:28	193-39-5	
Naphthalene	**292**	ug/kg	243	72.0	10	10/14/20 13:07	10/15/20 23:28	91-20-3	
Phenanthrene	**4920**	ug/kg	243	41.1	10	10/14/20 13:07	10/15/20 23:28	85-01-8	
Pyrene	**4640**	ug/kg	243	28.9	10	10/14/20 13:07	10/15/20 23:28	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	65	%.	42-125		10	10/14/20 13:07	10/15/20 23:28	321-60-8	D3
p-Terphenyl-d14 (S)	60	%.	46-125		10	10/14/20 13:07	10/15/20 23:28	1718-51-0	
8260D MSV UST	Analytical Method: EPA 8260D Preparation Method: EPA 5035/5030B Pace Analytical Services - Montana								
Benzene	**<55.6**	ug/kg	111	55.6	1	10/20/20 12:33	10/20/20 18:44	71-43-2	
Ethylbenzene	**<55.6**	ug/kg	111	55.6	1	10/20/20 12:33	10/20/20 18:44	100-41-4	
Toluene	**<55.6**	ug/kg	111	55.6	1	10/20/20 12:33	10/20/20 18:44	108-88-3	
Xylene (Total)	**<167**	ug/kg	334	167	1	10/20/20 12:33	10/20/20 18:44	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	91	%.	75-125		1	10/20/20 12:33	10/20/20 18:44	1868-53-7	
1,2-Dichloroethane-d4 (S)	90	%.	75-125		1	10/20/20 12:33	10/20/20 18:44	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1	10/20/20 12:33	10/20/20 18:44	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	75-125		1	10/20/20 12:33	10/20/20 18:44	460-00-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Sample: DUP-01 **Lab ID: 10535359003** Collected: 10/13/20 00:00 Received: 10/13/20 16:00 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
WIDRO GCS Silica Gel	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO Pace Analytical Services - Minneapolis								
WDRO C10-C28	**79.4**	mg/kg	12.3	3.3	1	10/15/20 14:48	10/17/20 20:56		T6
Surrogates									
n-Triacontane (S)	75	%.	30-150		1	10/15/20 14:48	10/17/20 20:56	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil Pace Analytical Services - Minneapolis								
Gasoline Range Organics	**<5.3**	mg/kg	18.7	5.3	1	10/14/20 11:00	10/15/20 01:54		
Surrogates									
a,a,a-Trifluorotoluene (S)	101	%.	80-150		1	10/14/20 11:00	10/15/20 01:54	98-08-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis								
Arsenic	**3.9**	mg/kg	1.7	0.35	1	10/15/20 16:13	10/16/20 12:27	7440-38-2	
Barium	**97.8**	mg/kg	0.86	0.14	1	10/15/20 16:13	10/16/20 12:27	7440-39-3	
Cadmium	**0.54**	mg/kg	0.26	0.052	1	10/15/20 16:13	10/16/20 12:27	7440-43-9	
Chromium	**20.3**	mg/kg	0.86	0.17	1	10/15/20 16:13	10/16/20 12:27	7440-47-3	
Copper	**28.2**	mg/kg	0.86	0.24	1	10/15/20 16:13	10/16/20 12:27	7440-50-8	
Lead	**48.7**	mg/kg	0.86	0.19	1	10/15/20 16:13	10/16/20 12:27	7439-92-1	
Selenium	**<0.56**	mg/kg	1.7	0.56	1	10/15/20 16:13	10/16/20 12:27	7782-49-2	
Silver	**<0.063**	mg/kg	0.86	0.063	1	10/15/20 16:13	10/16/20 12:27	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.053**	mg/kg	0.036	0.015	1	10/15/20 16:31	10/15/20 18:23	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**45.7**	%	0.10	0.10	1		10/21/20 11:20		N2
8270E MSSV CPAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
2-Methylnaphthalene	**21.5J**	ug/kg	184	16.8	10	10/14/20 13:07	10/15/20 23:55	91-57-6	
3-Methylcholanthrene	**36.5J**	ug/kg	184	20.6	10	10/14/20 13:07	10/15/20 23:55	56-49-5	
5-Methylchrysene	**204**	ug/kg	184	12.7	10	10/14/20 13:07	10/15/20 23:55	3697-24-3	
7,12-Dimethylbenz(a)anthracene	**<67.3**	ug/kg	184	67.3	10	10/14/20 13:07	10/15/20 23:55	57-97-6	
7H-Dibenzo(c,g)carbazole	**<24.1**	ug/kg	184	24.1	10	10/14/20 13:07	10/15/20 23:55	194-59-2	
Acenaphthene	**122J**	ug/kg	184	57.8	10	10/14/20 13:07	10/15/20 23:55	83-32-9	
Acenaphthylene	**81.5J**	ug/kg	184	47.7	10	10/14/20 13:07	10/15/20 23:55	208-96-8	
Anthracene	**373**	ug/kg	184	29.6	10	10/14/20 13:07	10/15/20 23:55	120-12-7	
Benzo(a)anthracene	**1240**	ug/kg	184	21.3	10	10/14/20 13:07	10/15/20 23:55	56-55-3	
Benzo(a)pyrene	**1380**	ug/kg	184	16.6	10	10/14/20 13:07	10/15/20 23:55	50-32-8	
Benzo(g,h,i)perylene	**118J**	ug/kg	184	23.9	10	10/14/20 13:07	10/15/20 23:55	191-24-2	
Benzofluoranthenes (Total)	**3430**	ug/kg	552	44.7	10	10/14/20 13:07	10/15/20 23:55		N2
Chrysene	**1880**	ug/kg	184	26.1	10	10/14/20 13:07	10/15/20 23:55	218-01-9	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Sample: DUP-01 **Lab ID: 10535359003** Collected: 10/13/20 00:00 Received: 10/13/20 16:00 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
8270E MSSV CPAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Dibenz(a,h)acridine	**<11.4**	ug/kg	184	11.4	10	10/14/20 13:07	10/15/20 23:55	226-36-8	
Dibenz(a,h)anthracene	**234**	ug/kg	184	22.1	10	10/14/20 13:07	10/15/20 23:55	53-70-3	
Dibenzo(a,e)pyrene	**281**	ug/kg	184	23.6	10	10/14/20 13:07	10/15/20 23:55	192-65-4	
Dibenzo(a,h)pyrene	**123J**	ug/kg	184	13.3	10	10/14/20 13:07	10/15/20 23:55	189-64-0	
Dibenzo(a,i)pyrene	**27.8J**	ug/kg	184	18.8	10	10/14/20 13:07	10/15/20 23:55	189-55-9	
Dibenzo(a,l)pyrene	**<42.3**	ug/kg	184	42.3	10	10/14/20 13:07	10/15/20 23:55	191-30-0	
Fluoranthene	**4110**	ug/kg	184	37.4	10	10/14/20 13:07	10/15/20 23:55	206-44-0	
Fluorene	**185**	ug/kg	184	38.6	10	10/14/20 13:07	10/15/20 23:55	86-73-7	
Indeno(1,2,3-cd)pyrene	**686**	ug/kg	184	20.2	10	10/14/20 13:07	10/15/20 23:55	193-39-5	
Naphthalene	**<54.5**	ug/kg	184	54.5	10	10/14/20 13:07	10/15/20 23:55	91-20-3	
Phenanthrene	**2210**	ug/kg	184	31.1	10	10/14/20 13:07	10/15/20 23:55	85-01-8	
Pyrene	**2860**	ug/kg	184	21.9	10	10/14/20 13:07	10/15/20 23:55	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	72	%.	42-125		10	10/14/20 13:07	10/15/20 23:55	321-60-8	D3
p-Terphenyl-d14 (S)	67	%.	46-125		10	10/14/20 13:07	10/15/20 23:55	1718-51-0	
8260D MSV UST	Analytical Method: EPA 8260D Preparation Method: EPA 5035/5030B Pace Analytical Services - Montana								
Benzene	**<43.6**	ug/kg	87.2	43.6	1	10/20/20 12:33	10/20/20 19:05	71-43-2	
Ethylbenzene	**<43.6**	ug/kg	87.2	43.6	1	10/20/20 12:33	10/20/20 19:05	100-41-4	
Toluene	**<43.6**	ug/kg	87.2	43.6	1	10/20/20 12:33	10/20/20 19:05	108-88-3	
Xylene (Total)	**<131**	ug/kg	262	131	1	10/20/20 12:33	10/20/20 19:05	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	91	%.	75-125		1	10/20/20 12:33	10/20/20 19:05	1868-53-7	
1,2-Dichloroethane-d4 (S)	92	%.	75-125		1	10/20/20 12:33	10/20/20 19:05	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1	10/20/20 12:33	10/20/20 19:05	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1	10/20/20 12:33	10/20/20 19:05	460-00-4	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Sample: Tip Blank **Lab ID: 10535359004** Collected: 10/13/20 00:00 Received: 10/13/20 16:00 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil Pace Analytical Services - Minneapolis								
Gasoline Range Organics	**<2.8**	mg/kg	10.0	2.8	1	10/19/20 10:41	10/20/20 02:38		
Surrogates									
a,a,a-Trifluorotoluene (S)	98	%.	80-150		1	10/19/20 10:41	10/20/20 02:38	98-08-8	
8260D MSV UST	Analytical Method: EPA 8260D Preparation Method: EPA 5035/5030B Pace Analytical Services - Montana								
Benzene	**<25.0**	ug/kg	50.0	25.0	1	10/20/20 12:33	10/20/20 15:20	71-43-2	
Ethylbenzene	**<25.0**	ug/kg	50.0	25.0	1	10/20/20 12:33	10/20/20 15:20	100-41-4	
Toluene	**<25.0**	ug/kg	50.0	25.0	1	10/20/20 12:33	10/20/20 15:20	108-88-3	
Xylene (Total)	**<75.0**	ug/kg	150	75.0	1	10/20/20 12:33	10/20/20 15:20	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	92	%.	75-125		1	10/20/20 12:33	10/20/20 15:20	1868-53-7	
1,2-Dichloroethane-d4 (S)	89	%.	75-125		1	10/20/20 12:33	10/20/20 15:20	17060-07-0	
Toluene-d8 (S)	103	%.	75-125		1	10/20/20 12:33	10/20/20 15:20	2037-26-5	
4-Bromofluorobenzene (S)	96	%.	75-125		1	10/20/20 12:33	10/20/20 15:20	460-00-4	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 704364
QC Batch Method: EPA 5030 Medium Soil
Analysis Method: WI MOD GRO
Analysis Description: WIGRO Solid GCV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10535359001, 10535359002, 10535359003

METHOD BLANK: 3763027 Matrix: Solid
Associated Lab Samples: 10535359001, 10535359002, 10535359003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	<2.8	10.0	2.8	10/14/20 13:55	
a,a,a-Trifluorotoluene (S)	%.	91	80-150		10/14/20 13:55	

LABORATORY CONTROL SAMPLE & LCSD: 3763028 3763029

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	50	41.7	49.2	83	98	80-120	17	20	
a,a,a-Trifluorotoluene (S)	%.				105	107	80-150			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3763110 3763111

Parameter	Units	10535347001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Gasoline Range Organics	mg/kg	ND	54.1	54.1	54.6	50.2	101	93	80-120	9	20	G+
a,a,a-Trifluorotoluene (S)	%.						100	92	80-150			

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: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 705230
QC Batch Method: EPA 5030 Medium Soil
Analysis Method: WI MOD GRO
Analysis Description: WIGRO Solid GCV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10535359004

METHOD BLANK: 3768022 Matrix: Solid
Associated Lab Samples: 10535359004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	<2.8	10.0	2.8	10/19/20 15:19	
a,a,a-Trifluorotoluene (S)	%.	98	80-150		10/19/20 15:19	

LABORATORY CONTROL SAMPLE & LCSD: 3768023 3768024

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	50	48.4	50.9	97	102	80-120	5	20	
a,a,a-Trifluorotoluene (S)	%.				98	98	80-150			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3768135 3768136

Parameter	Units	10535689002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Gasoline Range Organics	mg/kg	ND	60.1	60.1	65.8	60.7	109	100	80-120	8	20	
a,a,a-Trifluorotoluene (S)	%.						98	99	80-150			

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 704597
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10535359001, 10535359002, 10535359003

METHOD BLANK: 3764269 Matrix: Solid
Associated Lab Samples: 10535359001, 10535359002, 10535359003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0078	0.019	0.0078	10/15/20 17:50	

LABORATORY CONTROL SAMPLE: 3764270

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.47	0.47	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3764271 3764272

Parameter	Units	10534433003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.87	0.96	1	2.0	2.2	114	127	80-120	10	20	E,M1

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REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 704596
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10535359001, 10535359002, 10535359003

METHOD BLANK: 3764265 Matrix: Solid
Associated Lab Samples: 10535359001, 10535359002, 10535359003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.20	0.95	0.20	10/16/20 11:51	
Barium	mg/kg	<0.075	0.48	0.075	10/16/20 11:51	
Cadmium	mg/kg	<0.029	0.14	0.029	10/16/20 11:51	
Chromium	mg/kg	<0.095	0.48	0.095	10/16/20 11:51	
Copper	mg/kg	<0.13	0.48	0.13	10/16/20 11:51	
Lead	mg/kg	<0.11	0.48	0.11	10/16/20 11:51	
Selenium	mg/kg	<0.31	0.95	0.31	10/16/20 11:51	
Silver	mg/kg	<0.035	0.48	0.035	10/16/20 11:51	

LABORATORY CONTROL SAMPLE: 3764266

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	46.7	45.3	97	80-120	
Barium	mg/kg	46.7	48.6	104	80-120	
Cadmium	mg/kg	46.7	49.5	106	80-120	
Chromium	mg/kg	46.7	49.2	105	80-120	
Copper	mg/kg	46.7	47.6	102	80-120	
Lead	mg/kg	46.7	48.8	104	80-120	
Selenium	mg/kg	46.7	45.2	97	80-120	
Silver	mg/kg	23.4	23.4	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3764267 3764268

Parameter	Units	10534433003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	5.4	101	105	92.5	98.0	86	88	75-125	6	20	
Barium	mg/kg	146	101	105	241	255	94	104	75-125	6	20	
Cadmium	mg/kg	0.60	101	105	92.4	97.3	91	92	75-125	5	20	
Chromium	mg/kg	19.0	101	105	115	123	95	99	75-125	7	20	
Copper	mg/kg	25.7	101	105	117	126	90	95	75-125	7	20	
Lead	mg/kg	28.1	101	105	112	160	83	125	75-125	35	20	R1
Selenium	mg/kg	ND	101	105	91.1	97.3	89	91	75-125	7	20	
Silver	mg/kg	ND	50.6	52.7	45.2	48.4	89	92	75-125	7	20	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 705751
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10535359001, 10535359002, 10535359003

SAMPLE DUPLICATE: 3770546

Parameter	Units	10535900020 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.8	12.3	4	30	N2

SAMPLE DUPLICATE: 3770716

Parameter	Units	10535359003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	45.7	46.0	1	30	N2

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
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(612)607-1700

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 705578
QC Batch Method: EPA 5035/5030B
Analysis Method: EPA 8260D
Analysis Description: 8260D MSV UST
Laboratory: Pace Analytical Services - Montana
Associated Lab Samples: 10535359001, 10535359002, 10535359003, 10535359004

METHOD BLANK: 3769696 Matrix: Solid
Associated Lab Samples: 10535359001, 10535359002, 10535359003, 10535359004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Benzene	ug/kg	<24.9	49.7	24.9	10/20/20 13:39	
Ethylbenzene	ug/kg	<24.9	49.7	24.9	10/20/20 13:39	
Toluene	ug/kg	<24.9	49.7	24.9	10/20/20 13:39	
Xylene (Total)	ug/kg	<74.6	149	74.6	10/20/20 13:39	
1,2-Dichloroethane-d4 (S)	%.	92	75-125		10/20/20 13:39	
4-Bromofluorobenzene (S)	%.	97	75-125		10/20/20 13:39	
Dibromofluoromethane (S)	%.	90	75-125		10/20/20 13:39	
Toluene-d8 (S)	%.	101	75-125		10/20/20 13:39	

LABORATORY CONTROL SAMPLE: 3769697

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	926	692	75	61-127	
Ethylbenzene	ug/kg	926	784	85	69-125	
Toluene	ug/kg	926	785	85	69-125	
Xylene (Total)	ug/kg	2780	2410	87	71-125	
1,2-Dichloroethane-d4 (S)	%.			85	75-125	
4-Bromofluorobenzene (S)	%.			100	75-125	
Dibromofluoromethane (S)	%.			90	75-125	
Toluene-d8 (S)	%.			96	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3769698 3769699

Parameter	Units	10535359001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/kg	<38.8	1640	1640	1200	1170	73	72	41-137	2	30	
Ethylbenzene	ug/kg	<38.8	1640	1640	1340	1320	82	80	30-150	2	30	
Toluene	ug/kg	<38.8	1640	1640	1370	1340	84	82	38-141	2	30	
Xylene (Total)	ug/kg	<116	4910	4910	4080	4160	83	85	30-150	2	30	
1,2-Dichloroethane-d4 (S)	%.						85	92	75-125			
4-Bromofluorobenzene (S)	%.						99	97	75-125			
Dibromofluoromethane (S)	%.						90	90	75-125			
Toluene-d8 (S)	%.						101	100	75-125			

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 704319
QC Batch Method: EPA 3550C
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E CPAH by SIM MSSV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10535359001, 10535359002, 10535359003

METHOD BLANK: 3762883 Matrix: Solid
Associated Lab Samples: 10535359001, 10535359002, 10535359003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2-Methylnaphthalene	ug/kg	<0.91	10.0	0.91	10/15/20 20:19	
3-Methylcholanthrene	ug/kg	<1.1	10.0	1.1	10/15/20 20:19	
5-Methylchrysene	ug/kg	<0.69	10.0	0.69	10/15/20 20:19	
7,12-Dimethylbenz(a)anthracene	ug/kg	<3.7	10.0	3.7	10/15/20 20:19	
7H-Dibenzo(c,g)carbazole	ug/kg	<1.3	10.0	1.3	10/15/20 20:19	
Acenaphthene	ug/kg	<3.1	10.0	3.1	10/15/20 20:19	
Acenaphthylene	ug/kg	<2.6	10.0	2.6	10/15/20 20:19	
Anthracene	ug/kg	<1.6	10.0	1.6	10/15/20 20:19	
Benzo(a)anthracene	ug/kg	<1.2	10.0	1.2	10/15/20 20:19	
Benzo(a)pyrene	ug/kg	<0.90	10.0	0.90	10/15/20 20:19	
Benzo(g,h,i)perylene	ug/kg	<1.3	10.0	1.3	10/15/20 20:19	
Benzofluoranthenes (Total)	ug/kg	<2.4	30.0	2.4	10/15/20 20:19	N2
Chrysene	ug/kg	<1.4	10.0	1.4	10/15/20 20:19	
Dibenz(a,h)acridine	ug/kg	<0.62	10.0	0.62	10/15/20 20:19	
Dibenz(a,h)anthracene	ug/kg	<1.2	10.0	1.2	10/15/20 20:19	
Dibenzo(a,e)pyrene	ug/kg	<1.3	10.0	1.3	10/15/20 20:19	
Dibenzo(a,h)pyrene	ug/kg	<0.72	10.0	0.72	10/15/20 20:19	
Dibenzo(a,i)pyrene	ug/kg	<1.0	10.0	1.0	10/15/20 20:19	
Dibenzo(a,l)pyrene	ug/kg	<2.3	10.0	2.3	10/15/20 20:19	
Fluoranthene	ug/kg	<2.0	10.0	2.0	10/15/20 20:19	
Fluorene	ug/kg	<2.1	10.0	2.1	10/15/20 20:19	
Indeno(1,2,3-cd)pyrene	ug/kg	<1.1	10.0	1.1	10/15/20 20:19	
Naphthalene	ug/kg	<3.0	10.0	3.0	10/15/20 20:19	
Phenanthrene	ug/kg	<1.7	10.0	1.7	10/15/20 20:19	
Pyrene	ug/kg	<1.2	10.0	1.2	10/15/20 20:19	
2-Fluorobiphenyl (S)	%.	76	42-125		10/15/20 20:19	
p-Terphenyl-d14 (S)	%.	81	46-125		10/15/20 20:19	

LABORATORY CONTROL SAMPLE: 3762884

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/kg	100	71.1	71	39-125	
3-Methylcholanthrene	ug/kg	100	72.4	72	31-125	
5-Methylchrysene	ug/kg	100	90.6	91	63-125	
7,12-Dimethylbenz(a)anthracene	ug/kg	100	69.7	70	30-125	
7H-Dibenzo(c,g)carbazole	ug/kg	100	89.4	89	59-125	
Acenaphthene	ug/kg	100	77.6	78	46-125	
Acenaphthylene	ug/kg	100	76.4	76	42-125	
Anthracene	ug/kg	100	83.3	83	56-125	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

LABORATORY CONTROL SAMPLE: 3762884

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzo(a)anthracene	ug/kg	100	82.4	82	61-125	
Benzo(a)pyrene	ug/kg	100	81.2	81	60-125	
Benzo(g,h,i)perylene	ug/kg	100	64.1	64	48-125	
Benzofluoranthenes (Total)	ug/kg	300	255	85	62-125	N2
Chrysene	ug/kg	100	87.8	88	64-125	
Dibenz(a,h)acridine	ug/kg	100	89.2	89	60-125	
Dibenz(a,h)anthracene	ug/kg	100	87.8	88	58-125	
Dibenzo(a,e)pyrene	ug/kg	100	82.5	82	56-125	
Dibenzo(a,h)pyrene	ug/kg	100	88.1	88	56-125	
Dibenzo(a,i)pyrene	ug/kg	100	80.4	80	53-125	
Dibenzo(a,l)pyrene	ug/kg	100	57.4	57	30-125	
Fluoranthene	ug/kg	100	90.1	90	61-125	
Fluorene	ug/kg	100	82.2	82	52-125	
Indeno(1,2,3-cd)pyrene	ug/kg	100	85.4	85	58-125	
Naphthalene	ug/kg	100	70.3	70	37-125	
Phenanthrene	ug/kg	100	91.2	91	61-125	
Pyrene	ug/kg	100	85.4	85	61-125	
2-Fluorobiphenyl (S)	%.			70	42-125	
p-Terphenyl-d14 (S)	%.			83	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3762885 3762886

Parameter	Units	10535359001 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	22.0J	171	171	131J	146J	64	72	39-125		30	
3-Methylcholanthrene	ug/kg	38.0J	171	171	111J	123J	42	50	30-134		30	
5-Methylchrysene	ug/kg	206	171	171	162J	215	-26	5	30-145		30	M6
7,12-Dimethylbenz(a)anthracene	ug/kg	<62.9	171	171	<62.7	<62.7	0	0	30-150		30	M6
7H-Dibenzo(c,g)carbazole	ug/kg	<22.5	171	171	115J	110J	67	64	30-140		30	
Acenaphthene	ug/kg	130J	171	171	231	253	59	72	37-125	9	30	
Acenaphthylene	ug/kg	69.1J	171	171	185	197	68	75	40-125	6	30	
Anthracene	ug/kg	370	171	171	468	513	57	83	47-125	9	30	
Benzo(a)anthracene	ug/kg	1270	171	171	1400	1420	81	91	30-135	1	30	
Benzo(a)pyrene	ug/kg	1410	171	171	1460	1490	28	47	30-136	2	30	M6
Benzo(g,h,i)perylene	ug/kg	139J	171	171	173	179	20	24	30-127	3	30	M6
Benzofluoranthenes (Total)	ug/kg	3380	514	514	3580	3640	39	51	34-125	2	30	N2
Chrysene	ug/kg	1910	171	171	2000	2040	54	74	30-142	2	30	
Dibenz(a,h)acridine	ug/kg	<10.6	171	171	151J	163J	88	95	30-148		30	
Dibenz(a,h)anthracene	ug/kg	263	171	171	341	339	46	45	42-125	0	30	
Dibenzo(a,e)pyrene	ug/kg	346	171	171	367	345	12	-1	30-131	6	30	M6
Dibenzo(a,h)pyrene	ug/kg	142J	171	171	177	176	20	20	30-141	1	30	M6
Dibenzo(a,i)pyrene	ug/kg	36.6J	171	171	66.9J	73.6J	18	22	30-131		30	M6
Dibenzo(a,l)pyrene	ug/kg	<39.5	171	171	<39.4	44.1J	14	17	30-131		30	M6
Fluoranthene	ug/kg	4060	171	171	4200	4240	86	104	30-149	1	30	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3762885 3762886

Parameter	Units	10535359001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluorene	ug/kg	195	171	171	288	316	54	70	39-150	9	30	
Indeno(1,2,3-cd)pyrene	ug/kg	806	171	171	817	801	6	-3	30-134	2	30	M6
Naphthalene	ug/kg	<50.9	171	171	135J	143J	64	69	37-125		30	
Phenanthrene	ug/kg	2280	171	171	2250	2390	-17	64	30-150	6	30	M6
Pyrene	ug/kg	2920	171	171	2980	3020	35	59	30-150	1	30	
2-Fluorobiphenyl (S)	%.						69	71	42-125			D3
p-Terphenyl-d14 (S)	%.						66	67	46-125			

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

QC Batch: 704673
QC Batch Method: WI MOD DRO
Analysis Method: WI MOD DRO
Analysis Description: WIDRO Solid GCV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10535359001, 10535359002, 10535359003

METHOD BLANK: 3764539 Matrix: Solid
Associated Lab Samples: 10535359001, 10535359002, 10535359003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
WDRO C10-C28	mg/kg	<2.7	10.0	2.7	10/16/20 21:31	
n-Triacontane (S)	%.	121	30-150		10/16/20 21:31	

LABORATORY CONTROL SAMPLE & LCSD: 3764540 3764541

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO C10-C28	mg/kg	80	75.1	74.8	94	93	66-125	1	20	
n-Triacontane (S)	%.				103	102	30-150			

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REPORT OF LABORATORY ANALYSIS

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

QUALIFIERS

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

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.

TNTC - Too Numerous To Count

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 - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

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.

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
G+	Late peaks present outside the GRO window.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
R1	RPD value was outside control limits.
T6	High boiling point hydrocarbons are present in the sample.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 23270051.51 Medley Park Pond
Pace Project No.: 10535359

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10535359001	**SED-01**	WI MOD DRO	704673	WI MOD DRO	705083
10535359002	**SED-02**	WI MOD DRO	704673	WI MOD DRO	705083
10535359003	**DUP-01**	WI MOD DRO	704673	WI MOD DRO	705083
10535359001	**SED-01**	EPA 5030 Medium Soil	704364	WI MOD GRO	704432
10535359002	**SED-02**	EPA 5030 Medium Soil	704364	WI MOD GRO	704432
10535359003	**DUP-01**	EPA 5030 Medium Soil	704364	WI MOD GRO	704432
10535359004	**Tip Blank**	EPA 5030 Medium Soil	705230	WI MOD GRO	705305
10535359001	**SED-01**	EPA 3050B	704596	EPA 6010D	704831
10535359002	**SED-02**	EPA 3050B	704596	EPA 6010D	704831
10535359003	**DUP-01**	EPA 3050B	704596	EPA 6010D	704831
10535359001	**SED-01**	EPA 7471B	704597	EPA 7471B	704820
10535359002	**SED-02**	EPA 7471B	704597	EPA 7471B	704820
10535359003	**DUP-01**	EPA 7471B	704597	EPA 7471B	704820
10535359001	**SED-01**	ASTM D2974	705751		
10535359002	**SED-02**	ASTM D2974	705751		
10535359003	**DUP-01**	ASTM D2974	705751		
10535359001	**SED-01**	EPA 3550C	704319	EPA 8270E by SIM	704789
10535359002	**SED-02**	EPA 3550C	704319	EPA 8270E by SIM	704789
10535359003	**DUP-01**	EPA 3550C	704319	EPA 8270E by SIM	704789
10535359001	**SED-01**	EPA 5035/5030B	705578	EPA 8260D	705764
10535359002	**SED-02**	EPA 5035/5030B	705578	EPA 8260D	705764
10535359003	**DUP-01**	EPA 5035/5030B	705578	EPA 8260D	705764
10535359004	**Tip Blank**	EPA 5035/5030B	705578	EPA 8260D	705764

Barr Engineering Co. Chain of Custody

Sample Origination State: ☐ CO ☐ MI ☒ MN ☐ MO ☐ ND ☐ TX ☐ UT ☐ WI ☐ Other: _____

COC Number: **№ 587760**

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Eng	Company: Barr Eng
Address:	Address:
Address:	Address:
Name: Kevin Menken	Name: Kevin Menken
email: kmenken@barr.com	email:
Copy to: BarrDM@barr.com	P.O.
Project Name: Medley Park Pond	Barr Project No: 23270051.51200 202

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: Sed. (not Water) — cPAHs (stormwater pond list)	RCRA metals + copper	WI DRO 6-20 w silica gel cleanup	BTEX	Soil: % Solids	Preservative Code	Field Filtered Y/N
									A	A	A	F	F		
1. SED-01	0	2.7	ft	10/13/2020	10:30	SD	N	9	X	X	X	X	X	X	001
2. SED-02	0	4.0	ft	↓	11:30	SD	N	9	X	X	X	X	X	X	002
3. DUP-01				↓		SD	N	9	X	X	X	X	X	X	003
4.															
5.															
6.															
7.															
8.															
9.															
10.															

WO#: 10535359

10535359

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 = Zn Acetate; K = Other

BARR USE ONLY

Sampled by: Kevin Menken

Barr Proj. Manager: Katie Turpin-Nagel

Barr DQ Manager: Terri Olson

Lab Name: Pace

Lab Location: Mpls

Page 4 of 27

Relinquished by:	On Ice? (Y) N	Date	Time	Received by:	Date	Time
Kevin Menken	(Y) N	10/13/20	1330	Pace	10/13/20	1600
Relinquished by:	On Ice? Y N	Date	Time	Received by:	Date	Time

Samples Shipped VIA: ☒ Ground Courier ☐ Air Carrier ☐ Sampler ☐ Other: _____

Air Bill Number:

Lab WO: Temperature on Receipt (°C): 1.2 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; **Scan and email:** a copy to BarrDM@barr.com for tracking and filing procedures

H:\RLG\STDFORMS\Chain of Custody Form 2015 RLG Rev. 01/30/2020

Pace Analytical®	Document Name: **Sample Condition Upon Receipt (SCUR) - MN**	Document Revised: 12Aug2020 **Page 1 of 1**
	Document No.: **ENV-FRM-MIN4-0150 Rev.01**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt **Client Name:** Barr **Project #:** WO#: 10535359

PM: AA1 Due Date: 10/27/20
CLIENT: BARR

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

Tracking Number: _____ See Exceptions ☐ ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? ☐ Yes ☐ No **Seals Intact?** ☐ Yes ☐ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

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

Thermometer: ☐ T1(0461) ☒ T2(1336) ☐ T3(0459) ☐ T4(0254) ☐ T5(0489) **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☒ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 1.2 °C **Average Corrected Temp (no temp blank only):** _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

Correction Factor: true **Cooler Temp Corrected w/temp blank:** 1.2 °C

USDA Regulated Soil: (☐ N/A, water sample/Other: _____) **Date/Initials of Person Examining Contents:** M 10/20/20

Did samples originate in a quarantine zone within the United States: AL, AR, 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 and Filled Out?	☒ Yes	☐ No		1.
Chain of Custody Relinquished?	☒ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☒ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other _____
Rush Turn Around Time Requested?	☐ Yes	☒ No		6.
Sufficient Volume?	☒ Yes	☐ No		7.
Correct Containers Used? -Pace Containers Used?	☒ Yes ☒ Yes	☐ No ☐ No		8.
Containers Intact?	☒ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☒ Yes	☐ No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐ **ENV-FRM-MIN4-0142**
Matrix: ☐ Water ☒ Soil ☐ Oil ☐ Other _____				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☒ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐ Yes	☐ No	☒ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No **pH Paper Lot#** **See Exception** ☐ **ENV-FRM-MIN4-0142**
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☒ N/A	13. **See Exception** ☐ **ENV-FRM-MIN4-0140**
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☒ N/A	
Trip Blank Present?	☒ Yes	☐ No	☐ N/A	14. Pace Trip Blank Lot # (if purchased): 060120-3 (2)
Trip Blank Custody Seals Present?	☒ Yes	☐ No	☐ N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 10/14/20

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).

Labeled by: RVC

Intra-Regional Chain of Custody

Pace Analytical®
www.pacelabs.com

Workorder: 10535359 **Workorder Name:** 23270051.51 2 Medley Park Pond **Owner Received Date:** 10/13/2020 **Due Date:** 10/26/2020

Received at:	Send To Lab:
Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-6382	Pace Analytical Billings MT 150 N Ninth Street Billings, MT 59101 Phone (406)254-7226

Report To:
Amanda Albrecht

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: VG9M MeOH	Requested Analysis: EPA 8260D	LAB USE ONLY
1	SED-01	PS	10/13/2020 10:30	10535359001	Solid	2	X	001
2	SED-02	PS	10/13/2020 11:30	10535359002	Solid	2	X	002
3	DUP-01	PS	10/13/2020 00:00	10535359003	Solid	2	X	003
4	Tip Blank	PS	10/13/2020 00:00	10535359004	Solid	1	X	004
5								005

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] Pace	10/14/20 1555		
2	Waltco	10/15/20 0910	[signature] Pace	10/15/20 0910
3	FedEx		[signature] Pace	10/16/20 0920
4				

Comments

Cooler Temperature on Receipt 1.5 °C 0.6 **Custody Seal** (Y) or N **Received on Ice** (Y) or N **Samples Intact** (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 18Aug2020 Page 1 of 1
	Document No.: **F-MT-C-184-Rev.16**	Issuing Authority: Pace Montana Quality Office

Sample Condition Upon Receipt

Client Name: 10/16/20 ct Pace GB MN

Project #: 10533559

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

Tracking Number: 4276 9155 4436

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: ☒ 160285052 ☐ OS418-LS **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read: 0.6 (°C) **Date and Initials of Person Examining Contents:** 10/16/20 ct

Cooler Temp Corrected: 0.6 (°C) **Biological Tissue Frozen?** ☐ Yes ☒ No

USDA Regulated Soil ☐ Yes ☒ No

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA? Check maps & Circle State

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 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. 10/26/20
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? Note if sediment is visible in the dissolved container.	☐ Yes	☐ No	☒ N/A	11.
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 ☐ NaOH+ZnAce
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, WI-DRO (water)	☐ Yes	☒ No		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): NA				

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

Person Contacted: Date/Time:

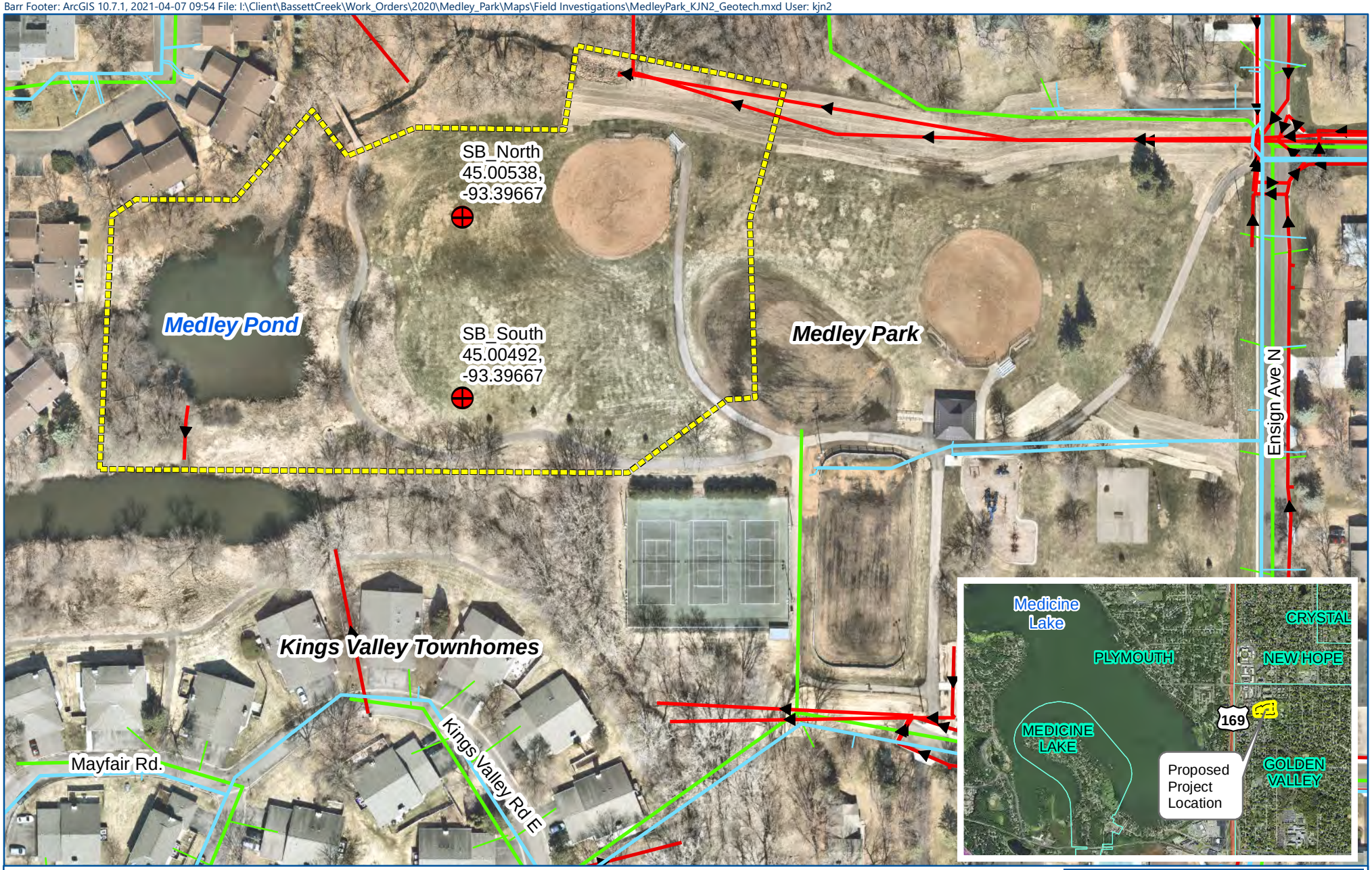
Comments/Resolution:

Project Manager Review: **Date:** 10/23/20

Appendix B

Geotechnical Soil Boring Logs (2020)

Barr Footer: ArcGIS 10.7.1, 2021-04-07 09:54 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Field Investigations\MedleyPark_KJN2_Geotech.mxd User: kjn2



Soil Boring Locations
Project Boundary
Storm Pipe*
Watermain*
Sanitary Main*

*Utility pipes shown on this figure are not all inclusive. A Gopher State One Call for utility locates was performed prior to geotechnical investigation.

N

0 120
Feet

MEDLEY PARK
SOIL BORING LOCATIONS

FIGURE B1

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING SB-North

Project: Medley Park
Project No.: 23270051.51
Location: Golden Valley, MN
Coordinates: Lat: 45.00538° Long: -93.39667°
Datum: NAD83

Surface Elevation: 906.3 (NAVD88)
Drilling Method: HSA
Sampling Method: SS
Completion Depth: 12.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0		1	2-3-3-.	**PID:**3.6	SM		SILTY SAND (SM): very fine to fine grained; light brown; moist; loose; trace gravel; no odor; no sheen; no discoloration.	
		2	2-2-3-.	**PID:**4.8	OL		ORGANIC SILT (OL): brown; moist; medium stiff; with fine grain sand; organic; no odor; no sheen; no discoloration.	
2.5		3	1-1-2-.	**PID:**4.8	CL		LEAN CLAY (CL): olive gray; moist; medium stiff to stiff; trace fine grain sand and fibrous; no odor; no sheen; no discoloration.	
5.0		4	2-2-3-.	**PID:**4.0				
		5	4-4-5-.	**PID:**4.0				
7.5		6	2-2-3-.	**PID:**5.2				
		7	1-1-1-.	**PID:**3.8	PT		PEAT (PT): brown; moist; soft; organic and fibrous; no odor; no sheen; no discoloration.	
10.0		8	1-2-2-.	**PID:**2.3				
12.5							End of boring 12.0 feet	
15.0								

Date Boring Started: 10/6/20
Date Boring Completed: 10/6/20
Logged By: JWJ
Drilling Contractor: Haugo
Drill Rig: Truck

Remarks: Borehole was drilled with 4-1/4 HSA from 0-12 feet. Borehole was abandoned with soil.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF BORING SB-South

Project: Medly Park
Project No.: 23270051.51
Location: Golden Valley, MN
Coordinates: Lat: 45.00492° Long: -93.39667°
Datum: NAD83

Surface Elevation: 907.7 (NAVD88)
Drilling Method: HSA
Sampling Method: SS
Completion Depth: 12.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0		1	1-3-3-.	**PID:**5.9	OL		ORGANIC SILT (OL): black; moist; medium stiff; topsoil; black organics; no odor; no sheen; no discoloration.	
2.5		2	2-2-4-.	**PID:**6.6	CL		LEAN CLAY (CL): black to olive gray; moist; stiff; trace peat; trace very fine to fine grained sand; no odor; no sheen; no discoloration.	
		3	2-2-5-.	**PID:**6.2				
5.0		4	2-2-3-.				4.5-6 feet: no recovery, 2 inch gravel chunk in sampler shoe.	
		5	2-2-2-.	**PID:**6.3				
7.5		6	1-2-2-.	**PID:**6.3	PT		PEAT (PT): brown; moist; soft; fibrous organics; no odor; no sheen; no discoloration.	
10.0		7	1-2-2-.	**PID:**6.3				
		8	2-1-1-.	**PID:**5.9	CL		LEAN CLAY (CL): olive gray; wet; soft; with very fine to fine grained sand; no odor; no sheen; no discoloration.	
12.5							End of boring 12.0 feet	
15.0								

Date Boring Started: 10/6/20
Date Boring Completed: 10/6/20
Logged By: JWJ
Drilling Contractor: Haugo
Drill Rig: Truck

Remarks: Borehole was drilled with 4-1/4 HSA from 0-12 feet. Borehole was abandoned with soil.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Appendix C

Wetland Delineation Report (2020)

Draft Wetland Delineation Report

Medley Park

Prepared for
City of Golden Valley

October 2020

Draft Wetland Delineation Report

Medley Park

Prepared for
City of Golden Valley

October 2020

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

Wetland Delineation Report

October 2020

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1.0 Introduction

This wetland delineation report has been prepared by Barr Engineering Co., (Barr) on behalf of the City of Golden Valley in support of the Medley Park Stormwater Project. The project area is located in Medley Park in the City of Golden Valley, Minnesota in Section 30 of Township 118 North, Range 21 West (**Figure 1**). A field wetland delineation was conducted by Barr for the proposed project on September 14, 2020. This delineation identified one wetland within the project area.

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.

This report includes general environmental information (Section 2.0), descriptions of the delineated wetlands (Section 3.0), and a discussion of regulations and the administering authorities (Section 4.0). The Tables section includes antecedent precipitation data. The Figures section includes the Project Location Map, Topography Map, National Wetland Inventory (NWI), Public Waters Inventory (PWI), Hydric Soils Map, Historic Aerial Imagery, and the Wetland Delineation Map. **Appendix A** includes Wetland Data Forms and **Appendix B** includes site photographs.

2.0 General Environmental Setting

2.1 Site Description

The project area is located within the Medley Park, just east of Highway 169 (**Figure 1**). The park is in a residential setting and can be accessed through a system of paved trails from the north and east side of the project area. The park includes a variety of amenities such as play structures, two baseball fields, tennis courts and an ice-skating rink. The project area is also used for stormwater management, with a stormwater detention basin located on the west side of the project area.

2.2 Topography

The project area is in an urban setting where the natural topography has been altered. Generally, The topography of the project area consists of gentle slopes from the eastern side with a high elevation of 910 feet MSL to the western side with a low elevation of 900 feet MSL (**Figure 2**).

2.3 Precipitation

Recent precipitation data was compared to historic precipitation data to evaluate monthly deviations from normal conditions. Precipitation data was obtained from the Minnesota Climatology Working Group, Wetland Delineation Precipitation Data Retrieval from a Gridded Database (Minnesota Climatology Office, 2020) for wetlands in Hennepin County, Township 118 North, Range 21 West, Section 30.

Antecedent moisture conditions were within the normal range according to precipitation data from the three months prior to the September 14, 2020, site visit (**Table 1**). During the month of August, the City of Golden Valley received around 5.11 inches of precipitation, which is within the normal range for August. In July the area received below-average levels of precipitation while June was within the normal range. The water year has varied between dry and wet for the past nine years but fell mostly into the wet range from 2016 through 2019 (**Table 2**).

Table 1, Antecedent Moisture Conditions

Score using 1981-2010 normal period

(value are in inches)	first prior month: **August 2020**	second prior month: **July 2020**	third prior month: **June 2020**
estimated precipitation total for this location:	5.11R	2.82R	3.72R
there is a 30% chance this location will have less than:	3.40	2.82	3.38
there is a 30% chance this location will have more than:	5.18	4.21	5.26
type of month: **dry** **normal** **wet**	**normal**	**dry**	**normal**
monthly score	3 * **2** = 6	2 * **1** = 2	1 * **2** = 2
multi-month score: 6 to 9 (**dry**) 10 to 14 (**normal**) 15 to 18 (**wet**)	**10 (normal)**		

*"R" following a monthly total indicates a provisional value derived from radar-based estimates

Table 2 Precipitation in comparison to WETS data

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)

Period-of-Record Summary Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.53	0.52	1.16	1.63	2.58	3.20	2.43	2.81	1.84	1.22	0.71	0.59	16.39	26.08	25.91
70%	1.07	1.18	2.06	2.80	4.25	5.36	4.44	4.57	3.88	2.74	1.89	1.37	21.46	32.82	32.03
mean	0.89	0.91	1.67	2.42	3.70	4.44	3.84	3.71	3.08	2.25	1.54	1.06	18.77	29.51	29.53

1981-2010 Summary Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
30%	0.54	0.40	1.34	2.27	2.88	3.38	2.82	3.40	2.21	1.23	1.09	0.74	18.44	30.35	27.90
70%	1.24	1.04	2.15	3.01	4.15	5.26	4.21	5.18	4.00	3.69	2.07	1.45	21.81	34.34	35.68
mean	0.88	0.81	1.94	2.78	3.66	4.59	4.27	4.16	3.41	2.54	1.84	1.24	20.09	32.12	31.93

Year-to-Year Data

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
2020	0.93	0.52	2.24R	1.53R	4.10R	3.72R	2.82R	5.11R							
2019	0.53	2.26	2.30	3.56	7.45	2.75	6.43	6.60	4.74	5.12	1.55	2.17	27.97	45.46	43.02
2018	0.94	1.34	1.33	2.20	2.43	4.30	3.62	3.29	6.21	3.35	1.48	1.57	19.85	32.06	32.11
2017	0.76	0.72	0.70	3.51	6.31	3.82	3.94	6.93	1.70	5.34	0.40	0.71	22.70	34.84	36.17
2016	0.30	0.84	1.60	3.74	2.22	3.09	5.78	9.89	6.43	3.20	2.58	2.00	27.41	41.67	42.66
2015	0.33	0.30	0.67	2.05	4.19	3.31	7.30	3.40	3.92	2.74	4.31	1.72	22.12	34.24	28.73
2014	1.23	1.38	0.76	7.26	4.33	10.49	3.07	3.15	1.59	1.10	1.10	1.06	22.63	36.52	39.91
2013	0.69	1.19	2.07	4.57	4.86	7.79	4.76	1.53	1.29	4.40	0.59	1.66	20.23	35.40	32.71
2012	0.50	2.14	1.35	2.91	9.35	4.13	4.23	1.46	0.52	1.38	0.92	1.66	19.69	30.55	28.63
2011	0.96	0.96	2.18	3.18	6.11	4.06	6.74	4.07	0.44	0.94	0.20	0.90	21.42	30.74	36.04
2010	0.61	0.89	0.97	2.04	2.75	6.18	4.00	5.92	6.00	2.02	2.01	3.31	24.85	36.70	38.08
2009	0.49	1.04	1.97	1.37	0.40	3.67	1.00	6.55	0.79	5.91	0.60	2.21	12.41	26.00	21.57
2008	0.14	0.52	2.12	4.20	2.58	4.24	2.13	2.82	2.15	1.54	1.22	1.53	13.92	25.19	28.05
2007	0.58	1.42	3.63	2.41	3.02	2.06	2.58	6.72	4.87	5.22	0.10	1.83	19.25	34.44	31.67
2006	0.71	0.39	1.80	3.27	3.66	4.14	2.39	5.73	3.14	0.67	1.09	2.62	19.06	29.61	32.82
2005	1.27	1.04	1.30	2.60	3.56	6.21	2.80	3.63	6.63	4.43	1.75	1.41	22.83	36.63	34.41
2004	0.55	1.54	2.23	2.78	5.80	4.85	3.82	1.47	4.66	3.80	1.09	0.48	20.60	33.07	30.79
2003	0.28	0.99	1.68	2.93	5.31	7.92	1.74	0.28	2.23	0.95	1.17	0.97	17.48	26.45	27.55
2002	0.60	0.57	1.98	4.11	4.19	8.40	6.38	6.59	4.11	3.84	0.08	0.27	29.67	41.12	41.66
2001	1.39	1.42	1.03	7.29	5.57	4.87	2.38	3.14	3.95	0.91	3.18	0.64	19.91	35.77	37.48

2.4 National Wetland Inventory

The National Wetland Inventory (NWI) data was reviewed for any wetlands located within or adjacent to the project area. Two NWI wetlands are mapped on the western side of the project area. The northern most NWI is classified as a freshwater pond with a freshwater emergent wetland connected to the north

(PUBH/EM1A**; Figure 3**). The southern most wetland is classified as a freshwater pond with a freshwater forested/emergent wetland around the parameter (PUBH/PFO1/EM1A).

2.5 Water Resources

The Minnesota Department of Natural Resources (MnDNR) Public Water Inventory (PWI) was queried for any Public Waters located within or adjacent to the project area (**Figure 4**). No PWI watercourses or PWI basins are located within the project area. The nearest PWI basin is Medicine Lake located approximately 0.31 miles west of the project area.

2.6 Soil Resources

Soil information for the wetland delineation area was obtained from the Soil Survey for Hennepin County, Minnesota (USDA, 2004). Three soils are mapped within the project area; Urban land Udorthents wet substratum complex, Udorthents wet substratum, and urban land-udorthents (Cut and fill land). All of these soils are classified as non-hydric soils (**Figure 5)**.

2.7 Historic Aerial Imagery Review

Historic aerial imagery of the project area was reviewed for the presence of wetland signatures. Aerial imagery from 1937, 1956, 1971, 1991 and 2017 was reviewed. In 1937the project area appears to have been used for agricultural practices, no wetland signatures were identified within the project area. In 1971, the project area is still used for agricultural practices however the crops located in the western portion of the project area appear to be stunted and a wetland signature is present in the northwestern corner of the evaluation area. By 1991 a wetland appears in the western side of the project area. The wetland is of similar size and shape in the 2017 aerial imagery.

3.0 Wetland Delineation

3.1 Wetland Delineation and Classification Methods

The wetland delineation was completed 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) and the requirements of the Minnesota Wetland Conservation Act (WCA) of 1991.

The delineated wetland boundaries and associated sample points were surveyed using a Global Positioning System (GPS) with sub-meter accuracy. 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, 2015).

Two soil samples were collected to examine for the presence of hydric soil indicators using the Natural Resources Conservation Service (NRCS) hydric soil indicators (Version 8.2). Hydrologic conditions were evaluated at each soil boring. Additionally, the dominant plant species were identified, and the

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

3.2 Aquatic Resources

During the wetland delineation, one wetland totaling 0.82 acres was delineated within the project area (**Table 3**). Descriptions and assessments of the wetland areas are provided below, with representative photographs in **Appendix B**.

Table 3: Delineated Wetlands

Wetland Number	Sample Point Number	Circular 39	Cowardin Classification	Eggers and Reed	Wetland Size (Acres)
Wetland 1	SP 1	Type 3/4	PUBGx/PEMC	Shallow Marsh/Deep marsh	0.82

Wetland 1 is a storm water detention basin that is separated into two segments by an upland berm. The two wetland segments are connected through a culvert located underneath the berm. Both segments of the wetland were classified as a deep marsh boarded with a seasonally flooded basin (PUBGx/PEMC; **Figure 7**). Vegetation along the wetland boundary was dominated by cattails (*typha spp.*;OBL), boarded by reed canarygrass (*Phalaris arundinacea*; FACW), jewel weed (*Impatiens capensis*; FACU), water smartweed (*Persicaria amphibia*; OBL), in addition to woody vegetation such as boxelder (*Acer negundo*; FAC) and common buckthorn (*Rhamnus cathartica*; FAC). floating vegetation like duck weed (observed within the deep marsh portion of the wetland.

At the time of the field survey, much of the wetland area was inundated with approximately 4-6 feet of water. The area receives water from a drainage channel located on the northern end of the wetland boundary. Water flows from the northern wetland area into the wetland area to the south and outside of the project area. At sample point 1, two primary hydrology indicators were observed, including saturation (A3), inundation visible on aerial imagery (B7).

According to NRCS data, the soils mapped within the boundary of Wetland 1 are classified as Urban land-Udorthents, Wet Substratum Complex, a non-hydric soil. Sampled soils consisted of a very dark grayish brown (10YR 3/2) matrix color from the soil surface down to approximately 4 inches. A depleted grayish brown (2.5Y 5/2) matrix is present starting at 4 inches below ground surface with 10 percent distinct prominent redoximorphic features. A gleyed matrix with a dark greenish gray (10Y 4/1) color was found 8 inches below the soil surface. The soils at Sample Point 1 met the loamy gleyed matrix (F2) and redox dark surface (F6) hydric soil indicators.

The transition to upland was defined by a sudden change in topography around the perimeter of the wetland. The vegetation in the adjacent upland area consisted of woody vegetation along the side slopes of the wetland with maintained grassland.

Using the MnRAM wetland assessment methodology, the wetland area was classified as a Manage 2 wetland. As the wetland is rated low for amphibian habitat . See the attached for the MnRAM Excel spreadsheet.

4.0 Regulatory Overview

The U.S. Army Corps of Engineers (USACE) regulates the dredge or placement of 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 (NEPA).

Filling, excavating, and draining wetlands are also regulated by the Minnesota Wetland Conservation Act (WCA), and the Minnesota Public Waters Inventory Program, which are administered by the City of Golden Valley and the MnDNR. The City of Golden Valley, MnDNR, and the USACE, should be contacted before altering any aquatic resources in the project area. Delineated wetland boundaries may be reviewed, if needed, by a Technical Evaluation Panel (TEP) consisting of representatives from the Minnesota Board of Water and Soil Resources (BWSR), Hennepin County, and the City of Golden Valley, along with the USACE.

5.0 References

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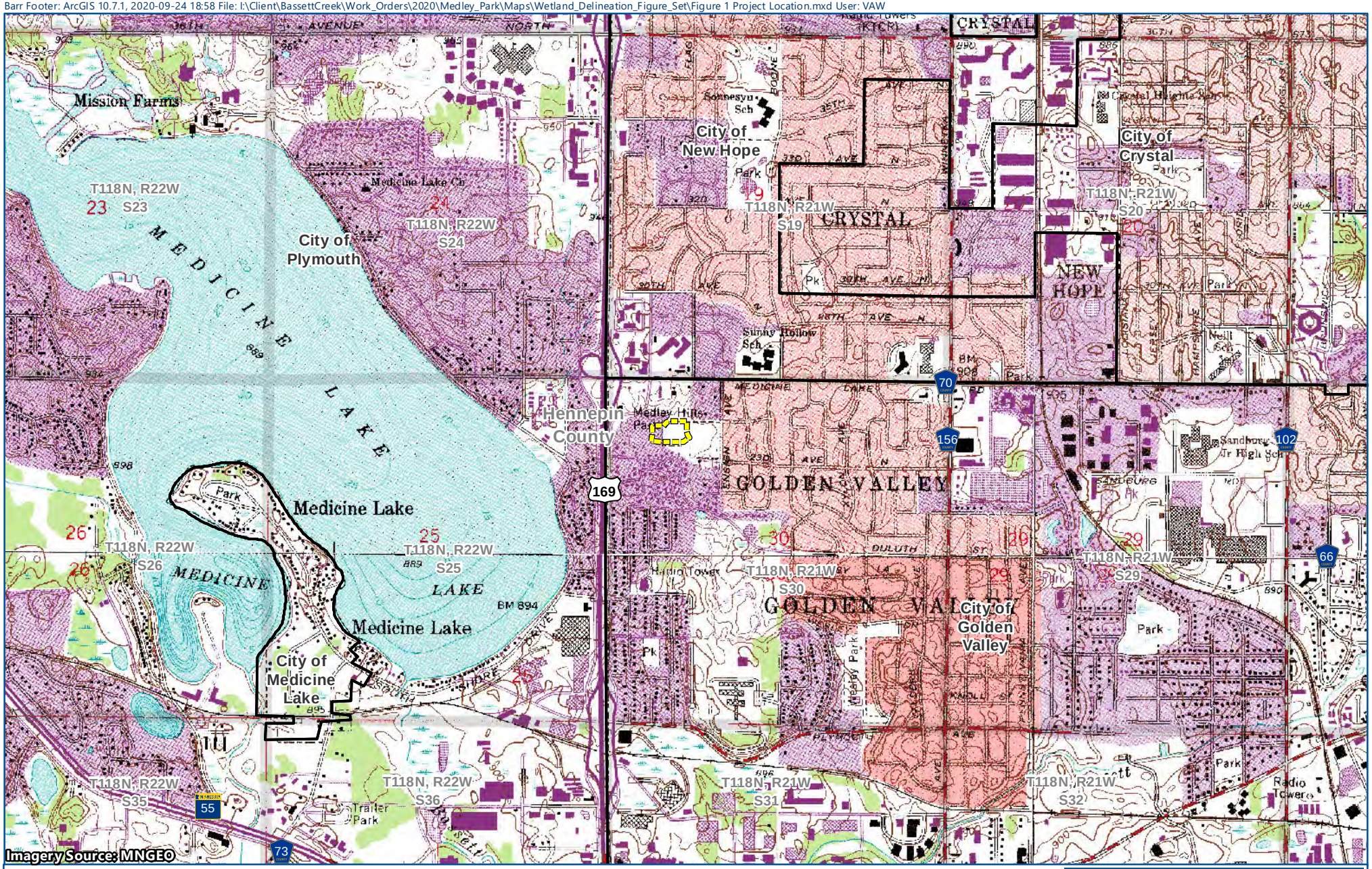
Figures



Project Boundary

N

0 2,000 4,000

Feet

1 inch = 2,000 feet

PROJECT LOCATION
Medley Park Stormwater Treatment Facility
Golden Valley, MN

FIGURE 1

Barr Footer: ArcGIS 10.7.1, 2020-09-24 18:20 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Wetland_Delineation_Figure_Set\Figure 2 LiDAR Map.mxd User: VAW

Elevation

- Index Contour (10' Interval)
- Intermediate Contour (2' Interval)
- Project Boundary

N

0 120 240

Feet

1 inch = 120 feet

LIDAR MAP
Medley Park Stormwater Treatment Facility
Golden Valley, MN

FIGURE 2

Barr Footer: ArcGIS 10.7.1, 2020-09-24 19:17 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Wetland_Delineation_Figure_Set\Figure 3 NWI Map.mxd User: VAW

Project Boundary

Wetlands (National Wetlands Inventory)

- Freshwater Emergent Wetland (PEM1A)
- Freshwater Forested/Emergent Wetland (PFO1/EM1A)
- Freshwater Pond (PUBH)

N

0 120 240

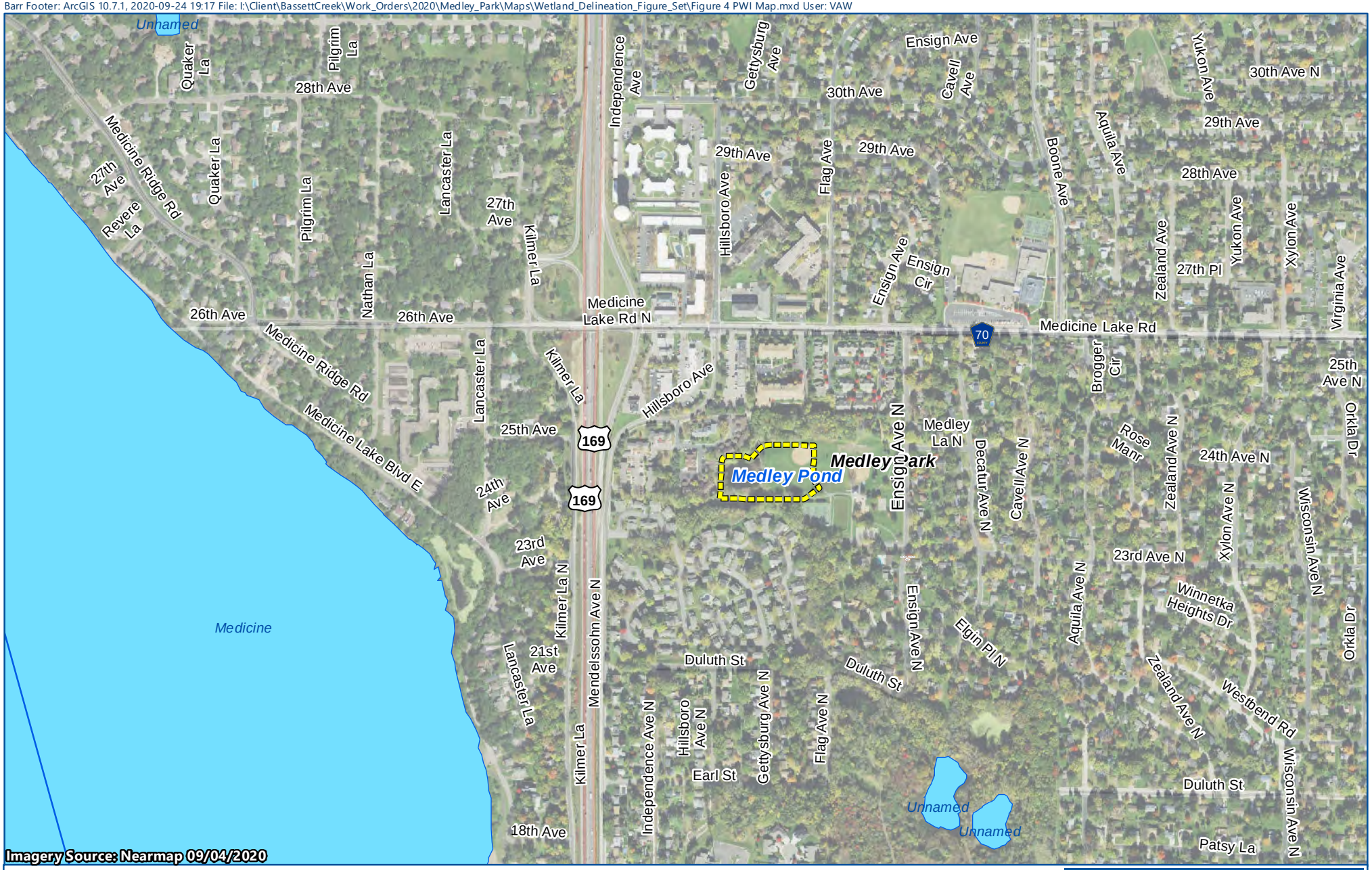
Feet

1 inch = 120 feet

NWI MAP
Medley Park Stormwater Treatment Facility
Golden Valley, MN

FIGURE 3

Barr Footer: ArcGIS 10.7.1, 2020-09-24 19:17 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Wetland_Delineation_Figure_Set\Figure 4 PWI Map.mxd User: VAW



Project Boundary
Public Water Inventory Watercourses.lyr
Public Water Inventory Basins.lyr

N

0 0.25 0.5
Miles

1 inch = 755 feet

BARR

PWI MAP
Medley Park Stormwater Treatment Facility
Golden Valley, MN

FIGURE 4

Project Boundary **Hydric Rating**

Soil Boundary Not Hydric (0%)

BARR

N

0 120 240

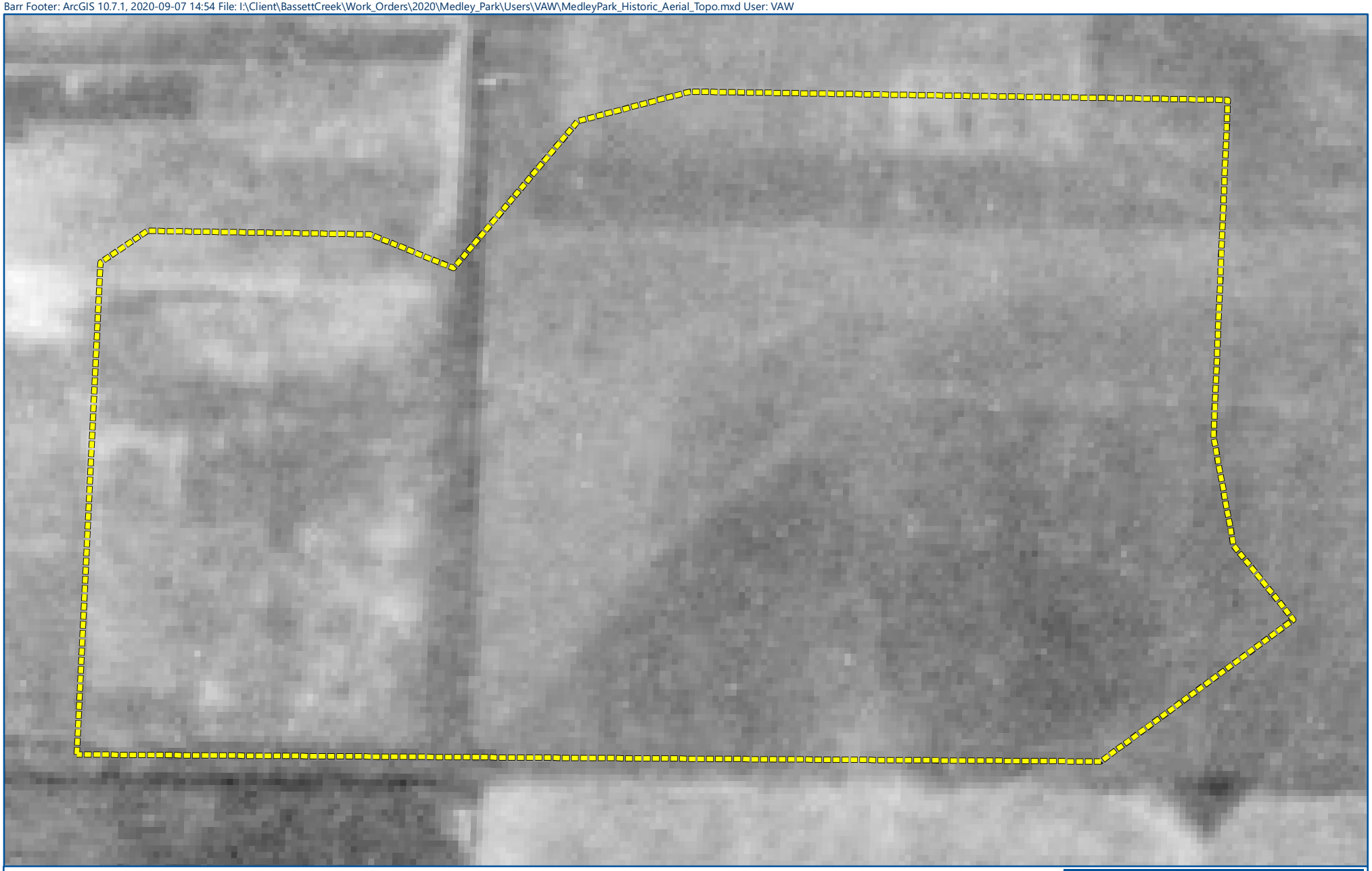
Feet

1 inch = 125 feet

SOILS MAP
Medley Park Stormwater Treatment Facility
Golden Valley, MN

FIGURE 5

Barr Footer: ArcGIS 10.7.1, 2020-09-07 14:54 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Users\VAW\MedleyPark_Historic_Aerial_Topo.mxd User: VAW



BARR

Project Boundary

N

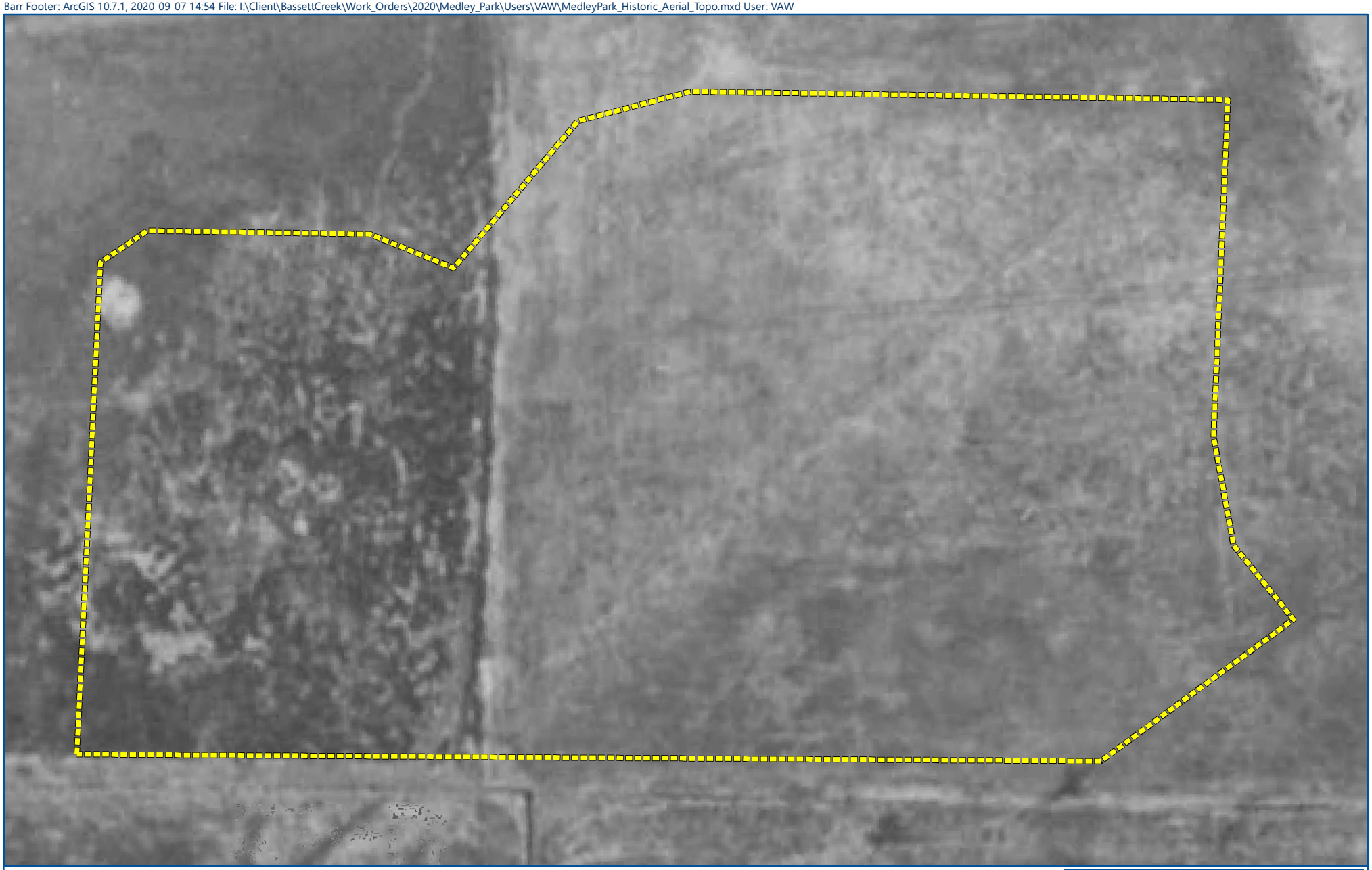
0 120

Feet

MEDLEY PARK
HISTORIC AERIAL
IMAGERY REVIEW
1937

FIGURE 6a

Barr Footer: ArcGIS 10.7.1, 2020-09-07 14:54 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Users\VAW\MedleyPark_Historic_Aerial_Topo.mxd User: VAW



BARR

Project Boundary

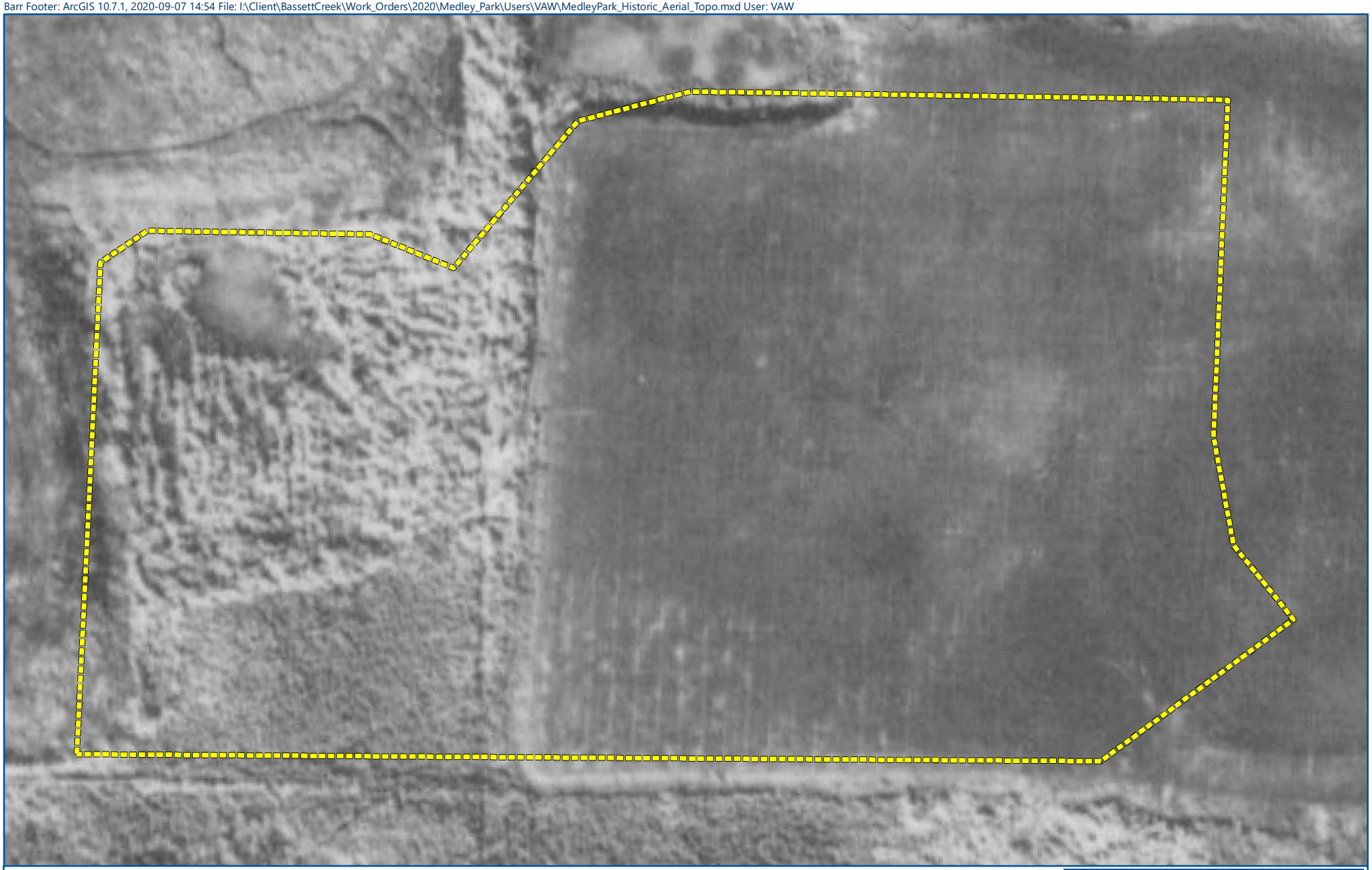
N

0 120

Feet

MEDLEY PARK HISTORIC AERIAL IMAGERY REVIEW 1957

FIGURE 6b



BARR

Project Boundary

N

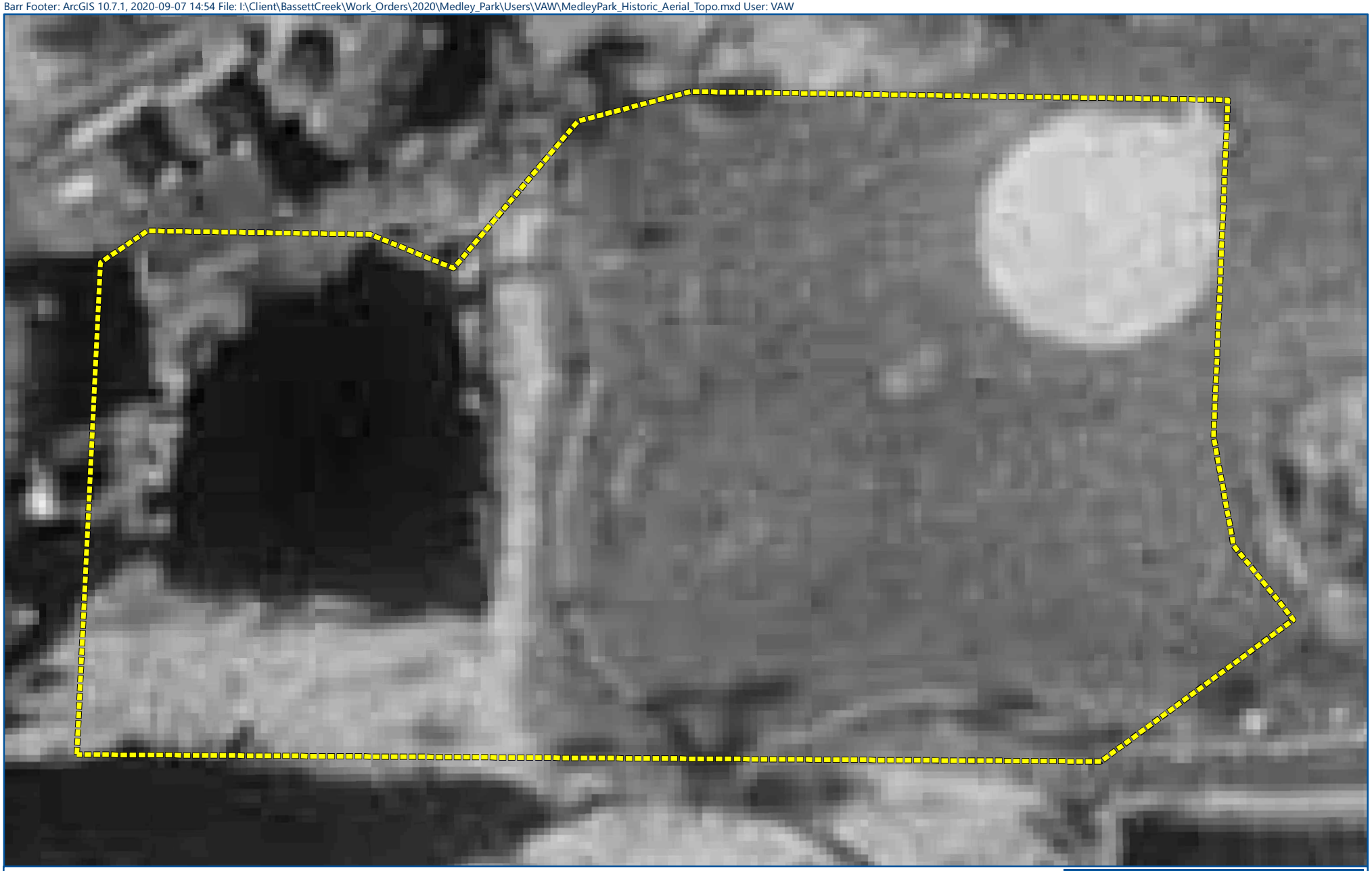
0 120

Feet

MEDLEY PARK
HISTORIC AERIAL
IMAGERY REVIEW
1971

FIGURE 6c

Barr Footer: ArcGIS 10.7.1, 2020-09-07 14:54 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Users\VAW\MedleyPark_Historic_Aerial_Topo.mxd User: VAW



BARR

Project Boundary

N

0 120

Feet

MEDLEY PARK
HISTORIC AERIAL
IMAGERY REVIEW
1991

FIGURE 6d

Barr Footer: ArcGIS 10.7.1, 2020-09-07 14:54 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Users\VAW\MedleyPark_Historic_Aerial_Topo.mxd User: VAW

BARR

Project Boundary

N

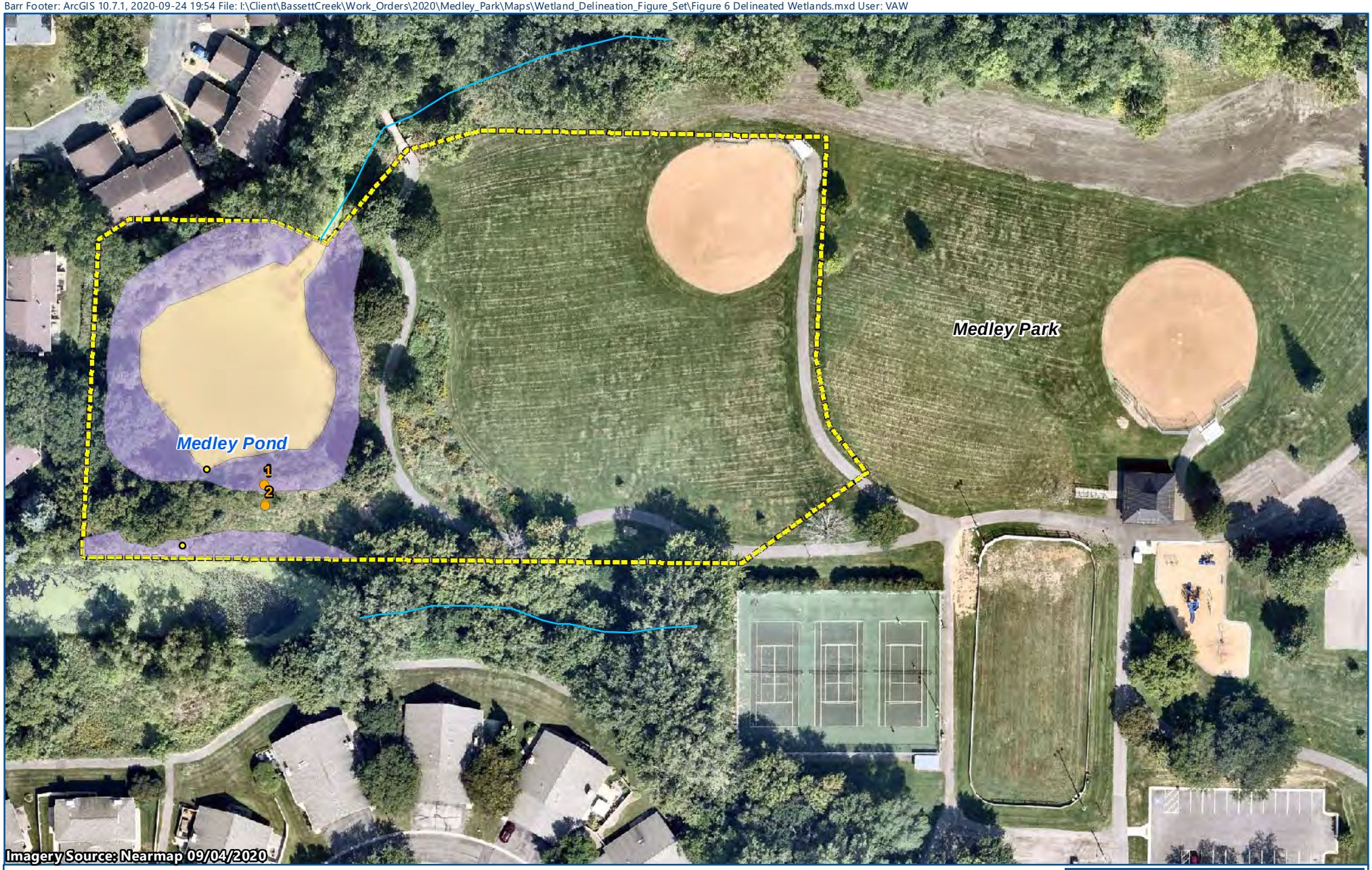
0 120

Feet

MEDLEY PARK
HISTORIC AERIAL
IMAGERY REVIEW
2017

FIGURE 6d

Barr Footer: ArcGIS 10.7.1, 2020-09-24 19:54 File: I:\Client\BassettCreek\Work_Orders\2020\Medley_Park\Maps\Wetland_Delineation_Figure_Set\Figure 6 Delineated Wetlands.mxd User: VAW



Project Boundary
Sample Point
Classifica
Culverts
Drainage Channels
PEMC
PUBGx

N

0 120 240
Feet

1 inch = 96 feet

DELINEATED WETLANDS
Medley Park Stormwater Treatment Facility
Golden Valley, MN

FIGURE 7

Appendix A
Wetland Delineation Datasheets

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Medley Park | Applicant/Owner: City of Golden Valley | City/County: Golden Valley | State: MN | Sampling Date: 09/14/20

Investigator(s): TAC | Section: 30 | Township: 118 | Range: 21 | Sampling Point: SP 1

Land Form: Depression | Local Relief: Concave | Slope %: 2 | Soil Map Unit Name: urban land-Udorthents, wet substratum

Subregion (LRR): M | Latitude: 45.004886 | Longitude: -93.397445 | Datum: Hennepin County

Cowardin Classification: PUBGx/PEMC | Circular 39 Classification: Type 3/4 | Mapped NWI Classification: PUBHx

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

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

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): Sample point is located within the boundary of wetland 1. According to antecedent precipitation data the area has received normal levels of precipitation in the three months prior to the field survey.

If yes, optional Wetland Site ID: Wetland 1

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	35	Yes	OBL
2.	Cirsium arvense	30	Yes	FACU
3.	Impatiens capensis	10	No	FACW
4.	Rumex crispus	5	No	FAC
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	0	0
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: 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	35	X 1 =	35	
FACW Species	10	X 2 =	20	
FAC Species	5	X 3 =	15	
FACU Species	30	X 4 =	120	
UPL Species	0	X 5 =	0	
Column Totals:	80	(A)	190	(B)

Prevalence Index = B/A = 2.38

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — 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

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WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: SP 1

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 - 4	10YR 3/2	100					SiL	
2.	4 - 8	2.5Y 5/2	60	7.5YR 4/6	10	C	M	SiCL	
3.	-	10YR 3/2	30						
4.	8 - 24	Gley 1 10Y 4/1	95					SiCL	
5.	-	Gley 110Y 5/1	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):** 4

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: Medley Park | Applicant/Owner: City of Golden Valley | City/County: Golden Valley | State: MN | Sampling Date: 09/14/20

Investigator(s): TAC | Section: 30 | Township: 118 | Range: 21 | Sampling Point: SP 2

Land Form: Hillslope | Local Relief: Convex | Slope %: 7 | Soil Map Unit Name: urban land-Udorthents, wet substratum

Subregion (LRR): M | Latitude: 45.004844 | Longitude: -93.397442 | Datum: Hennepin County Coordinates

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

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (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
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): Sample point is located on a berm adjacent to wetland 1. According to antecedent precipitation data the area has received normal levels of precipitation in the three months prior to the field survey.

If yes, optional Wetland Site ID:

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.	Cirsium arvense	45	Yes	FACU
2.	Phalaris arundinacea	15	Yes	FACW
3.	Hordeum jubatum	10	No	FAC
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	70		

Woody Vine Stratum (Plot Size: 30 ft)

1.		0		
2.		0		
	Total Cover:	0		

% Bare Ground in Herb Stratum: 30 | % Sphagnum Moss Cover:

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

Vegetation at the sample point was stunted and appeared to be mowed.

50/20 Thresholds:

	20%	50%
Tree Stratum	0	0
Sapling/Shrub Stratum	0	0
Herb Stratum	14	35
Woody Vine Stratum	0	0

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	15	X 2 =	30
FAC Species	10	X 3 =	30
FACU Species	45	X 4 =	180
UPL Species	0	X 5 =	0
Column Totals:	70 (A)		240 (B)

Prevalence Index = B/A = 3.43

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

10/5/2020 2:59:42 PM

WETLAND DETERMINATION DATA FORM - Midwest Region

SOIL

Sampling Point: SP 2

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 - 30	10YR 3/1	100					SCL	
2.	30 - 36	10YR 3/1	80					SCL	
3.	-	7.5YR 4/6	20						
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: No hydrology indicators were observed. Sample point is located on top of a berm inbetween two wetlands.

10/5/2020 2:59:42 PM

Appendix B
Site Photographs

Medley Park

Photolog

Photograph 1,eastern edge of the project area, view north

Photograph 2, southeastern edge of project area, view west

Photograph 3,center of baseball field, view north

Photograph 4, native prairie planting on the southwest end of the project area, view west

Photograph 5,overview of native prairie planting, view south

Photograph 6, wetland 1, view north

Photograph 7,northern end of wetland 1, view south

Photograph 8, Southern segment of wetland 1, view southeast

Appendix C
MnRAM Wetland Management Classification

MnRAM 3.2 Digital Worksheet, Side 2

		Question Description	User entry	Rating										
	1	Veg. Table 2, Option 4		0.22										
		TOTAL VEG Rating	0.22	L										
	4	Listed, rare, special plant species?	n	next										
	5	Rare community or habitat?	n	next										
	6	Pre-European-settlement conditions?	n	next										
	7	hydrogeo & topo onal/Flow	#N/A											
	8	Water depth (inches)	60											
		Water depth (% inundation)												
	9	Local watershed/immedita drainage (acres)												
	10	Existing wetland size	0.82											
	11	SOILS: Up/Wetland (survey classification + site)												
Digital worksheet, section I	12	Outlet characteristics for flood retention	A	1										
	13	Outlet characteristics for hydrologic regime	C	0.1										
	14	Dominant upland land use (within 500 ft)	B	0.5	0.5									
	15	Soil condition (wetland)	B	0.5										
	16	Vegetation (% cover)	30%	M	0.5									
	17	Emerg. veg. flood resistance	B	0.5										
	18	Sediment delivery	C	0.1										
	19	Upland soils (based on soil group)	B	0.5										
	20	Stormwater runoff pretreatment & detention	A	1	0.1									
	21	Subwatershed wetland density	B	0.5										
	22	Channels/sheet flow	A	1										
	23	Adjacent naturalized buffer average width (feet)	30	M	WQ	0.5	L		0.1					
	24	Adjacent Area Management: % Full	60%	0.6	2	**0.8**								
		adjacent area mgmt: % Manicured	40%	0.2										
		adjacent area mgmt: % Bare	0%	0										
	25	Adjacent Area Diversity & Structure: % Native	10%	0.1	3	**0.51**								
		adjacent area diversity: % Mixed	80%	0.4										
		adjacent area diversity: % Sparse/Inv./Exotic	10%	0.01										
	26	Adjacent Area Slope: % Gentle	25%	0.25	3	**0.525**								
		adjacent area slope: % Moderate	50%	0.25										
		adjacent area slope: % Steep	25%	0.025										
Digital worksheet, section II	27	Downstream sensitivity/WQ protection	B	0.5										
	28	Nutrient loading	C	0.1										
	29	Shoreline wetland?	N	N										
	30	Rooted shoreline vegetation (%cover)	Enter a percentage											
	31	Wetland in-water width (in feet, average)	Enter a percentage											
	32	Emergent vegetation erosion resistance	Enter valid choice											
	33	Shoreline erosion potential	Enter valid cho											
	34	Bank protection/upslope veg.	Enter valid choice											
	35	Rare Wildlife	N	N										
	36	Scarce/Rare/S1/S2 local community	N	N										
	37	Vegetation interspersion cover (see diagram 1)	4	M	0.5									
	38	Community interspersion (see diagram 2)	1	L	0.1					0				
	39	Wetland detritus	B	0.5										
	40	Wetland interspersion on landscape	B	0.5	0.5									
	41	Wildlife barriers	C	0.1										
	42	Amphibian breeding potential-hydroperiod	A	1										
	43	Amphibian breeding potential--fish presence	A	1										
	44	Amphibian & reptile overwintering habitat	A	1										
	45	Wildlife species (list)	Redwing black bird											
	46	Fish habitat quality	C	0.1										
	47	Fish species (list)	N/A											
	48	Unique/rare educ./cultural/rec.opportunity	N	N										
	49	Wetland visibility	A	1										
	50	Proximity to population	Y	1										
	51	Public ownership	A	1										
	52	Public access	A	1										
	53	Human influence on wetland	C	0.1										
	54	Human influence on viewshed	C	0.1										
	55	Spatial buffer	B	0.5										
	56	Recreational activity potential	C	0.1										
	57	Commercial crop--hydrologic impact	N/A	N/A										

This comes in from Side 1 automatically using the weighted average. To use the highest rated veg. Community rating, please manually overwrite that value (shown to the right) into the field at E5.

Highest-rated: 0.3

Enter data starting here. Yellow boxes are used in calculations.

Scroll down to answer more questions and see formula calculations

Additional questions

58	***GW - Wetland soils***	R	R or D	0.1
59	***GW - Subwatershed land use***	R	R or D	0.1
60	***GW - Wetland size and soil group***	R	R or D	0.1
61	GW - Wetland hydroperiod	D	R or D	1
62	GW - Inlet/Outlet configuration	D	R or D	1
63	GW - Surrounding upland topographic relief	D	R or D	1
64	Restoration potential w/o flooding		Y or N	3.3
65	***Landowners affected by restoration***		***E a b c***	Enter valid choice
66A	***Existing wetland size (acres) [from #10]***	0.82	__ acres	
66B	Total wetland restoration size (acres)		__ acres	0.1
66C	(Calculated) Potential New Wetland Area [B-A]	-0.82	__ acres	% effectively drained: ####
67	Average width of naturalized upland buffer (poten	0	__ feet	0.1 value: ####
68	Likelihood of restoration success		a b c	Enter valid choice
69	Hydrologic alteration type		Outlet, Tile, Ditch, GW pump, Wtrshd div., Filling	
70	Potential wetland type (Circ. 39)		1, 2, 3, 4, 5, 6, 7, 8	
71	Wetland sensitivity to stormwater		E a b c	
72	Additional stormwater treatment needs		a b c	

Functional Rating Summaries

Function Name	Raw score	Final Rating	Rating Category	Formula shown to the right.
Vegetative Diversity/Integrity		0.22	L	
Hydrology - Characteristic		0.30	Low	
Flood Attenuation		0.64	Med	
Water Quality--Downstream		0.60	Med	
Water Quality--Wetland		0.26	Low	
Shoreline Protection		N/A	N/A	
Characteristic Wildlife Habitat Structure	0.28	0.28	Low	
Maintenance of Characteristic Fish Habitat	0.22	0.22	Low	
Maintenance of Characteristic Amphibian Habitat		0.32	Low	
Aesthetics/Recreation/Education/Cultural	0.49	0.49	Med	
Commercial use		N/A	N/A	0

Special Features listing: -

Groundwater Interaction	indeterminate GW source	
Groundwater Functional Index		no special indicators
Restoration Potential (draft formula)	#VALUE!	#####
Stormwater Sensitivity (not active)		

Appendix D

Feasibility Level Cost Estimates

BARR **PREPARED BY: BARR ENGINEERING COMPANY**		SHEET:	1	OF	1
		CREATED BY:	TAO2	DATE:	2/18/2021
ENGINEER'S OPINION OF PROBABLE PROJECT COST		CHECKED BY:	KJN2	DATE:	2/22/2021
PROJECT: Medley Park - Concept 1		APPROVED BY:		DATE:	
LOCATION: City of Golden Valley	ISSUED:			DATE:	
PROJECT #: 23270051.51	ISSUED:			DATE:	
OPINION OF COST - SUMMARY	ISSUED:			DATE:	

Engineer's Opinion of Probable Project Cost

Medley Park - Concept #1

Stormwater Retrofit (Feasibility Design)

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization	LS	1	$107,500	$107,500	1,2,3,4,5,6
B	Traffic and Pedestrian Safety Control Measures	LS	1	$5,000	$5,000	1,2,3,4,5,6
C	Construction Layout and Staking	LS	1	$20,000	$20,000	1,2,3,4,5,6
D	Temporary Erosion Control	LS	1	$5,500	$5,500	1,2,3,4,5,6
E	Coordinate Utility Relocation	LS	1	$4,000	$4,000	1,2,3,4,5,6
F	Removal and Disposal of Tree < 7" Diameter	EA	2	$390	$780	1,2,3,4,5,6
G	Removal and Disposal of Tree 12 inch to 28 inch Diameter	EA	5	$1,200	$6,000	1,2,3,4,5,6
H	Remove and Dispose Bituminous Pavement	SY	508	$5	$2,539	1,2,3,4,5,6
I	Sawcut Bituminous Pavement (Full Depth)	LF	24	$6	$144	1,2,3,4,5,6
J	Remove and Dispose Sewer Pipe (36" RCP)	LF	16	$30	$480	1,2,3,4,5,6
K	Remove Existing Structure	Each	1	$600	$600	1,2,3,4,5,6
L	Salvage and Place Topsoil (P)	CY	586	$10	$5,863	1,2,3,4,5,6
M	Excavation (P)	CY	12,033	$9	$108,297	1,2,3,4,5,6
N	Subgrade Excavation	CY	1,971	$11	$21,686	1,2,3,4,5,6
O	Contaminated Sediment Excavation	CY	1,499	$20	$29,980	1,2,3,4,5,6
P	Offsite Disposal of Excavated Soil (Clean)	CY	13,812	$20	$276,249	1,2,3,4,5,6
Q	Offsite Disposal of Excavated Soil (Contaminated)	TON	1,949	$30	$58,461	1,2,3,4,5,6
R	Aggregate Base (CV), Class 5	CY	228	$45	$10,250	1,2,3,4,5,6
S	Common Borrow Import	CY	1	$16	$16	1,2,3,4,5,6
T	Topsoil Import	TON	722	$40	$28,885	1,2,3,4,5,6
U	Bituminous Pavement (Typ)	SY	1,367	$30	$41,000	1,2,3,4,5,6
V	12" RCP Pipe Sewer	LF	25	$90	$2,250	1,2,3,4,5,6
W	12" RCP FES	Each	1	$680	$680	1,2,3,4,5,6,7
X	24" RCP Pipe Sewer	LF	401	$130	$52,130	1,2,3,4,5,6
Y	24" RCP FES	Each	7	$1,000	$7,000	1,2,3,4,5,6,7
Z	24" FES Trash Rack	Each	2	$1,800	$3,600	1,2,3,4,5,6
AA	48" Diameter RC Drainage Structure, Complete	Each	1	$5,500	$5,500	1,2,3,4,5,6
BB	60" Diameter RC Drainage Structure with 5-foot Weir, Complete	Each	2	$11,000	$22,000	1,2,3,4,5,6
CC	Random Riprap, Class III with Filter Fabric	TON	10	$80	$800	1,2,3,4,5,6
DD	Restoration/Planting	AC	1.4	$15,000	$21,300	1,2,3,4,5,6
EE	Clean Washed Sand	CY	1,053	$105	$110,530	1,2,3,4,5,6
FF	Small Splash Block Assembly (Pipe Discharge)	EA	2	$1,800	$3,600	1,2,3,4,5,6
GG	6" Perforated Dual Wall HDPE Draintile Pipe and Fittings (no sock) (P)	LF	632	$23	$14,536	1,2,3,4,5,6
HH	6" Draintile Cleanout and Cover Unit	EA	3	$650	$1,950	1,2,3,4,5,6
II	Planting Soil (75% sand, 25% leaf compost - MnDOT Grade II) (P)	CY	526	$60	$31,580	1,2,3,4,5,6
JJ	Plantings and Mulch	SF	14,211	$5	$71,055	1,2,3,4,5,6
KK	Dewatering	LS	1	$100,000	$100,000	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				$1,182,000	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (25%)				$296,000	1,4,8
	ESTIMATED CONSTRUCTION COST				$1,478,000	1,2,3,4,5,6,7,8
	PLANNING, ENGINEERING, & DESIGN (25%)				$370,000	1,2,3,4,5,6,7,8
	EASEMENTS					1,5,6
	PERMITTING & REGULATORY APPROVALS					1,5,6
	ESTIMATED TOTAL PROJECT COST				**$1,848,000**	1,2,3,4,5,6,7,8
	ESTIMATED ACCURACY RANGE	**-20%**			$1,479,000	1,2,3,4,5,6,7,8
		30%			$2,403,000	1,2,3,4,5,6,7,8

Notes

[1] Quantities based on Design Work Completed (1 - 15%).

[2] Unit Prices Based on Information Available at This Time.

[3] Limited Soil Boring and Field Investigation Information Available.

[4] This design level (Class 4, 1-15% design completion per ASTM E 2516-11) cost estimate is based on concept designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -20% to +30%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.

[5] Estimate assumes that projects will not be located on contaminated soil.

[6] Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.

[7] Furnish and Install pipe cost per linear foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials

[8] Estimate costs are reported to nearest thousand dollars.

BARR	**PREPARED BY: BARR ENGINEERING COMPANY**		SHEET:	1	OF	1
			CREATED BY:	TAO2	DATE:	2/18/2021
ENGINEER'S OPINION OF PROBABLE PROJECT COST			CHECKED BY:	KJN2	DATE:	2/22/2021
PROJECT:	Medley Park - Concept 2		APPROVED BY:		DATE:	
LOCATION:	City of Golden Valley	ISSUED:			DATE:	
PROJECT #:	23270051.51	ISSUED:			DATE:	
OPINION OF COST - SUMMARY		ISSUED:			DATE:	

Engineer's Opinion of Probable Project Cost

Medley Park - Concept #2

Stormwater Retrofit (Feasibility Design)

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization	LS	1	$124,300	$124,300	1,2,3,4,5,6
B	Traffic and Pedestrian Safety Control Measures	LS	1	$5,000	$5,000	1,2,3,4,5,6
C	Construction Layout and Staking	LS	1	$20,000	$20,000	1,2,3,4,5,6
D	Temporary Erosion Control	LS	1	$5,500	$5,500	1,2,3,4,5,6
E	Coordinate Utility Relocation	LS	1	$4,000	$4,000	1,2,3,4,5,6
F	Removal and Disposal of Tree < 7" Diameter	EA	2	$390	$780	1,2,3,4,5,6
G	Removal and Disposal of Tree 12 inch to 28 inch Diameter	EA	5	$1,200	$6,000	1,2,3,4,5,6
H	Remove and Dispose Bituminous Pavement	SY	249	$5	$1,247	1,2,3,4,5,6
I	Sawcut Bituminous Pavement (Full Depth)	LF	24	$6	$144	1,2,3,4,5,6
J	Remove and Dispose Sewer Pipe (36" RCP)	LF	16	$30	$480	1,2,3,4,5,6
K	Salvage and Place Topsoil (P)	CY	586	$10	$5,863	1,2,3,4,5,6
L	Excavation (P)	CY	13,236	$9	$119,124	1,2,3,4,5,6
M	Subgrade Excavation	CY	1,810	$11	$19,912	1,2,3,4,5,6
N	Contaminated Sediment Excavation	CY	1,499	$20	$29,980	1,2,3,4,5,6
O	Offsite Disposal of Excavated Soil (Clean)	CY	14,339	$20	$286,783	1,2,3,4,5,6
P	Offsite Disposal of Excavated Soil (Contaminated)	TON	1,949	$30	$58,461	1,2,3,4,5,6
Q	Aggregate Base (CV), Class 5	CY	170	$45	$7,667	1,2,3,4,5,6
R	Common Borrow Import	CY	1	$16	$16	1,2,3,4,5,6
S	Topsoil Import	TON	473	$40	$18,920	1,2,3,4,5,6
T	Bituminous Pavement (Typ)	SY	1,022	$30	$30,667	1,2,3,4,5,6
U	24" RCP Pipe Sewer	LF	250	$130	$32,500	1,2,3,4,5,6
V	24" RCP FES	Each	3	$1,000	$3,000	1,2,3,4,5,6,7
W	30" RCP Pipe Sewer	LF	73	$150	$10,950	1,2,3,4,5,6
X	30" RCP FES	Each	2	$1,310	$2,620	1,2,3,4,5,6
Y	30" FES Trash Rack	Each	1	$2,300	$2,300	1,2,3,4,5,6
Z	48" Diameter RC Drainage Structure, Complete	Each	3	$5,500	$16,500	1,2,3,4,5,6
AA	60" Diameter RC Drainage Structure with 5-foot Weir, Complete	Each	1	$11,000	$11,000	1,2,3,4,5,6
BB	14' x 5' Precast Concrete Box Culvert	LF	74	$1,040	$76,960	1,2,3,4,5,6
CC	14' x 5' Precast Concrete Box Culvert End Section	Each	2	$14,500	$29,000	1,2,3,4,5,6
DD	Random Riprap, Class III with Filter Fabric	TON	50	$80	$4,000	1,2,3,4,5,6
EE	Restoration/Planting	AC	1.2	$15,000	$17,700	1,2,3,4,5,6
FF	Clean Washed Sand	CY	1,266	$105	$132,953	1,2,3,4,5,6
GG	Small Splash Block Assembly (Pipe Discharge)	EA	1	$1,800	$1,800	1,2,3,4,5,6
HH	6" Perforated Dual Wall HDPE Draintile Pipe and Fittings (no sock) (P)	LF	1,099	$23	$25,277	1,2,3,4,5,6
II	6" Draintile Cleanout and Cover Unit	EA	6	$650	$3,900	1,2,3,4,5,6
JJ	Planting Soil (75% sand, 25% leaf compost - MnDOT Grade II) (P)	CY	633	$60	$37,987	1,2,3,4,5,6
KK	Metal Hand Rail	LF	110	$225	$24,750	1,2,3,4,5,6
LL	Plantings and Mulch	SF	17,094	$5	$85,470	1,2,3,4,5,6
MM	Turf Reinforcement Mat	SY	100	$30	$3,000	1,2,3,4,5,6
NN	Dewatering	LS	1	$100,000	$100,000	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				$1,367,000	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (25%)				$342,000	1,4,8
	ESTIMATED CONSTRUCTION COST				$1,709,000	1,2,3,4,5,6,7,8
	PLANNING, ENGINEERING, & DESIGN (25%)				$428,000	1,2,3,4,5,6,7,8
	EASEMENTS					1,5,6
	PERMITTING & REGULATORY APPROVALS					1,5,6
	ESTIMATED TOTAL PROJECT COST				**$2,137,000**	1,2,3,4,5,6,7,8
	ESTIMATED ACCURACY RANGE	**-20%**			$1,710,000	1,2,3,4,5,6,7,8
		30%			$2,779,000	1,2,3,4,5,6,7,8

Notes

[1] Quantities based on Design Work Completed (1 - 15%).

[2] Unit Prices Based on Information Available at This Time.

[3] Limited Soil Boring and Field Investigation Information Available.

[4] This design level (Class 4, 1-15% design completion per ASTM E 2516-11) cost estimate is based on concept designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -20% to +30%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.

[5] Estimate assumes that projects will not be located on contaminated soil.

[6] Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.

[7] Furnish and Install pipe cost per linear foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials

[8] Estimate costs are reported to nearest thousand dollars.

BARR	**PREPARED BY: BARR ENGINEERING COMPANY**		SHEET:	1	OF 1
			CREATED BY:	TAO2	DATE: 2/18/2021
ENGINEER'S OPINION OF PROBABLE PROJECT COST			CHECKED BY:	KJN2	DATE: 2/22/2021
PROJECT: Medley Park - Concept 3			APPROVED BY:		DATE:
LOCATION: City of Golden Valley		ISSUED:			DATE:
PROJECT #: 23270051.51		ISSUED:			DATE:
OPINION OF COST - SUMMARY		ISSUED:			DATE:

Engineer's Opinion of Probable Project Cost

Medley Park - Concept #3

Stormwater Retrofit (Feasibility Design)

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization	LS	1	$107,400	$107,400	1,2,3,4,5,6
B	Traffic and Pedestrian Safety Control Measures	LS	1	$5,000	$5,000	1,2,3,4,5,6
C	Construction Layout and Staking	LS	1	$20,000	$20,000	1,2,3,4,5,6
D	Temporary Erosion Control	LS	1	$5,500	$5,500	1,2,3,4,5,6
E	Coordinate Utility Relocation	LS	1	$4,000	$4,000	1,2,3,4,5,6
F	Removal and Disposal of Tree < 7" Diameter	EA	2	$390	$780	1,2,3,4,5,6
G	Removal and Disposal of Tree 12 inch to 28 inch Diameter	EA	5	$1,200	$6,000	1,2,3,4,5,6
H	Remove and Dispose Bituminous Pavement	SY	508	$5	$2,539	1,2,3,4,5,6
I	Sawcut Bituminous Pavement (Full Depth)	LF	24	$6	$144	1,2,3,4,5,6
J	Salvage and Place Topsoil (P)	CY	586	$10	$5,863	1,2,3,4,5,6
K	Excavation (P)	CY	18,875	$9	$169,875	1,2,3,4,5,6
L	Subgrade Excavation	CY	1,245	$11	$13,695	1,2,3,4,5,6
M	Contaminated Sediment Excavation	CY	1,499	$20	$29,980	1,2,3,4,5,6
N	Offsite Disposal of Excavated Soil (Clean)	CY	19,373	$20	$387,460	1,2,3,4,5,6
O	Offsite Disposal of Excavated Soil (Contaminated)	TON	1,949	$30	$58,461	1,2,3,4,5,6
P	Aggregate Base (CV), Class 5	CY	519	$45	$23,333	1,2,3,4,5,6
Q	Common Borrow Import	CY	1	$16	$16	1,2,3,4,5,6
R	Topsoil Import	TON	407	$40	$16,296	1,2,3,4,5,6
S	Bituminous Pavement (Typ)	SY	1,556	$30	$46,667	1,2,3,4,5,6
T	24" RCP Pipe Sewer	LF	119	$130	$15,470	1,2,3,4,5,6
U	24" RCP FES	Each	4	$1,000	$4,000	1,2,3,4,5,6,7
V	24" FES Trash Rack	Each	2	$1,800	$3,600	1,2,3,4,5,6
W	14' x 5' Precast Concrete Box Culvert	LF	74	$1,040	$76,960	1,2,3,4,5,6
X	14' x 5' Precast Concrete Box Culvert End Section	Each	2	$14,500	$29,000	1,2,3,4,5,6
Y	Random Riprap, Class III with Filter Fabric	TON	50	$80	$4,000	1,2,3,4,5,6
Z	Restoration/Planting	AC	1.1	$15,000	$16,800	1,2,3,4,5,6
AA	Metal Hand Rail	LF	110	$225	$24,750	1,2,3,4,5,6
BB	Turf Reinforcement Mat	SY	100	$30	$3,000	1,2,3,4,5,6
CC	Dewatering	LS	1	$100,000	$100,000	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				$1,181,000	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (25%)				$295,000	1,4,8
	ESTIMATED CONSTRUCTION COST				$1,476,000	1,2,3,4,5,6,7,8
	PLANNING, ENGINEERING, & DESIGN (25%)				$369,000	1,2,3,4,5,6,7,8
	EASEMENTS					1,5,6
	PERMITTING & REGULATORY APPROVALS					1,5,6
	ESTIMATED TOTAL PROJECT COST				**$1,845,000**	1,2,3,4,5,6,7,8
ESTIMATED ACCURACY RANGE		**-20%**			$1,476,000	1,2,3,4,5,6,7,8
		30%			$2,399,000	1,2,3,4,5,6,7,8

Notes

[1] Quantities based on Design Work Completed (1 - 15%).

[2] Unit Prices Based on Information Available at This Time.

[3] Limited Soil Boring and Field Investigation Information Available.

[4] This design level (Class 4, 1-15% design completion per ASTM E 2516-11) cost estimate is based on concept designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -20% to +30%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.

[5] Estimate assumes that projects will not be located on contaminated soil.

[6] Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.

[7] Furnish and Install pipe cost per linear foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials

[8] Estimate costs are reported to nearest thousand dollars.