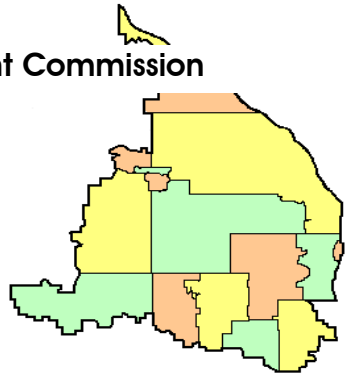
Shingle Creek Watershed Management Commission

West Mississippi Watershed Management Commission



3235 Fernbrook Lane N • Plymouth, MN 55447
Tel: 763.553.1144 • Fax: 763.553.9326
Email: judie@jass.biz • Website: www.shinglecreek.org

July 1, 2021

Commissioners
Members of the TAC
Shingle Creek and West Mississippi
Watershed Management Commissions
Hennepin County, Minnesota

The agendas and meeting packets for both the TAC and regular meetings are available to all interested parties on the Commission's web site at http://www.shinglecreek.org/tac-meetings.html **and** http://www.shinglecreek.org/minutes--meeting-packets.html

Dear Commissioners and Members:

Regular meetings of the Shingle Creek and West Mississippi Watershed Management Commissions will be held **Thursday, July 8, 2021, at 12:45 p.m.** This will be a virtual meeting.

The Joint SCWM Technical Advisory Committee will meet at 11:30 a.m., prior to the regular meetings.

To join the meetings, click on the link below which takes you directly to the meeting:
https://us02web.zoom.us/j/834887565?pwd=N3MvZThacmNRVDFrOWM3cU1KRU5qQT09,

OR, go to www.zoom.us **and click Join A Meeting. Please use the regular meeting ID and passcode for both meetings.** The meeting ID is **834-887-565.** The passcode for this meeting is **water.**

If your computer is not equipped with audio capability, you need to dial into one of these numbers:

+1 929 205 6099 US (New York)	+1 312 626 6799 US (Chicago)	+1 669 900 6833 US (San Jose)
+1 346 248 7799 US (Houston)	+1 253 215 8782 US	+1 301 715 8592 US

Meetings remain open to the public via the instructions above.

Please email me at judie@jass.biz to confirm whether you or your Alternate will be attending the regular and TAC meetings. Thank you.

Regards,

Judie A. Anderson
Administrator

cc:	Alternate Commissioners	Member Cites	Troy Gilchrist	TAC Members
	Wenck-Stantec	BWSR	MPCA	Met Council

Z:\Shingle Creek\Meetings\Meetings 2021\07 Notice_Regular and TAC Meetings .docx

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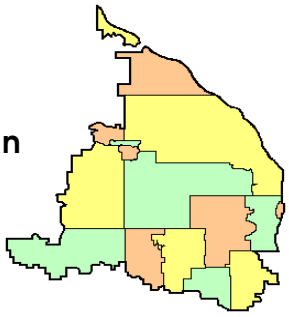

A combined regular meeting of the Shingle Creek and West Mississippi Watershed Management Commissions will be convened on Thursday, July 8, 2021, at 12:45 p.m. Agenda items are available at **http://www.shinglecreek.org/ minutes--meeting-packets.html**.
Black typeface denotes SCWM items, blue denotes SC items, green denotes WM items.

To join the meeting, click https://zoom.us/j/834887565 or go to www.zoom.us and click Join A Meeting. The meeting ID is **834-887-565,** the passcode is **water.** If your computer is not equipped with audio capability, dial into one of these numbers:
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A G E N D A
July 8, 2021

		1.	Call to Order.	
	SCWM		a. Roll Call.	
√	SCWM		b. Approve Agenda.*	
√	SCWM		c. Approve Minutes of Last Meeting.*	
		2.	Reports.	
	SC		a. Shingle Creek.	
√	SC		1) Treasurer's Report and Claims** - voice vote.	
	WM		b. West Mississippi.	
√	WM		1) Treasurer's Report and Claims** - voice vote.	
		3.	Open forum.	
		4.	Project Reviews.	
√	WM		a. WM2021-010 Xylon Avenue Extension, Brooklyn Park.*	
	SCWM	5.	Technical Advisory Committee Report - verbal.	
		6.	Watershed Management Plan.	
√	SCWM		a. Approve Scope of Services.*	
√	SCWM		b. Authorize Request for Agency/City Input.*	
√	SCWM		c. Set kickoff Meeting for September 9, 2021.*	
		7.	Water Quality.	
√	SC		a. Approve New Hope Cost Share Reimbursement Request.*	
√	SC		b. Accept Gaulke Pond and Crystal Lake Pump Operating Plan.*	
		8.	Grant Opportunities.	
	SCWM		a. Clean Water Fund Grants.	
			1) Announcement.*	
			2) Criteria.*	
√	SC		b. Palmer Lake Estates.*	

over

SCWM 9. Education and Public Outreach.
- a. WMWA – update.**
- b. Next WMWA meetings – 8:30 a.m., Tuesday, July 13, and Tuesday, August 10, 2021. *Virtual meetings at* https://us02web.zoom.us/j/922390839?pwd=RU95T2ttL3FzQmxHcU9jcFhDdng1QT09. Meeting ID: 922 390 839 | Passcode: water | or by phone using numbers above.

SCWM 10. Communications.
- SCWM a. Staff Report.*
- SCWM b. Communications Log.*
- SCWM c. Hennepin County Natural Resources Strategic Plan.*
- SC d. Shingle Creek on TV.*
  - 1) 2000 Carp Removed.*
  - 2) Invasive Carp Removal … Really Cool.*
  - 3) Crystal Lake Carp Management – more details.*
- WM e. River Park Re-Opening.*
- SC f. Crescent Cove.*
- SC g. MnDRIVE Research Grant Recipients.*

11. Other Business.
- SCWM a. Insurance Coverages.*
- SCWM b. In-person Meeting Survey Results.*

12. Adjournment.

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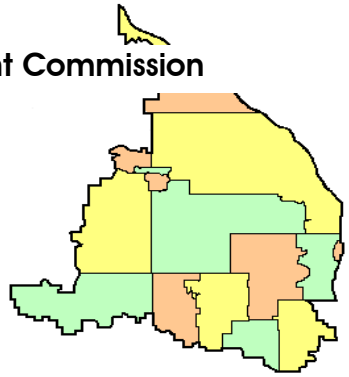


REGULAR MEETING MINUTES
June 10, 2021
(Action by the SCWMC appears in blue, by the WMWMC in green and shared information in black.
*indicates items included in the meeting packet.)

I. A joint virtual meeting of the Shingle Creek Watershed Management Commission and the West Mississippi Watershed Management Commission was called to order by Shingle Creek Chairman Andy Polzin at 12:47 p.m. on Thursday, June 10, 2021.

Present for Shingle Creek were: David Vlasin, Brooklyn Center; Burton Orred, Jr., Crystal; Karen Jaeger, Maple Grove; Ray Schoch, Minneapolis; Bob Grant, New Hope; John Roach, Osseo; Andy Polzin, Plymouth; Wayne Sicora, Robbinsdale; Ed Matthiesen, Diane Spector, and Todd Shoemaker, Wenck-Stantec; Troy Gilchrist, Kennedy & Graven; and Judie Anderson, Amy Juntunen, and Beverly Love, JASS. Not represented: Brooklyn Park.

Present for West Mississippi were: David Vlasin, Brooklyn Center; Alex Prasch, Brooklyn Park; Gerry Butcher, Champlin; Karen Jaeger, Maple Grove; Harold Johnson, Osseo; Ed Matthiesen and Diane Spector, Wenck-Stantec; Troy Gilchrist, Kennedy & Graven; and Judie Anderson, Amy Juntunen, and Beverly Love, JASS.

Also present were: Melissa Collins, Mitch Robinson, and Samantha Nguyen, Brooklyn Park; Derek Asche, Maple Grove; Megan Hedstrom, New Hope; Ben Scharenbroich, Plymouth; Richard McCoy and Marta Roser, Robbinsdale; and Jacob Zea, Wenck/Stantec.

II. Agendas and Minutes.

Motion by Schoch, second by Jaeger to approve the **Shingle Creek agenda*** as amended. *Motion carried unanimously.*

Motion by Butcher, second by Johnson to approve the **West Mississippi agenda** as amended.* *Motion carried unanimously.*

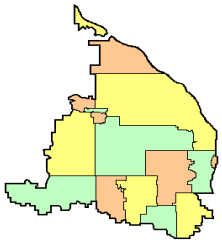
Motion by Schoch, second by Roach to approve the **minutes of the May 13, 2021, regular and public meetings.*** *Motion carried unanimously.*

Motion by Johnson, second by Butcher to approve the **minutes of the May 13, 2021, regular meeting.*** *Motion carried unanimously.*

III. Finances and Reports.

A. Motion by Schoch, second by Roach to approve the Shingle Creek **June Treasurer's Report* and claims** totaling $72,548.82. Voting aye: Vlasin, Orred, Jaeger, Schoch, Grant, Roach, Polzin, and Sicora; voting nay – none; absent – Brooklyn Park.

B. Motion by Schoch, second by Orred to accept the **2020 Audit Report.** *Motion carried unanimously.* It was prepared by Johnson and Company, Ltd. and will be submitted to the State Auditor as prescribed by Statute by June 30, 2021.



C. Motion by Johnson, second by Jaeger to approve the **West Mississippi June Treasurer's Report* and claims** totaling $19,664.22. Voting aye: Vlasin, Prasch, Butcher, Jaeger, and Johnson; voting nay – none.

D. Motion by Johnson, second by Butcher to accept the **2020 Audit Report.** *Motion carried unanimously.* It was prepared by Johnson and Company, Ltd. and will be submitted to the State Auditor as prescribed by Statute by June 30, 2021.

IV. Open Forum.

Staff will survey the members regarding **returning to in-person meetings.**

V. Project Reviews.

A. SC2021-03 Walser Hyundai, Brooklyn Park.* Redevelopment of two existing dealerships into a single building with parking lots and utility improvements on a 5.1-acre site located at 8100 Lakeland Avenue North, Brooklyn Park. The existing sites were constructed without any treatment or rate control. Prior to reconstruction the site was 83.4% impervious. Following redevelopment, the site will be 78.6 percent impervious with 4.0 acres of impervious surface, a decrease of 0.25 acres. A complete project review application was received May 13, 2021.

To comply with the Commission's water quality treatment requirement, the site must provide ponding designed to NURP standards with dead storage volume equal to or greater than the volume of runoff from a 2.5" storm event, or BMPs providing a similar level of treatment - 85% TSS removal and 60% TP removal. Infiltrating 1.3 inches of runoff, for example, is considered sufficient to provide a similar level of treatment. If a sump is used the MnDOT Road Sand particle size distribution is acceptable for 80% capture.

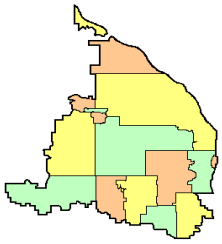
Runoff from the site is proposed to be routed to two underground infiltration galleries, which have the capacity to infiltrate 1.3 inches of runoff in less than 48 hours. The applicant meets Commission water quality treatment requirements.

Commission rules require that site runoff be limited to predevelopment rates for the 2-, 10-, and 100-year storm events. Runoff from the site is routed to two underground infiltration galleries and then to city storm sewer. Two small areas that are entirely pervious grassy areas flow to adjacent parcels. Those areas are zero discharge except for 100-year events, when the rate of runoff is 0.2 and 0.1 cfs. A small area along the boulevard flows directly into Lakeland Street. The post-construction runoff rates for that area are less than pre-construction rates. The bulk of the site is routed through the galleries, and post construction rates are less than pre-construction rates. The applicant meets Commission rate control requirements.

Commission rules require the site to infiltrate 1.0 inch of runoff from new impervious area within 48 hours. While the site as redeveloped has 0.25 acres less impervious surface, the newly reconstructed impervious area on this site is just over 4.0 acres, requiring infiltration of 0.44 acre-feet, or 18,936 CF within 48 hours. The proposed infiltration galleries provide 21,083 CF of storage and can infiltrate the required volume within 48 hours. The applicant meets Commission volume control requirements.

The erosion control plan includes a rock construction entrance, perimeter silt fence, inlet protection, and a turf establishment plan. The erosion control plan meets Commission requirements.

The National Wetlands Inventory does not identify any wetlands on site. The applicant meets Commission wetland requirements. There are no Public Waters on this site. The applicant meets Commission Public Waters requirements.



There is no FEMA-regulated floodplain on this site. Stormwater storage is underground. The applicant meets Commission floodplain requirements.

The site is located in a Drinking Water Management Area (DWSMA) but is outside of the Emergency Response Area. Therefore, infiltration is permitted, but infiltrated water must first filter through 1 foot of soil, the top four inches of which are amended topsoil, and the bottom 8 inches of which are tilled. The applicant proposes 18" of fine filter aggregate atop native soil. The applicant meets Commission drinking water protection requirements.

A public hearing on the project was conducted on June 9, 2021, as part of Planning Commission and City Council review of this project, meeting Commission public notice requirements.

A draft Operations & Maintenance (O&M) agreement between the applicant and the City of Brooklyn Park was not provided.

Motion by Jaeger, second by Schoch to advise the City of Brooklyn Park that project review SC2021-03 is approved with the following conditions:

1. Provide a complete O&M agreement between the applicant and the City of Brooklyn Park for all stormwater facilities on the project site.

2. Demonstrate by double ring infiltrometer or witness test that the site can meet the design infiltration rate of 0.8 inches/hour.

Motion carried unanimously.

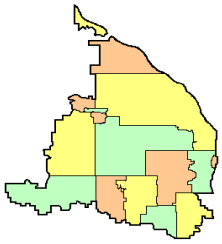
B. SC2021-04 Keller Williams, Maple Grove.* Construction of an office building, parking lots, utilities, and stormwater treatment on a 4.6-acre site located at 104102 73rd Avenue North, Maple Grove. Following development, the site will be 35.8 percent impervious with 1.65 acres of impervious surface, an increase of 1.65 acres. A complete project review application was received May 28, 2021.

To comply with the Commission's water quality treatment requirement, the site must provide ponding designed to NURP standards with dead storage volume equal to or greater than the volume of runoff from a 2.5" storm event, or BMPs providing a similar level of treatment - 85% TSS removal and 60% TP removal. Infiltrating 1.3 inches of runoff, for example, is considered sufficient to provide a similar level of treatment. If a sump is used the MnDOT Road Sand particle size distribution is acceptable for 80% capture.

Runoff from the site is proposed to be routed to an infiltration basin that feeds into a pond. 6,589 CF of infiltration are required and 6,707 CF are provided. The applicant must show a minimum 3' separation between the bottom of the infiltration basin and the seasonally high ground water. It is unclear if the applicant meets Commission water quality treatment requirements due to the apparent high normal water level of the adjacent pond.

Commission rules require that site runoff be limited to predevelopment rates for the 2-, 10-, and 100-year storm events. Runoff from the site is directed into an infiltration basin. The applicant meets Commission rate control requirements.

Commission rules require the site to infiltrate 1.0 inch of runoff from new impervious area within 48 hours. The new impervious area on this site is 1.65 acres, requiring infiltration of 6,589 CF within 48 hours. The applicant proposes to an infiltration basin that has the capacity to infiltrate the required volume within 48 hours. The applicant meets Commission volume control requirements.



The erosion control plan includes a rock construction entrances, perimeter silt fence/biolog, silt fence surrounding detention ponds/infiltration basins, inlet protection, rip rap at inlets. The erosion control plan meets Commission requirements.

The National Wetlands Inventory does not identify any wetlands on site. The applicant meets Commission wetland requirements. There are no Public Waters on this site. The applicant meets Commission Public Waters requirements.

There is no FEMA-regulated floodplain on this site. The low floor elevations of the buildings are at least two feet higher than the high-water elevation of the detention ponds/infiltration basins according to Atlas 14 precipitation. The adjacent pond 100-yr HWL is 887.2 and the proposed building first floor elevation is 893.0. The applicant meets Commission floodplain requirements.

The site is not located in a Drinking Water Management Area (DWSMA). The applicant meets Commission drinking water protection requirements.

The project is schedule to be on the June 14, 2021, Planning Commission meeting. The Commission public notice requirement has been met.

A draft Operations & Maintenance (O&M) agreement between the applicant and the City of Maple Grove must be provided.

Motion by Jaeger, second by Orred to advise the City of Maple Grove that project review SC2021-04 is approved with the following conditions:

1. Provide a complete O&M agreement between the applicant and the City of Maple Grove for all stormwater facilities on the project site. (A draft agreement has been provided.)

2. Demonstrate that the proposed infiltration basin has a minimum 3-foot separation between the basin bottom and the seasonally high ground water or revise the pond to a wet basin following MPCA guidelines.

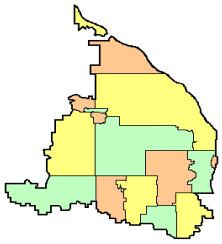
3. Demonstrate by double ring infiltrometer or witness test that the site can meet the design infiltration rate of 0.08 inches/hour.

Motion carried unanimously.

C. WM-2021-07 Twin Cities Twisters, Champlin.* Construction of two-story athletic facility, parking lot, and stormwater treatment area on 4.0 acres located at Business Park Boulevard North, Champlin. Following development, the site will be 70% percent impervious with 2.80 acres of impervious surface, an increase of 2.80 acres. A complete project review application was received May 24, 2021.

To comply with the Commission's water quality treatment requirement, the site must provide ponding designed to NURP standards with dead storage volume equal to or greater than the volume of runoff from a 2.5" storm event, or BMPs providing a similar level of treatment - 85% TSS removal and 60% TP removal. Infiltrating 1.3 inches of runoff, for example, is considered sufficient to provide a similar level of treatment. If a sump is used the MnDOT Road Sand particle size distribution is acceptable for 80% capture.

Runoff from 92% of the site is to be routed to an infiltration basin on the east property line. The 1.3" volume is 13,199 CF and the applicant is proposing 24,468 CF of infiltration capacity. The applicant meets Commission water quality treatment requirements.



Commission rules require that site runoff be limited to predevelopment rates for the 2-, 10-, and 100-year storm events. Runoff from the site is controlled by the infiltration basin and outlet control structure. The applicant meets Commission rate control requirements.

Commission rules require the site to infiltrate 1.0 inch of runoff from new impervious area within 48 hours. The new impervious area on this site is 4.0 acres, requiring infiltration of 10,153 CF within 48 hours. The applicant proposes to install an infiltration basin that has the capacity to infiltrate 24,468 CF within 48 hours. The applicant meets Commission volume control requirements.

The erosion control plan includes a rock construction entrance, perimeter silt fence/biolog, silt fence surrounding detention ponds/infiltration basins, inlet protection. The erosion control plan meets Commission requirements.

The National Wetlands Inventory does not identify any wetlands on site. The applicant meets Commission wetland requirements. There are no Public Waters on this site. The applicant meets Commission Public Waters requirements.

There is no FEMA-regulated floodplain on this site. The low floor elevation of the building (864.0) is at least two feet higher than the high-water elevation of the detention ponds/infiltration basins (857.5) according to Atlas 14 precipitation. The applicant meets Commission floodplain requirements.

The site is located in a Drinking Water Management Area, but is outside of the Emergency Response Area. Therefore, infiltration is permitted, but infiltrated water must first filter through 1 foot of soil, the top four inches of which are amended topsoil, and the bottom 8 inches of which are tilled. The applicant proposes infiltrating no faster than 0.8 inches/hour. The applicant meets Commission drinking water protection requirements.

The City of Champlin will send notification to properties within 350' of the project during the week of June 6, 2021, and the project is scheduled to appear before the Planning Commission on June 21, 2021. This notification meets the Commission public notice requirements.

A draft Operations & Maintenance (O&M) agreement between the applicant and the City of Champlin must be provided.

Motion by Butcher, second by Johnson to advise the City of Champlin that project review WM2021-07 is approved with the following conditions:

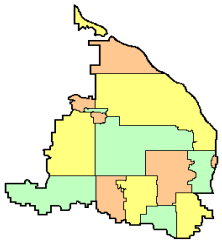
1. Provide a complete O&M agreement between the applicant and the City of Champlin for all stormwater facilities on the project site.

2. Demonstrate by double ring infiltrometer or witness test that the site can meet the design infiltration rate of 0.8 inches/hour post construction.

Motion carried unanimously.

D. WM2021-08 610 Commerce Center Phase 3, Brooklyn Park.* Construction (third phase) of office/warehouse building on 7.475 acres located at 6360 West Broadway, Brooklyn Park. Following development, the site will be 85 percent impervious with 5.0 acres of impervious surface, an increase of 5.0 acres. A complete project review application was received May 27, 2021.

To comply with the Commission's water quality treatment requirement, the site must provide ponding designed to NURP standards with dead storage volume equal to or greater than the volume of runoff



from a 2.5" storm event, or BMPs providing a similar level of treatment - 85% TSS removal and 60% TP removal. Infiltrating 1.3-inches of runoff, for example, is considered sufficient to provide a similar level of treatment. If a sump is used the MnDOT Road Sand particle size distribution is acceptable for 80% capture.

Runoff from the site is proposed to be routed to two infiltration basins, one on the east and one on the west. The applicant is meeting the 1.3" infiltration volume for the combined three buildings. 93,610 CF are required and 102,622 CF are provided. The applicant meets Commission water quality treatment requirements.

Commission rules require that site runoff is limited to predevelopment rates for the 2-, 10-, and 100-year storm events. Runoff from the site is directed into two infiltration basins. The applicant meets Commission rate control requirements.

Commission rules require the site to infiltrate 1.0 inch of runoff from new impervious area within 48 hours. The total impervious area on this site requires infiltration of 93,610 CF within 48 hours. The applicant proposes two infiltration basins that have the capacity to infiltrate 102,622 CF within 48 hours. The applicant meets Commission volume control requirements.

The erosion control plan includes rock construction entrances, perimeter silt fence/biolog, silt fence surrounding detention ponds/infiltration basins, inlet protection, rip rap at inlets. The erosion control plan meets Commission requirements.

The National Wetlands Inventory does not identify any wetlands on site. The applicant meets Commission wetland requirements. There are no Public Waters on this site. The applicant meets Commission Public Waters requirements.

There is no FEMA-regulated floodplain on this site. The low floor elevations of the buildings are at least two feet higher than the high-water elevation of the detention ponds/infiltration basins according to Atlas 14 precipitation. The 100-yr elevations are 872.30 for the east and 876.90 for the west ponds compared to the building first floor elevation of 882.0. The applicant meets Commission floodplain requirements.

The site is not located in a Drinking Water Management Area (DWSMA). The applicant meets Commission drinking water protection requirements.

The project has not had a public hearing or is scheduled to be on a Planning Commission meeting. The applicant is considering a revised plan with a smaller office building. The public notification does not meet Commission public notice requirements.

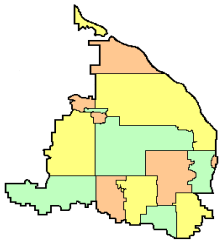
A draft Operations & Maintenance (O&M) agreement between the applicant and the City of Brooklyn Park was not provided.

Motion by Prasch, second by Butcher to advise the City of Brooklyn Park that project review WM2021-08 is approved with the following conditions:

1. Provide a complete O&M agreement between the applicant and the City of Brooklyn Park for all stormwater facilities on the project site.

2. Demonstrate by double ring infiltrometer or witness test that the site can meet the design infiltration rate of 0.8 inches/hour.

3. Provide documentation that the public within 300 feet of the project has been informed of the proposed project.



Motion carried unanimously.

E. WM2021-09 / SC2021-05 CenterPoint Energy – Wyoming Avenue – Brooklyn Park.* Installation of 10,746 LF of 8, 6 and 4" plastic and steel natural gas pipeline and a new regulator station on a 4.9-acre site. The south endpoint of the project is located at Wyoming and 85th Avenues, the north endpoint is located at Winnetka Avenue and Highway 610. Following development, a 1,000 SF pad will be added at a regulator station. A complete project review application was received May 21, 2021.

To comply with the Commission's water quality treatment requirement, the site must provide ponding designed to NURP standards with dead storage volume equal to or greater than the volume of runoff from a 2.5" storm event, or BMPs providing a similar level of treatment - 85% TSS removal and 60% TP removal. Infiltrating 1.3-inches of runoff, for example, is considered sufficient to provide a similar level of treatment. If a sump is used the MnDOT Road Sand particle size distribution is acceptable for 80% capture.

The proposed project has no new increase in impervious area and, therefore, meets Commission requirements.

Commission rules require that site runoff is limited to predevelopment rates for the 2-, 10-, and 100-year storm events. There is no change in impervious surface and, therefore, the applicant meets the Commission rate control requirements.

Commission rules require the site to infiltrate 1.0 inch of runoff from new impervious area within 48 hours. The new impervious area on this site is 0 acres, requiring infiltration of 0 acre-feet (CF) within 48 hours. The applicant meets Commission volume control requirements.

The erosion control plan includes (a) perimeter silt fence/biolog, silt fence, inlet protection, mulch, road cleaning, sandbag, and seeding. The erosion control plan meets Commission requirements.

The National Wetlands Inventory does not identify any wetlands on site. The applicant meets Commission wetland requirements. There are Public Waters on this site. The project proposes to go under Edinburgh Channel and proposes no fill. The applicant meets Commission Public Waters requirements.

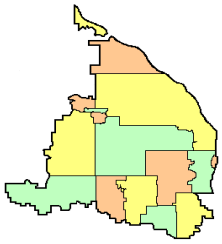
The project does not affect FEMA-regulated floodplain. However, there is one proposed crossing of Edinburgh Channel near 89th and Wyoming Ave. It is advised the top of the proposed pipe be a minimum of 4' below the existing channel bottom for safety and unanticipated channel movement.

The site is not located in a Drinking Water Management Area (DWSMA). [The site is located in a Drinking Water Management Area, but is outside of the Emergency Response Area. Therefore, infiltration is permitted, but infiltrated water must first filter through 1 foot of soil, the top four inches of which are amended topsoil, and the bottom 8 inches of which are tilled. The applicant does not need to infiltrate.] The applicant meets Commission drinking water protection requirements.

The applicant, through the Corps of Engineers General Permit application process, has notified all parties within 300 feet of construction, meeting Commission public notice requirements.

A draft Operations & Maintenance (O&M) agreement between the applicant and the City of Brooklyn Park is not needed.

Motion by Jaeger, second by Prasch to advise the City of Brooklyn Park that project review WM2021-09 is approved conditioned that an as-built elevation be provided for the pipe crossing of the channel near 89th and Wyoming Ave. to show a minimum 4' separation between the top of the new pipe and the bottom of the existing channel.



Motion carried unanimously.

Motion by Schoch, second by Roach to advise the City of Brooklyn Park that project review SC2021-005 is approved with the same condition.

Motion carried unanimously.

VI. Watershed Management Plan.

A. 2021 Maximum Levy.*

At this time, the Commissions must set the maximum amounts of capital projects levy they expect to certify to Hennepin County. The actual levies will be certified in September, after the Commissions hold public hearings on the proposed projects. Tables 1 and 2 show the CIP projects that will be considered in September. The Maximum Levy sets the ceiling for the capital levy; the Commissions can certify a lesser levy amount but cannot increase it. In 2016 the Commissions began levying an additional 5% to cover administrative costs, and an additional 1% to cover uncollected levies, based on the historical rate of uncollectables. These maximum levies will be forwarded to Hennepin County by mid-June.

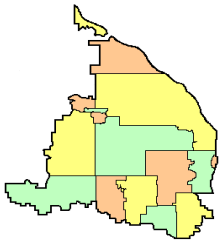
Table 1. Shingle Creek 2021 CIP Projects (2022 levy).

Project	Total Est. Cost	City/ Private	Grant	Commission Share	Total Levy Amount
Cost share (city projects)	$200,000	$100,000	0	$100,000	$106,050
Partnership cost share (private projects)	50,000	0	0	50,000	53,025
Palmer Lake Estates Bass Creek Restoration	600,000	0	0	600,000	636,300
Phase 2 SRP Channel Extension	125,000	0	0	125,000	132,565
Subtotal	**$975,000**	**$100,000**	**$0**	**$875,000**	
5% additional for legal/admin costs				**43,750**	
Subtotal				**918,750**	
TOTAL LEVY (101% for uncollectable)				**$927,940**	**$927,940**

Motion by Schoch, second by Roach to certify $927,940 as Shingle Creek's 2021 levy (pay 2022). *Motion carried unanimously.*

Table 2. West Mississippi 2021 CIP Projects (2022 levy).

Project	Total Estimated	City/ Private	Grant	Commission Share	Total Levy Amount
Cost share (city projects)	$100,000	$50,000	0	$50,000	$53,025
Partnership Cost Share	100,000	0	0	100,000	106,050
Subtotal	**$150,000**	**$50,000**	**$ 0**	**$150,000**	
5% additional for legal/admin costs				**7,500**	
Subtotal				**157,500**	
TOTAL LEVY (101% for uncollectable)				**$159,075**	**$159,075**



Motion by Jaeger, second by Butcher to certify $159,075 as West Mississippi's 2021 levy (pay 2022). *Motion carried unanimously.*

B. Technical Advisory Committee Report.

Matthiesen and McCoy recapped the **Technical Advisory Committee meeting** held earlier today. Shoemaker presented an update of the Ryan Lake Subwatershed Assessment; Spector led the members in a brainstorming discussion of the elements of the Fourth Generation Watershed Management Plan; and Staff provided members with an update on the SRP Channel Filter project. These items will also be discussed later in this meeting.

The next TAC meeting is scheduled for 11:30 a.m., prior to the Commissions' July 8, 2021, regular meeting.

C. Fourth Generation Watershed Management Plan.*

Spector led a brainstorming session to start the members thinking about what to include in the Fourth Generation Watershed Management Plan and how to proceed. Staff will use the outcome of this discussion to put together a scope of work and budget for consideration at the July TAC/Commission meetings.

The Commissions' Third Generation Plan was approved by the Board of Water and Soil Resources (BWSR) March 2013 and adopted in April 2013. The Plan covers the period 2013-2022, meaning the Commissions should plan on achieving a BWSR-approved plan by the end of 2022 so it can be in place to cover the period 2023-2032. To allow six months for the review and approval process, a draft Fourth Generation Plan should be completed by mid-2022.

Under State Statues and Minnesota Rules 8410, which govern what must be included in the watershed management plan, much of the background information that was developed over the course of the first three plans does not need to be repeated except to reflect any changed conditions, such as updated land use information, or newly-identified Impaired Waters. Most of the focus will be on updating goals and policies and the Implementation Plan. As long as the Commissioners meet the regulatory minimums for what must be in the Plan, the rest is up to them.

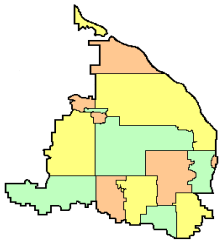
Listed below are a few things that have come up in previous discussions or from Staff brainstorming. These are a starting point; Commissioners are urged to suggest other topics to be considered. The purpose of this discussion is not to solve or debate these questions but for Staff to get a better understanding of the level of effort to address them and to complete the Plan update.

(1) Do the Commissions wish to revisit merging into a single Joint Powers Organization or remain separate but jointly administered? The current JPA terminates January 1, 2025, so at a minimum it must be renewed during the life of the Fourth Generation Plan.

(2) Presumably the existing TAC will serve as the TAC for the Plan. Do you wish to recruit and involve a Citizens Advisory Committee (CAC)? If so, how?

(3) How do you want to involve elected officials or City Managers? In past planning we have had a single meeting for City Managers to get them up to speed and hear their needs and thoughts.

(4) What type of public participation process should be undertaken for this Plan? What should be the role of the lake associations? Since much of the watershed falls into the MPCA's Areas of Environmental Justice Concern, should we plan on making a special effort to reach out to underserved communities or non-English speakers?



(5) Do you want the Plan to be a simple update that consists mainly of Implementation Plan, or do you want a stand-alone plan that also incorporates all the inventory data and TMDL 5-Year Review findings that serves as a more comprehensive volume?

(6) One big policy question is: as implementation expands from solely "brick and mortar" type capital projects to include other ongoing or maintenance type activities such as rough fish management, aquatic invasive species management, maintenance of installed projects, etc., who should be responsible for each and how should they be financed? Where is the line between city responsibility and Commission responsibility?

(7) Another big policy question is addressing sustainability and resiliency and addressing the impacts of climate change on water and natural resources. What are your thoughts about level of focus?

(8) Are there updates to the current Rules and Standards that need to be considered? At a minimum there are some modifications that are necessary to reflect the most recent General Stormwater permit, but are there others?

(9) Are there other policy topics that need to be covered during the plan process?

Generally, the comments from the Commissioners seemed to reflect those of the TAC members. Spector will return to the July TAC and regular meetings with a scope of content as well as a calendar/timeline of activities to be completed.

VII. Water Quality.

Ryan Lake Subwatershed Assessment.* Earlier this year the Commission authorized development of a subwatershed assessment for Ryan Lake to assess the potential impacts of pumping discharge from two landlocked systems into Ryan - the Gaulke Pond chain in the city of Crystal, and Crystal Lake in Robbinsdale. Each depends on permanent pumps to manage water levels and minimize flooding. Over the six years from 2014 to 2019, the Twin Cities received what was effectively an extra year of precipitation. This required each City to actively manage pumping more than ever before and motivated this study to determine potential downstream effects of increasing the discharge from and changing the timing of pumping from Gaulke Pond and Crystal Lake.

Here, and at the TAC meeting earlier today, Staff presented the results of this study, which was based on a model created by merging two existing PCSWMM hydrologic and hydraulic models: the Shingle Creek Watershed Management Commission preliminary HUC-8 model ("Commission Model") and the Gaulke Pond watershed model developed for the City of Crystal *Central Core Stormwater Project*.

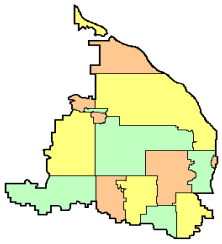
Two baseline or existing conditions were established based on existing Minnesota Department of Natural Resources (DNR) permits for pumping from Crystal Lake. Staff then used the baseline models to evaluate eleven different alternatives or modifications to Gaulke Pond, Crystal Lake and other watershed features. These alternatives include modifying storm sewer, adding storage in the upper watershed, and various pumping scenarios. General conclusions from the alternatives analysis included:

A. Crystal Lake – slight reductions to the maximum water surface elevations but significant reductions to the duration of high-water on Crystal Lake for the 10-, 50-, and 100-year events.

B. Gaulke Pond – maximum water levels were reduced by 0.1 to 0.3 feet and the durations of high-water reduced by up to one-third.

C. Twin Lake and Ryan Lake –

1. Some alternatives may increase the duration of high-water on Twin Lake with a simultaneous reduction of high-water duration on Ryan Lake.



2. Some alternatives will increase the 100-year flood elevation of Ryan Lake by up to 0.1 feet compared to the Baseline 1 Model. However, there is no change to the 100-year flood elevation when compared to Baseline 2 as a result of proposed pumping on Crystal Lake and Gaulke Pond, which also reflects an existing permitted operating condition.

D. Permanent pumping from Crystal Lake to Ryan Lake may increase total phosphorus loading to Ryan Lake by up to four percent. This is not significant, so pumping from Crystal Lake to Ryan Lake is not expected to negatively impact the water quality of Ryan Lake.

VIII. Grant Opportunities.

SRP Channel Filter Project.* The Commission has previously discussed a proposed project to extend an iron-enhanced sand filter down the Wetland 639W overflow channel. This is the follow up to the SRP Reduction Project study that evaluated different types of filter material to see which was best at removing soluble reactive phosphorus (SRP) from wetland discharge. The SRP Channel Filter Project will line about 400 feet of the channel downstream of the wetland's overflow weir with iron-enhanced sand. Hennepin County has awarded the Commission a $75,000 Opportunity Grant for the project, matched by $50,000 from the Commission's Closed Projects Account. The estimated cost of construction is $100,000, with design, construction oversight, and follow up monitoring estimated at $25,000.

Included in the meeting packet is a Scope of Work* between the Commission and Wenck/Stantec to design the project and perform construction observation. The City of Crystal has agreed to serve as the contracting agent for the project. Staff recommends authorizing the Commission's attorney to work with the City to prepare a cooperative agreement specifying terms, similar to those developed for other projects where the City constructs the project at the Commission's request and then is reimbursed for its costs.

Motion by Schoch, second by Roach to approve the Scope of Work for this project and to approve the chair's execution of the Cooperative Agreement between the Shingle Creek Commission and the City of Crystal upon successful review by the Commission's attorney. *Motion carried unanimously.*

IX. Education and Public Outreach.

A. At recent meetings of the **West Metro Water Alliance** (WMWA) members have been concentrating on education and outreach items in the new NPDES General Permit, focusing on chloride and pet waste. WMWA subgroups reviewed existing materials relating to chloride and bacteria to determine if they meet the new requirements or could be revised to do so, and to identify any needs for additional materials. The subcommittees are completing this assessment to determine additional needs and required resources (e.g., design assistance, fabrication, printing) as well as a plan for disseminating the materials.

It is anticipated this work can be completed using the WMWA Special Projects budget, which had a balance of $10,700 at the end of 2020. The agreement between the four WMOs in WMWA (Bassett Creek, Elm Creek, Shingle Creek and West Mississippi) requires that Special Projects be approved by the four WMOs before expenditures can be made. It is intended that the assessment will be available for consideration at the July meetings of the WMOs. The goal is to have all the work completed by the end of 2021.

B. Sharon Meister, **Watershed PREP** educator has retired. WMWA is seeking to hire a new educator and to begin preparing for in-person classes in the fall.

C. The **July meeting,** a virtual meeting, is scheduled for 8:30 a.m., Tuesday, July 13, 2021. The **Zoom number** is https://us02web.zoom.us/ j/922390839. Or call in at any of these numbers using **meeting ID: 922 390 839**: (1) +1 301 715 8592 US (Germantown); (2) +1 312 626 6799 US (Chicago); (3) +1 929 205 6099 US (New York); or (4) +1 253 215 8782 US (Tacoma). The **passcode is water**.

X. Communications.

A. May Communications Log.* No items required action.

Roser noted that the Crystal Lake alum treatment was postponed because of unfavorable lake conditions due to the high temperatures.

B. Staff Report.* Updates were provided on the Watershed Based Implementation Funding projects; the Crystal Lake, Bass and Pomerleau Lakes, and Meadow Lake Management Plans; the SRP Channel Extension project; and the Connections II and Bass Creek Restoration projects. It was also noted that the City of Crystal held a dedication ceremony for the new Becker Park on May 22.

XI. Other Business.

XII. Adjournment. There being no further business before the Commissions, the joint meeting was adjourned at 3:13 p.m.

Respectfully submitted,

Judie A. Anderson,
Recording Secretary
JAA:tim

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Date 7/2/2021

WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSION

PROJECT REVIEW WM2021-010: Xylon Avenue Extension

Owner: **Jesse Struve**
Company: **City of Brooklyn Park**
Address: **5200 85th Ave N**
Brooklyn Park, MN 55443

Engineer: **Luke Moren**
Company: **Kimley-Horn and Associates**
Address: **767 Eustis Street, Suite 100**
St. Paul, MN 55114

Phone: **651-643-0489**
Fax:
Email: **Luke.Moren@kinley-horn.com**

Purpose: Construction of Xylon Avenue extension between Xylon Avenue cul-de-sac and 101st Avenue including curb, gutter, pedestrian underpass, storm sewer, trail and sidewalks on 7.12 acres.

Location: Xylon Ave and 101st Avenue in Brooklyn Park, MN (Figure 1).

Exhibits:

1. Project review application and project review fee of $1,100, dated 6/25, received 6/28.

2. Site plan, preliminary plat, grading (Figure 2), utility, erosion control, and landscaping plans dated 6/21/2021, received 6/28.

3. Hydrologic calculations by Kimley-Horn, dated 6/2021, received 6/28.

Findings:

1. The proposed project is the Xylon Avenue extension. The site is 7.12 acres. Following development, the site will be 28.2 percent impervious with 2.0 acres of impervious surface, an increase of 2.0 acres.

2. The complete project application was received on 6/28. To comply with the 60-day review requirement, the Commission must approve or deny this project no later than the 8/13 meeting. Sixty calendar-days expires on 8/30.

2. To comply with the Commission's water quality treatment requirement, the site must provide ponding designed to NURP standards with dead storage volume equal to or greater than the volume of runoff from a 2.5" storm event, or BMPs providing a similar level of treatment - 85% TSS removal and 60% TP removal. Infiltrating 1.3-inches of runoff, for example, is considered sufficient to provide a similar level of treatment. If a sump is used the MnDOT Road Sand particle size distribution is acceptable for 80% capture.

   Runoff from the site is proposed to be routed to two stormwater ponds as well as an infiltration basin. The applicant meets Commission water quality treatment requirements.

3. Commission rules require that site runoff is limited to predevelopment rates for the 2-, 10-, and 100-year storm events. The applicant meets Commission rate control requirements (Table 1).

Table 1. Runoff from site (cfs).

Drainage Area	2-year event		10-year event		100-year event	
	Pre-	Post-	Pre-	Post-	Pre-	Post-
15" Culvert at 101st Ave North	0	0	1.6	1.34	19.49	19.37

4. Commission rules require the site to infiltrate 1.0 inch of runoff from new impervious area within 48 hours. The new impervious area on this site is 2.01 acres, requiring infiltration of 0.8 in/hr acre-feet within 48 hours. The applicant proposes one stormwater pond and two infiltration basins that have the capacity to infiltrate the required volume within 48 hours. The applicant meets Commission volume control requirements.

5. The erosion control plan includes a rock construction entrance, perimeter silt fence/biolog, silt fence surrounding detention ponds/infiltration basins, inlet protection, rip rap at inlets, and native seed specified on the pond slopes and hydromulch. The erosion control plan meets Commission requirements.

6. The National Wetlands Inventory does not identify any wetlands on site. The applicant meets Commission wetland requirements.

7. There are no Public Waters on this site. The applicant meets Commission Public Waters requirements.

8. There is no FEMA-regulated floodplain on this site. The applicant meets Commission floodplain requirements.

9. The site is located in a Drinking Water Management Area but is outside of the Emergency Response Area. Therefore, infiltration is permitted, but infiltrated water must first filter through 1 foot of soil, the top four inches of which are amended topsoil, and the bottom 8 inches of which are tilled. The applicant proposes an infiltration rate of less than .8 inches/hour. The applicant meets Commission drinking water protection requirements.

10. A public hearing on the project will not be held as the entire project area is on land owned by the City of Brooklyn Park and there are no residents within 300'. According to City Engineer Jesse Struve the bid documents will be posted to the City webpage for public viewing.

11. A draft Operations & Maintenance (O&M) agreement is not needed as the City will own and operate the stormwater features.

12. A Project Review Fee of $1,100 has been received.

Recommendation: Recommend approval subject to the following condition:

1. Demonstrate by double ring infiltrometer or witness test that the site can meet the design infiltration rate of 0.8 inches/hour post construction.

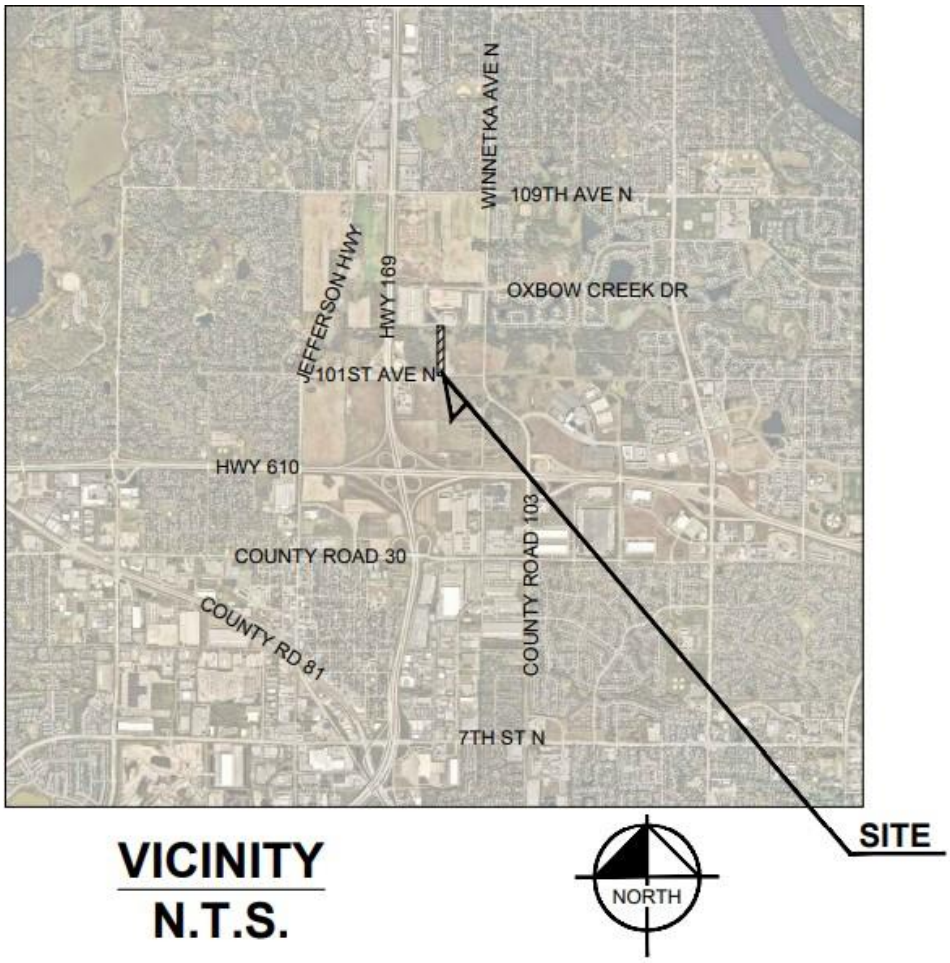
Wenck Associates, Inc.
Engineers for the Commission

Ed Matthiesen, P.E. Date

WM 2021-010: Xylon Avenue Extension

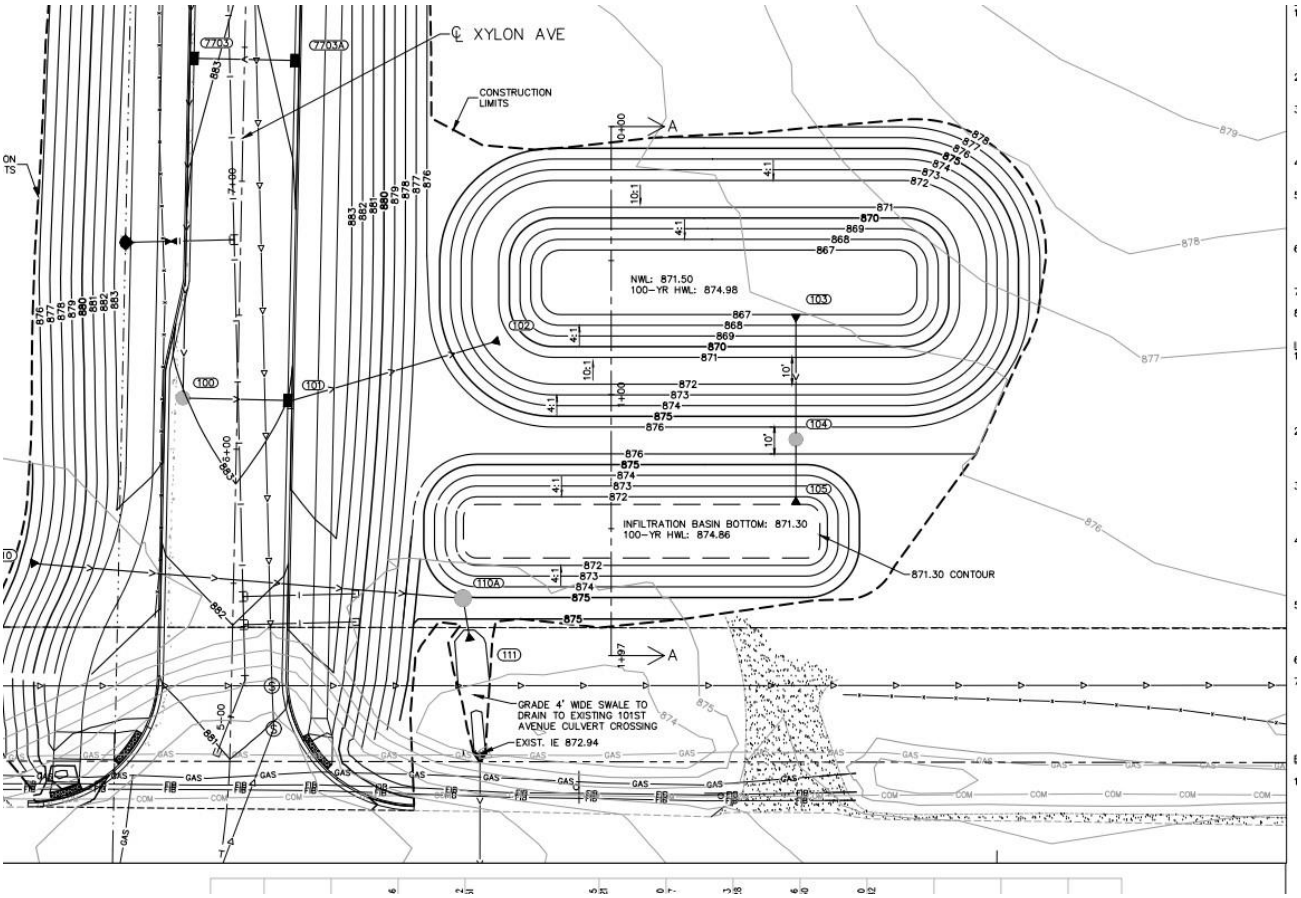
Figure 1. Site location.

WM 2021-010: Xylon Avenue Extension

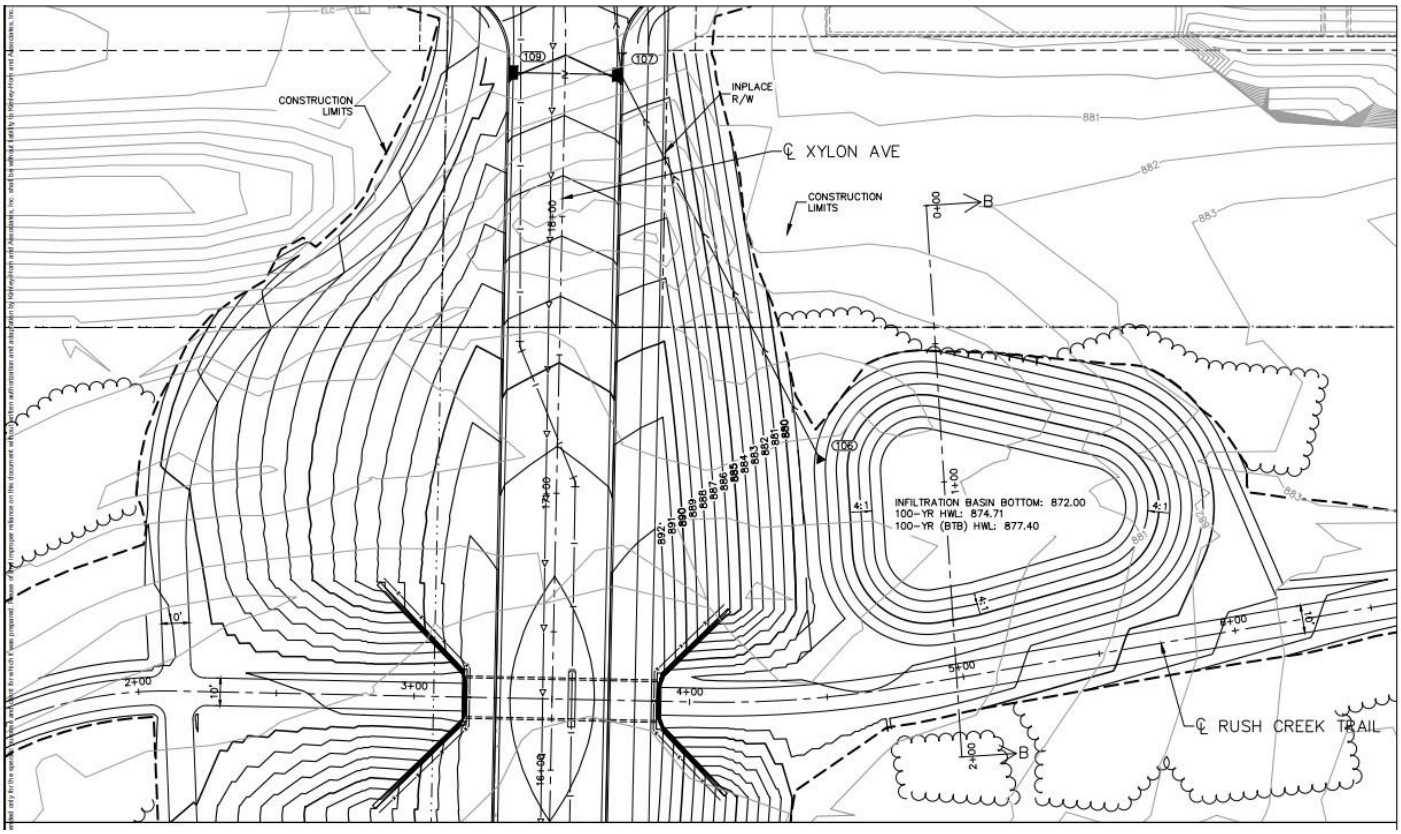


VICINITY
N.T.S.

WM 2021-010: Xylon Avenue Extension



WM 2021-010: Xylon Avenue Extension



Pond grading plans

To: Shingle Creek/West Mississippi WMO TAC/Commissioners

From: Ed Matthiesen, P.E.
Diane Spector

Date: June 4, 2021

Subject: Fourth Generation Plan Scoping

Recommended Action	Discuss and provide direction.

This will be a brainstorming session to start thinking about what to include in the Fourth Generation Watershed Management Plan and how to proceed. We will use the outcome of the brainstorming to put together a scope of work and budget for consideration at the July TAC/Commission meetings. For more information about Metro-area watershed planning, see: http://www.bwsr.state.mn.us/metro-update.

The Third Generation Plan was approved by the Board of Water and Soil Resources (BWSR) March 2013 and adopted in April 2013. The Plan covers the period 2013-2022, meaning the Commissions should plan on achieving a BWSR-approved plan by the end of 2022 so it can be in place to cover the period 2023-2032. To allow six months for the review and approval process, we should plan on having a draft Fourth Generation Plan complete by mid-2022, or one year from now.

Under State Statues and Minnesota Rules 8410, which govern what must be included in the watershed management plan, much of the background information that was developed over the course of the first three plans does not need to be repeated except to reflect any changed conditions, such as updated land use information, or newly-identified Impaired Waters. Most of the focus will be on updating goals and policies and the Implementation Plan. However, as long as you meet the regulatory minimums for what must be in the Plan, the rest is up to you.

As you brainstorm process and topics you may want to cover, here are a few that have come up in previous discussions or by staff brainstorming. These are a starting point; please feel free to suggest other topics to be considered. Again, the purpose of this discussion is not to solve or debate these questions but for staff to get a better understanding of the level of effort to address them and to complete the Plan update.

1. Do the Commissions wish to revisit merging into a single Joint Powers Organization or remain separate but jointly administered? The current JPA terminates January 1, 2025 so at a minimum it must be renewed during the life of the Fourth Generation Plan.
2. Presumably the existing TAC will serve as the TAC for the Plan. Do you wish to recruit and involve a Citizens Advisory Committee (CAC)? If so, how?
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9. Are there other policy topics that need to be covered during the plan process?

now part of Stantec

Stantec Consulting Services Inc.
7500 Olson Memorial Highway
Suite 300
Golden Valley, MN 55427

July 2, 2021
File: File Number

Mr. Andy Polzin, Shingle Creek Watershed WMC Chair
Mr. Gerry Butcher, West Mississippi WMC Chair

Reference: Shingle Creek and West Mississippi Watershed Management Commission Fourth Generation Plan Scope of Services

Gentlemen:

Wenck, now part of Stantec, is pleased to provide you with this scope of services to assist you in the completion of your Fourth Generation Watershed Management Plan. Based on our discussion with the Commissions and the TAC at your June 2021 meetings, we understand the work to be as follows:

Scope

Task 1: Meetings

For the purpose of this scope, we have assumed a total of six Technical Advisory Committee (TAC) meetings and one Policy Advisory Committee (PAC) meeting. It is our recommendation that the Commissions proceed as they did with the Third Generation Plan, and instead of a separate Citizens Advisory Committee (CAC), ask the cities to designate one of their existing citizen commissions to serve as a joint CAC. Our staff will provide city staff with materials to review with those designated commissions to obtain their feedback. We have also included in this task time to develop and publish an online interactive map to help obtain input from the public, and to reach out to lake associations, potentially hosting a lake association summit. We have also included time to undertake some targeted outreach to traditionally underrepresented and underserved communities, although we don't have a specific plan yet how to do that. We plan to work with the cities and with Blue Thumb, where an Equitable Engagement committee is currently developing a Toolkit (https://bluethumb.org/ej-hub/) to help address Environmental Justice.

Task 2: Update Plan

Based on the discussion in June, we will update the plan to include overviews of all the diagnostic work completed in the past ten years such as the TMDL Five Year Reviews so that it is a comprehensive reference document. We expect this task to include the following:

- Review and update as necessary the Goals and Policies established in the Third Generation Plan
- Update data summarizing the progress toward meeting the TMDL requirements
- Review and update as necessary the Rules and Standards, monitoring, and education and outreach programs
- Discuss possible policies and actions the Commission could consider to address climate resiliency and sustainability
- Develop a policy establishing responsibilities and funding mechanisms for maintenance of capital projects and for ongoing "non bricks and mortar" type actions
- Organize the suite of hydrologic & hydraulic and water quality models that have been developed over the past ten years

- Update the Capital Improvement Program (CIP)
- Update the website and add an interactive map highlighting water quality and projects completed and cataloging project reviews
- Forecast future budget needs

Task 3: Plan Review Process

As with previous plans, we assume that after completion of the draft plan, the Commissions will send the plan to the cities and review agencies for "informal" review to see if there are any additional topics they would like to see addressed or discussed more fully. After incorporating those comments, the Plan would proceed to the formal 60-Day Review process, which is sent to a specific roster of reviewers as well as published for general public comment. At the close of the 60-Day Review, the Commissions must log and respond in writing to all the comments received, and then conduct a Public Hearing. Following the hearing, after making final edits based on comments received, the Commissions must forward the draft final plan to BWSR, along with the log of comments received, responses, and how the plan was revised. BWSR staff will then review the draft plan, and it will be presented to the BWSR Central Region Committee, which will make a recommendation to the full BWSR Board. Following approval by BWSR, the plan will come back to the Commissions for final adoption.

Schedule

The Third Generation Plan was approved by BWSR in March 2013 and adopted by the Commissions in April 2013.

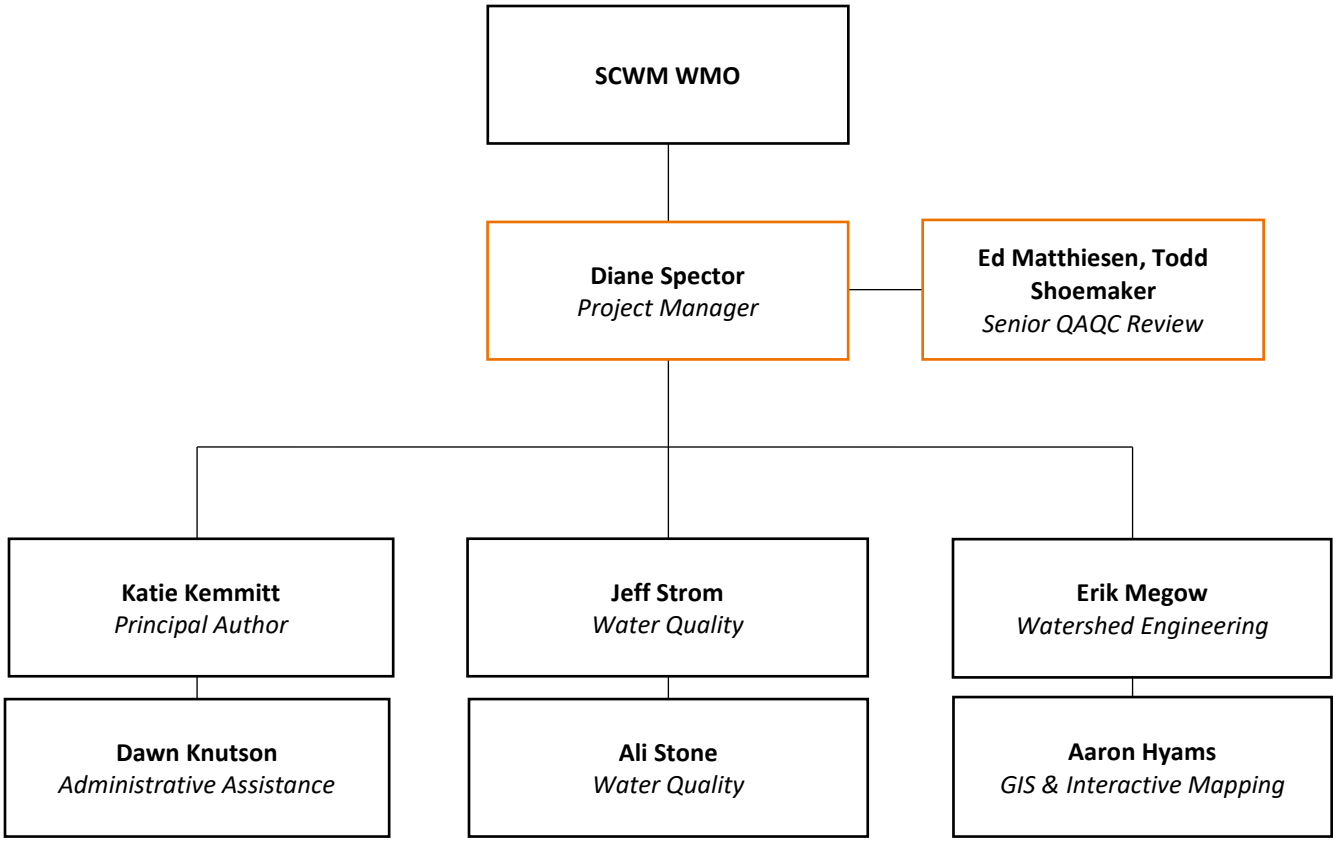
Estimated Schedule

July 2021	60-day notice of plan kickoff and request for information
July-August 2021	Compile data, background work
September 2021	Kickoff meeting
October 2021 – July 2022	Commission, TAC, PAC meetings, public input
August 2022	Preliminary draft for informal review
August-September 2022	Review preliminary comments and revise plan
October 2022	Review final draft plan and authorize start of 60-day review
December 2022	Approximate end of 60-day review
January 2023	Public Hearing
January-June 2023	Agency review and approval
July 2023	Commission adoption

Team

We have assembled a team thoroughly familiar with the watersheds and their issues. Diane Spector will be your Project Manager, with Senior QAQC by Ed Matthiesen and Todd Shoemaker. Katie Kemmitt will be the principal author, assisted by Ali Stone. Erik Megow will work with you to provide technical input on modelling, development rules and standards, and future capital and maintenance projects. Jeff Strom will manage the incorporation of the TMDL 5 Year Review updates and water quality analyses into the plan.

Reference: **Fourth Generation Plan Scope**



Estimated Cost

We have developed the following not to exceed cost estimate for this work, which includes attendance at four Board meetings and two TAC/CAC meetings. This estimate assumes that County staff would complete most of the general GIS work for the Plan with the coordination of Stantec GIS staff. Additional meetings or GIS work can be added on a time and materials basis if the Board so desires.

Task		Hours								Expense	Professional Services	Total
		Diane Spector	Katie Kemmitt	Erik Megow	Jeff Strom	Ali Stone	Ed Matthiesen	Aaron Hyams	Admin			
1	Meetings and Outreach	26	48	12	6	18	18	8		$400	$20,750	$21,150
2	Plan update	38	92	28	8	56	14	48	12		$42,088	$42,088
3	Approval process	11	34	2	0	6	10	6	10		$11,468	$11,468
TOTAL										$400	$74,306	$74,706
Hourly Rate		$180	$131	$160	$160	$127	$200	$127	$119			

*Mileage

Thank you for the opportunity to be of service to you. We look forward to working with you.

Regards,

Stantec Consulting Services Inc.

Ed Matthiesen, P.E.
Watershed Engineer
763-252-6851
ematthiesen@wenck.com

Diane Spector
Senior Water Resources Planner
763-252-6880
dspector@wenck.com

By signing this proposal, West Mississippi Watershed Management Commission authorizes Stantec to proceed with the services herein described and the Client acknowledges that it has read and agrees to be bound by the attached Professional Services Terms and Conditions.

This proposal is accepted and agreed on the 8 day of July, 2021.

Per: Shingle Creek WMC

Anndy Polzin, Chair

Name & Title

Signature

Reference: **Fourth Generation Plan Scope**

By signing this proposal, West Mississippi Watershed Management Commission authorizes Stantec to proceed with the services herein described and the Client acknowledges that it has read and agrees to be bound by the attached Professional Services Terms and Conditions.

This proposal is accepted and agreed on the 8 day of July, 2021.

Per: West Mississippi WMC

Gerry Butcher, Chair

Name & Title

Signature

D R A F T

July xx, 2021

Dear Interested Parties:

The Shingle Creek and West Mississippi Watershed Management Commissions (SCWMWMC) is in the process of updating its Watershed Management Plan.

As required per revised MN Rules Chapter 8410, the Commissions are requesting information related to local water management goals and priorities. This information will be used to guide our planning process and align our efforts with those of our local partners. We are requesting that this information be provided by **September 7, 2021.** *Information gathered from this request will be considered at a kick-off meeting scheduled for Thursday, September 9, 2021.*

Plan Review Agencies – Metropolitan Council, Minnesota Pollution Control Agency (MPCA), Board of Water and Soil Resources (BWSR), Minnesota Department of Health (MDH), Minnesota Department of Natural Resources (MDNR), MDNR Fisheries Division, Minnesota Department of Agriculture (MDA) - *Please provide information on management expectations for your agency's priority issues, summaries of relevant water management goals, and water resource information.*

Member Cities, Hennepin County Department of Environment and Energy (HCEE), Minnesota Department of Transportation (MnDOT), Three Rivers Park District (TRPD) - *Please provide information on your organization's local water-related issues, water management goals, official controls, and programs.*

Advisory Committees - As part of the outreach and engagement effort for the Plan update, the Commission is identifying various advisory committees to provide ongoing review and input.

The **Citizens Advisory Committee (CAC)**. The member cities will not establish a separate CAC for this planning effort but will ask each city to designate one of its standing citizen advisory commissions to serve as a local CAC. The city's commissioners and TAC member will be responsible for sharing information with these individual CACs and obtaining input

The **Policy Advisory Committee (PAC)** will be comprised of one representative from every member community (typically the city manager or designee). The PAC usually meets only once, just after the kickoff of the planning process, to discuss policy, budget, and JPA topics.

The **Technical Advisory Committee (TAC)** is a standing committee that is comprised of one representative from every member community that meets monthly. Agency representatives are invited to participate as they desire.

For more information, please contact Judie Anderson in the SCWMWMO office, 763-553-1144 or judie@jass.biz

To: Shingle Creek WMO Commissioners

From: Ed Matthiesen, P.E.
Diane Spector

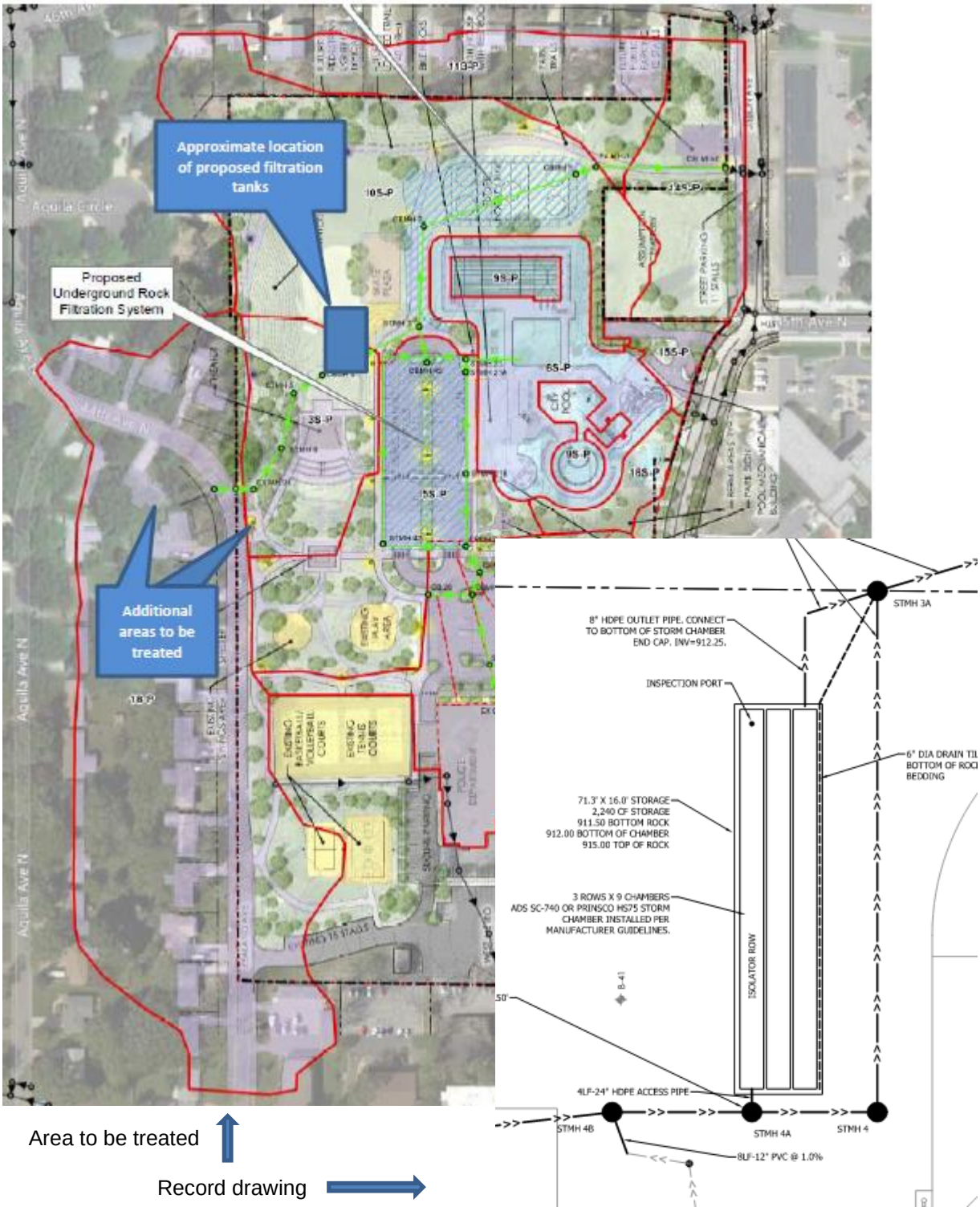
Date: July 2, 2021

Subject: Approve New Hope Cost Share Reimbursement

Recommended Commission Action	Approve the New Hope request for reimbursement.

In 2019 the Commission approved a cost share request from the City of New Hope for $50,000 to help fund an underground stormwater retention and treatment tank on the west side of Civic Center Park, which was undergoing a complete renovation at the time. This would take advantage of the grading and other work being completed in the park to add stormwater treatment for a 7.4-acre adjacent area comprised of Zealand Ave and surrounding residential areas that drained to the project site untreated. It was estimated the project would remove 4.7 pounds of TP and 1,106 pounds of TSS annually and remove 8.309 acre-ft of runoff in an average year.

The work has been completed and the City has submitted the required documentation. They are requesting $49,066.50, or 50% of the total project cost. Staff recommends that you approve this request for reimbursement with $25,000 from the Watershed Based Implementation Funding grant dedicated to cost share projects and $24,066.50 from the Cost Share Account.



Area to be treated

Record drawing

Gaulke Pond & Crystal Lake Pump Operating Plan

2021 Ryan Lake Subwatershed Assessment

File No.: 1240-21-503

June 18, 2021

Prepared for:

Shingle Creek Watershed Management Commission
3235 Fernbrook Lane North
Plymouth, MN 55447

Prepared by:

Stantec Consulting Services Inc.
7500 Olson Memorial Highway
Suite 300
Golden Valley, MN 55427

Revision	Description	Author		Quality Check		Independent Review	
1	Final	Ross Mullen	5/26/21	Todd Shoemaker	6/4/21	Ed Matthiesen	6/7/21

Sign-off Sheet

This document entitled Gaulke Pond and Crystal Lake Pump Operating Plan was prepared by Stantec Consulting Services Inc. (“Stantec”) for the account of Shingle Creek Watershed Management Commission (the “Client”). Any reliance on this document by any third party is strictly prohibited. The State of Minnesota, cities and municipalities in Minnesota, and other applicable regulatory agencies may use this report for information purposes. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 
(signature)

Ross Mullen

Reviewed by 
(signature)

Todd Shoemaker

Approved by 
(signature)

Todd Shoemaker

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EXECUTIVE SUMMARY

Gaulke Pond and Crystal Lake are located in the Cities of Crystal and Robbinsdale, respectively. Each is landlocked and depends on pumps to manage water levels and minimize flooding. Between the six years from 2014 to 2019, the Twin Cities received approximately an extra year of precipitation. This required each City to actively manage pumping more than ever before and motivated this study to determine potential downstream effects of increasing the discharge from and changing the timing of pumping from Gaulke Pond and Crystal Lake.

Stantec studied the Gaulke and Ryan Lake watersheds by merging two existing PCSWMM hydrologic and hydraulic models: the Shingle Creek Watershed Management Commission preliminary HUC-8 model ("Commission Model") and the Gaulke Pond watershed model developed for the City of Crystal *Central Core Stormwater Project*. We established two baseline or existing conditions based on existing Minnesota Department of Natural Resources permits for pumping from Crystal Lake. We then used the baseline models to evaluate eleven different alternatives or modifications to Gaulke Pond, Crystal Lake and other watershed features.

General conclusions from the alternatives analysis included:

- Crystal Lake – slight reductions to the maximum water surface elevations but significant reductions to the duration of high-water on Crystal Lake for the 10-, 50-, and 100-year events.
- Gaulke Pond – maximum water levels were reduced by 0.1 to 0.3 feet and the durations of high-water reduced by up to one-third.
- Twin Lake and Ryan Lake
    - Because of the shape of the hydrographs and the relative height of the no-wake zone above the normal water level, some alternatives may increase the duration of high-water on Twin Lake with a simultaneous reduction of high-water duration on Ryan Lake.
    - Some alternatives will increase the 100-year flood elevation of Ryan Lake by less than one inch compared to the Baseline 1 Model. This increase is less than one-half inch when compared to the Baseline 2 Model.
    - City staff report the significant reduction in duration of high water for Crystal Lake, Ryan Lake, and Gaulke Pond is of far greater benefit than the likely immeasurable impact of the Ryan Lake 100-year high water level increasing by one inch (0.1 feet) in the 100-year event.
- Permanent pumping from Ryan Lake to Crystal Lake may increase total phosphorus loading to Ryan Lake by up to four percent. This is not significant and will not negatively impact the water quality of Ryan Lake. It also does not account for the alum treatment scheduled for Crystal Lake in June 2021, which will likely further decrease the potential phosphorus load to Ryan Lake.

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

The subsequent sections discuss the background and purpose of this study and are organized by subwatershed and the municipality that prompted that requested the analysis.

The Gaulke Pond Watershed (City of Crystal)

Gaulke Pond is in the City of Crystal, south of 41st Avenue North and east of Douglas Drive North. The pond site is bordered to the north by property owned by the City of Crystal, to the east by the Fair School, and to the south and west by residential properties. Gaulke Pond is the most downstream of a series of four ponds (including Memory Pond, Brownwood Pond, and Hagemeister Pond) that collect runoff from a 905-acre mixed residential, institutional, and commercial watershed draining portions of New Hope, Crystal, and Robbinsdale. Approximately 40% of this watershed is impervious. Figure 1 shows the location of the Gaulke Pond in the city and some of the surrounding features.

Gaulke Pond is land-locked, meaning it has no gravity outlet. Instead, water is pumped from the pond through an existing stormwater lift station to a 15-inch gravity storm sewer north of the Fair School, which flows east under 40th Avenue into Robbinsdale (east of Adair Avenue). The 15-inch gravity storm sewer size increases to an 18-inch at Zane Avenue N (one block east) and a 21-inch at Yates Avenue N (one block further east). Downstream of Xenia Avenue N, the storm sewer is an arch pipe of increasing size as it flows east, eventually discharging to Graeser Pond then to the 45th Avenue Pond and finally discharging into Lower Twin Lake as shown on Figure 2.

To address flood risk in the watershed and improve maintenance, the City of Crystal has commissioned a study to perform detailed watershed modeling and to design and construct improvements and infrastructure. This study assumes *The Central Core Stormwater Project* is completed as planned and includes the following project elements:

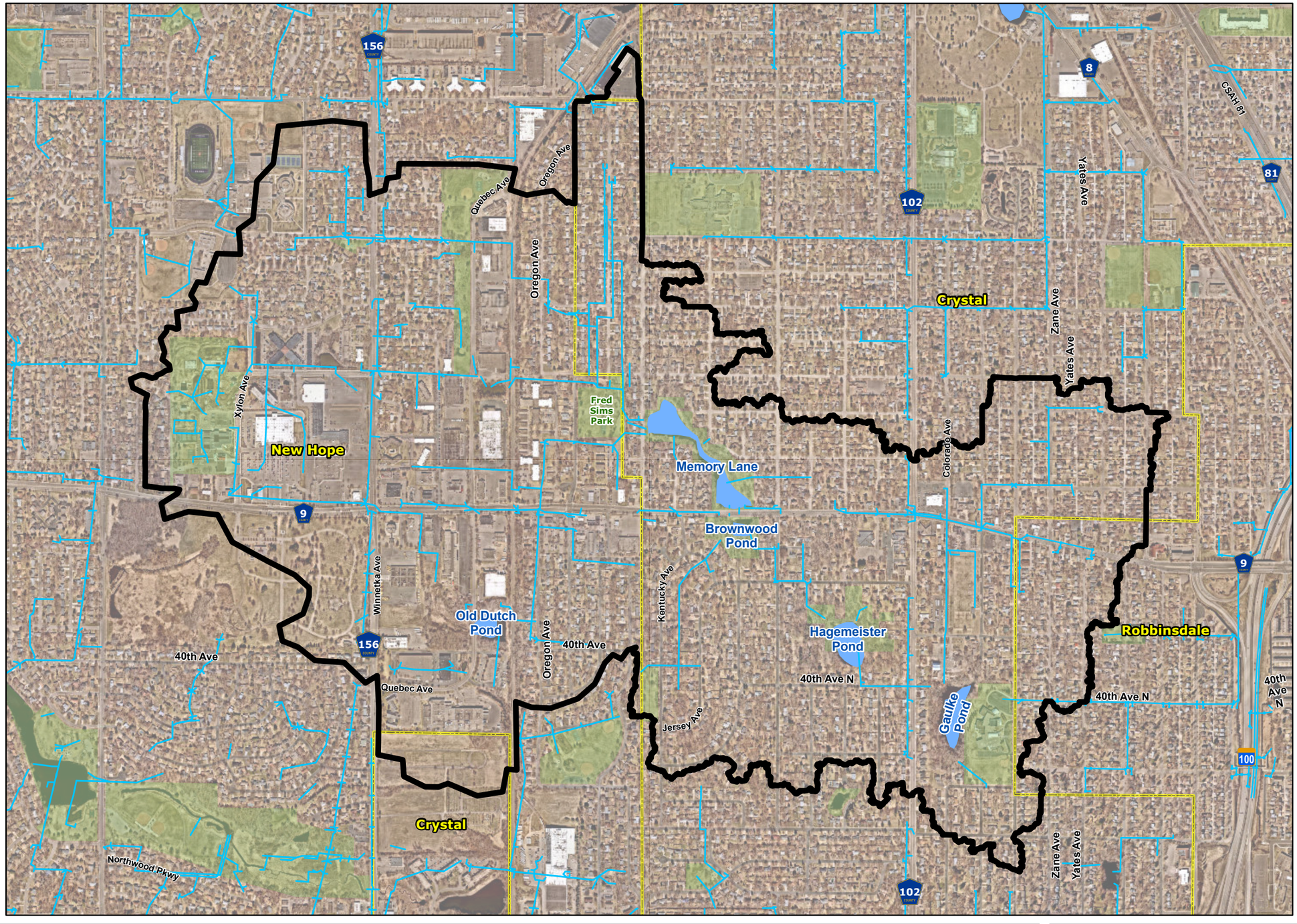
- Assessment of flood mitigation alternatives at Brunswick Avenue north of 42nd Avenue North and Colorado Avenue south of 42nd Avenue N, which may recommend additional discharge to the Gaulke Pond chain;
- Dredging sediment, expanding flood storage, and replacing existing stormwater lift station on Gaulke Pond (MDNR PWI #27-643).

Under the agreement to discharge the Gaulke Pond watershed into the City of Robbinsdale, the City of Crystal is bound by the terms of a 1962 inter-community agreement to discharge a maximum of 1,400 gpm (3.12 cfs) only during periods of no flow or dry weather (City of Crystal, 1962). This agreement is included in Appendix A.

In preparation for *The Central Core Stormwater Project*, the City of Crystal commissioned the *Gaulke Pond Discharge Rate Evaluation* (Wenck Associates, Inc., 2019) to assess the discharge capacity of the gravity storm sewer beneath 40th Avenue and to determine the feasibility of increased pumping rates from Gaulke Pond (Appendix B). The study concluded that the discharge capacity of the 15-inch storm sewer is about 5.5 cfs (approx. 2,500 gpm) when flowing full and the capacity of the 18-inch gravity sewer is about 10.2 cfs (approx. 4,500 gpm) when flowing full. Because pipe capacity is slightly larger when flowing near-full, 10.2 cfs was rounded up to 11 cfs (4,950 gpm).

The City of Crystal desires for this 2021 study to use the conclusions of the 2019 study as the basis for determining the watershed-wide effects of increasing the discharge from and changing the timing of pumping Gaulke Pond from that included in the 1962 inter-community agreement, including:

- Impacts to storm sewer in Robbinsdale;
- Flood elevations and durations of flooding on the Twin Lake chain and Ryan Lake; and
- Flood elevations, discharge, erosivity, and/or scour impacts to Shingle Creek.



Legend

- Gaulke Pond Subwatershed Boundary
- Municipal Boundary
- Storm Sewer
- Park
- Waterbody

N

1,000 500 0 1,000

Feet

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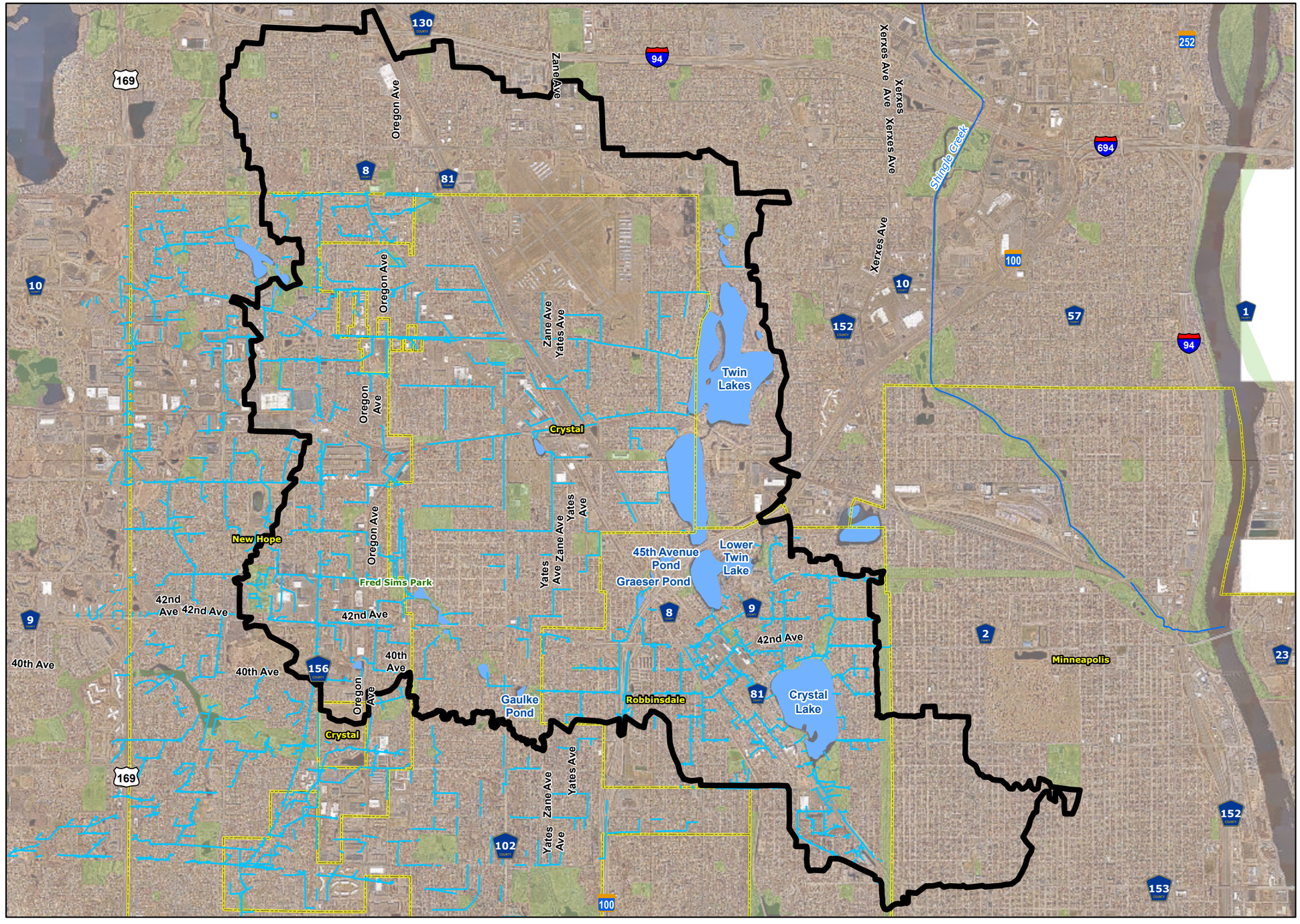
SHINGLE CREEK

Gaulke Pond Subwatershed

WENCK now part of Stantec

JUN 2021

Figure 1



Legend

- Twin Lake Subwatershed Boundary
- Municipal Boundary
- Storm Sewer
- Waterbody
- Stream
- Park

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5/26/2021 11:56 AM BerKA1064 Layout: Lower Twin Lake Subwatershed

SHINGLE CREEK

Lower Twin Lake Subwatershed

WENCK now part of Stantec

MAY 2021

Figure 2

The Crystal Lake Watershed (Robbinsdale)

Crystal Lake is located in the City of Robbinsdale, south of 40th Avenue North and east of Bottineau Boulevard. Crystal Lake collects runoff from a 1,237-acre mixed residential, institutional, and commercial watershed draining portions Robbinsdale, Crystal, and Minneapolis. Crystal Lake and its contributing subwatershed are shown on Figure 2.

Crystal Lake is a naturally land-locked lake, meaning it has no gravity outlet. Runoff directed to the lake is pumped by a permanent stormwater lift station through 1,780 feet of 8-inch diameter forcemain that connects to the City of Minneapolis storm sewer at the intersection of Xerxes Avenue and 42nd Avenue and by a portable pump that is discharges to storm sewer leading to Ryan Lake. The terms of this permanent pumped outlet are governed by a 1992 Minnesota Department of Natural Resources (MNDNR) pumping permit, a 1994 amendment to the 1992 permit, and a 2020 temporary permit.

- The 1992 MNDNR pumping permit (#92-6123) authorized the City of Robbinsdale to construct a permanent pumped outlet from Crystal Lake to pump up to 800 gpm (1.79 cfs) between the months of March and November when the lake was above the Ordinary High-Water Level (OHW, 847.5 feet NGVD29). The pumping was stipulated to cease when the water level in Crystal Lake fell below the OHW or when the Shingle Creek WMC or the City of Minneapolis determine that there are downstream problems due to high water.
- The December 1994 amendment to the 1992 MNDNR pumping permit authorized the City of Robbinsdale to pump up to 1,150 gpm (2.56 cfs) through the permanent pumped outlet and to pump up to 800 gpm (1.79 cfs) using a portable pump and 1,280 feet of 8-inch diameter irrigation pipe to Ryan Lake. The amendment required that only one of the two pumps (either the permanent pump or the portable pump) could be used at any given time. This amendment provided the City of Robbinsdale greater flexibility to discharge from Crystal Lake.
- The May 2020 temporary permit (2019-2958) authorized the City of Robbinsdale to increase the discharge from 800 to 1,200 gpm from Crystal Lake to Ryan Lake. The temporary permit allowed for pumping when Crystal Lake is above the OHW and did not include restrictions on simultaneous pumping to Minneapolis storm sewer.

Infrastructure in the City of Minneapolis cannot handle additional discharge from Crystal Lake permanent outlet (City of Robbinsdale, 2019). Therefore, the City of Robbinsdale desires for this 2021 study to determine the watershed-wide effects of increasing the discharge from Crystal Lake to Ryan Lake, with pumping beginning when the water level in Crystal Lake exceeds the OHW, including:

- Flood elevations and durations of flooding on the Twin Lake chain and Ryan Lake;
- Flood elevations, discharge, erosivity, and/or scour impacts to Shingle Creek; and
- Water quality considerations of pumping from a nutrient impaired waterbody (Crystal Lake) to a non-impaired waterbody (Ryan Lake has been delisted).

Shingle Creek Watershed (Shingle Creek WMC and Minneapolis)

The Cities of Robbinsdale and Crystal are developing or revising existing pumping plans to outlet areas within their cities into the Twin and Ryan Lakes chain. Because there are multiple member cities involved

(Crystal, Robbinsdale, and Minneapolis) and there are permitting and agreements in place governing the discharge between member cities as well as watershed-wide impacts that may result from pumping from one municipality to the other, the Shingle Creek WMC has requested this study to determine the risk to each member city.

2.0 METHODS

2.1 HYDROLOGIC AND HYDRAULIC MODEL UPDATES

Stantec staff merged two existing PCSWMM hydrologic and hydraulic models to complete this study:

1. The Shingle Creek Watershed Management Commission preliminary HUC-8 model ("Commission Model") submitted to the Minnesota Department of Natural Resources on March 30, 2021, was used to model the entire Shingle Creek watershed, including current study areas for Crystal Lake, Twin Lake, and the Single Creek. This represents the best available information for the watershed and it was prepared in accordance with FEMA technical guidance and standards in order to replace the 2016 effective model at a future date(Federal Emergency Management Agency, 2016).

2. The detailed two-dimensional Gaulke Pond watershed model developed for the *Central Core Stormwater Project* replaced the "Commission Model" within the Gaulke Pond subwatershed to provide additional detail within this subwatershed. Because the newly combined model simulates three months to understand the hydrologic impacts on Twin Lake, Ryan Lake, and Shingle Creek, portions of this model were converted to one-dimensional analysis due to excessively long model run times (initial runs exceeded 600 hours for each of the storms simulated for each alternative discussed in subsequent sections).

3. The Commission Model was based on the 2011 MNDNR LiDAR data for Hennepin County. At the time of the LiDAR flight, the water level measured in Crystal Lake (847.8 feet NGVD29) exceeded the OHW (847.5 feet NGVD29). The Crystal Lake storage curve was modified using a 1963 MNDNR survey of the Crystal Lake so the proposed pumping operation could be modeled.

Additional updates to the combined model included:

- City of Robbinsdale storm sewer maps to update the model along 40th Avenue;
- The valves at Old Dutch and Brownwood Ponds were simulated as open; and
- The Gaulke Pond pump began operation immediately after the conclusion of rainfall to meet the dry weather criteria discussed in the 1962 inter-community agreement.

2.2 ANALYZED STORM DURATION

The analysis focused on the 24-hour storm due to the *dry weather* restriction in the 1962 inter-community agreement for Gaulke Pond. The 24-hour duration storm is used to simulate the flood elevations for an intense, discrete storm where the pump could remain off until the conclusion of precipitation. The 10-day nested rainfall and 10-day snowmelt events result in higher maximum water levels on waterbodies in the study area and are used to simulate the flood elevations from a prolonged wet period (like that observed in 2014). These prolonged wet periods are likely to include dry and wet times, where the inter-community

agreement would require modulation of the pump operations and the direct impacts of pumping operations would be harder to discern.

2.3 MODELED SCENARIOS

The subsequent sections discuss the scenarios modeled in the combined PCSWMM hydrologic and hydraulic model. Each model was simulated for a period of three months with the design storm occurring on the first day.

2.3.1.1 Baseline 1 Model

The Baseline 1 Model considers the Gaulke Pond subwatershed after *The Central Core Stormwater Project*, but the discharge from the Gaulke Pond lift station is assumed to remain at the flow rate stated the existing inter-community agreement. Pumping from the Gaulke Pond stormwater lift station is assumed to begin immediately following the conclusion of rainfall. Pumping from Crystal Lake is assumed to be discharged through the permanent stormwater lift station to the City of Minneapolis at a rate of 1,150 gpm (2.56 cfs).

2.3.1.2 Baseline 2 Model

The Baseline 2 Model is identical to Baseline 1, except pumping from Crystal Lake is assumed to be discharged through the permitted portable stormwater pump to Ryan Lake at a rate of 800 gpm (1.78 cfs) instead to the City of Minneapolis. This baseline represents an alternate, permitted, operating condition that could be used by the city of Robbinsdale.

2.3.1.3 Alternatives Analysis

The following sections discuss the alternatives modeled for this analysis.

1. *Oregon Avenue Pipe Lining*
   This alternative reflects the proposed lining of the north flowing storm beneath Oregon Avenue between Old Dutch Pond and the 90-degree turn (to eastbound) at 4301 Oregon Avenue North in New Hope. Based on manufacturer specifications, the diameter of these pipes was reduced by 0.05 feet and the Manning's roughness set to 0.011.

   The Gaulke Pond and Crystal Lake pumping operations were not changed relative to the Baseline Model 1. The proposed flood storage expansions in Gaulke Pond are included in this alternative.

2. *Upsizing 40th Avenue Storm Sewer from 15-inch to 18-inch*
   This alternative simulates the replacement of the 15-inch gravity storm sewer Gaulke Pond and Zane Avenue with an 18-inch gravity storm sewer.

   The Gaulke Pond and Crystal Lake pumping operations were not changed relative to the Baseline Model 1. The proposed flood storage expansions in Gaulke Pond are included in this alternative.

3. *Expansion of Fred Sims Park Storage*
   This alternative simulates a conceptual-level design of significant increase in flood storage in Fred Sims Park just west of Memory Pond. The storage was maximized to the available space in Fred Sims Park, while minimizing infrastructure and utilizing disruption.

   The Gaulke Pond and Crystal Lake pumping operations were not changed relative to the Baseline Model 1. The proposed flood storage expansions in Gaulke Pond are included in this alternative.

4. *France Avenue Weir Removed*
   This alternative was added to provide additional understanding of the watershed for future infrastructure planning. The compound weir at France Avenue between Lower Twin Lake and the Ryan Lake channel has a normal flow crest (runout elevation) that is approximately 15-inches above the invert of the France Avenue culvert and a high-flow crest that is approximately 36-inches above the invert of the France Avenue culvert. The entire weir was assumed to have been removed for this analysis, which results in the lowering of the normal water level of Lower Twin Lake by 15-inches.

   The Gaulke Pond and Crystal Lake pumping operations were not changed relative to the Baseline Model 1. The proposed flood storage expansions in Gaulke Pond are included in this alternative.

5. *High-Flow France Avenue Weir Lowered*
   This alternative was added to provide additional understanding of the watershed for future infrastructure planning. Pursuant to Minnesota Statues 103.G.407, the runout elevation of a lake cannot change without unanimous consensus from all property owners abutting the OHW of the lake. This regulatory requirement makes Alternative 4 likely impossible. Therefore, the high-flow portion of the compound weir at France Avenue between Lower Twin Lake and the Ryan Lake channel was lowered to match the normal flow portion so that the runout elevation would not change (i.e. the section of weir that is 36-inches above the France Avenue culvert invert was lowered to be only 15-inches above the France Avenue culvert invert).

   The Gaulke Pond and Crystal Lake pumping operations were not changed relative to the Baseline Model 1. The proposed flood storage expansions in Gaulke Pond are included in this alternative.

6. *Increased Pumping Rate from Crystal Lake (2.67 cfs)*
   This alternative simulates the construction of a permanent stormwater lift station to pump water from Crystal Lake to Ryan Lake at a maximum flow rate of 1,200 gpm (2.67 cfs), likely along Chowen Avenue (City of Robbinsdale, 2019). This new 1,200 gpm discharge from Crystal Lake to Ryan Lake would be in addition to the existing pumping from Crystal Lake to Minneapolis storm sewer, both pumps would turn on when the Crystal Lake water level exceeds the OHW.

   The Gaulke Pond pumping operations were not changed relative to the Baseline Model 1. The proposed flood storage expansions in Gaulke Pond are included in this alternative.

7. *Increased Pumping Rate from Crystal Lake, redirected to Twin Lake*
   This alternative is identical to Alternative 6, but instead of routing the 1,200 gpm from Crystal Lake to Ryan Lake, the outfall is directed to Twin Lake.

8. *Increased Pumping Rate from Gaulke Pond (5.5 cfs) and Crystal Lake (2.67 cfs)*
   This alternative simulates modifications to both the Gaulke Pond and Crystal Lake pumping operations:
   - Increased pumping rate from Gaulke Pond through the 40th Avenue North to 5.5 cfs (2,500 gpm). This is the maximum flow rate through the existing 15-inch pipe without replacing it with a larger size.
   - The construction of a permanent stormwater lift station to pump water from Crystal Lake to Ryan Lake at a maximum flow rate of 1,200 gpm (2.67 cfs), likely along Chowen Avenue (City of Robbinsdale, 2019). This 1,200 gpm discharge from Crystal Lake to Ryan Lake would be in addition to the existing pumping from Crystal Lake to Minneapolis storm sewer.

   The proposed flood storage expansions in Gaulke Pond are included in this alternative.

9. *Increased Pumping Rate from Gaulke Pond (5.5 cfs)*
   This alternative is similar to Alternative #8, but it only simulates modifications to Gaulke Pond pumping operations:
   - Increased pumping rate from Gaulke Pond through the 40th Avenue North to 5.5 cfs (2,500 gpm). This is the maximum flow rate through the existing 15-inch pipe without replacing it with a larger size.

   The proposed flood storage expansions in Gaulke Pond are included in this alternative.

10. *Increased Pumping Rate from Gaulke Pond (11 cfs) and Crystal Lake (2.67 cfs)*
    This alternative simulates modifications to both the Gaulke Pond and Crystal Lake pumping operations:
    - Increased pumping rate from Gaulke Pond through the 40th Avenue North to 11 cfs (4,950 gpm), which requires replacement of the existing storm sewer west of Zane Avenue from a 15-inch to an 18-inch.
    - The construction of a permanent stormwater lift station to pump water from Crystal Lake to Ryan Lake at a maximum flow rate of 1,200 gpm (2.67 cfs), likely along Chowen Avenue (City of Robbinsdale, 2019). This 1,200 gpm discharge from Crystal Lake to Ryan Lake would be in addition to the existing pumping from Crystal Lake to Minneapolis storm sewer.

    The proposed flood storage expansions in Gaulke Pond are included in this alternative.

11. *Increased Pumping Rate from Gaulke Pond (11 cfs)*
    This alternative is similar to Alternative #10, but it only simulates modifications to Gaulke Pond pumping operations:
    - Increased pumping rate from Gaulke Pond through the 40th Avenue North to 11 cfs (4,950 gpm), which requires replacement of the existing storm sewer west of Zane Avenue from a 15-inch to an 18-inch.

The proposed flood storage expansions in Gaulke Pond are included in this alternative.

12. *Increased Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time*
This alternative simulates modifications to both the Gaulke Pond pumping rate and timing.
    - Increased pumping rate from Gaulke Pond through the 40th Avenue North to 5.5 cfs.
    - Gaulke Pond pumping beginning 'mid-storm' (halfway through the event).

    The Crystal Lake pumping operations were not changed relative to the Baseline Model 1. The proposed flood storage expansions in Gaulke Pond are included in this alternative.

3.0 RESULTS

The PCSWMM model results for the 2-, 10-, 50-, and 100-year events are presented in Tables C.1 and C.2 in Appendix C. These tables present both the modeled maximum water level for each waterbody (maximum flow rate for Shingle Creek) as well as a meaningful index of the duration of high-water (e.g. time above no-wake elevations or duration of minimal freeboard) to Baseline 1 and 2, respectively. The tables are organized such that the results of the Baseline Model (either 1 or 2) are presented in absolute values and the alternatives are presented as the change from the baseline for that event.

Further discussion of each alternative is included below.

1. *Oregon Avenue Pipe Lining*
   Lining the Oregon Avenue pipe between Old Dutch Pond and the 90-degree turn (to eastbound) at 4301 Oregon Avenue North in New Hope does not appreciably impact the Gaulke Pond chain or other downstream waterbodies compared to Baselines 1 and 2. The model shows a reduction in the maximum water surface level of one tenth of a foot at Old Dutch Pond for the 10-, 50-, and 100-year events.

2. *Upsizing 40th Avenue Storm Sewer from 15-inch to 18-inch*
   Increasing the size of the 40th Avenue storm sewer between Gaulke Pond and Zane Avenue N from a 15-inch to an 18-inch, without pumping rate and other changes, does not result in any change to the maximum water surface elevation or duration of high-water for any waterbody for any event compared to Baselines 1 and 2.

3. *Expansion of Fred Sims Park Storage*
   The addition of flood storage at Fred Sims Park, reduces maximum water levels on the Gaulke Pond chain by 0.1-0.4-feet, particularly for Memory and Brownwood Pond. More frequent events (the 10-year and 50-year) show a small reduction in the duration of high-water levels (half a day) for some ponds.

4. *France Avenue Weir Removed*
   Complete removal of the France Avenue weir between Lower Twin Lake and Ryan Lake resulted in reduced maximum water levels on both Twin and Ryan Lake of up to 1.1 feet due to the additional flood storage and lowered normal water level of Twin Lake. Additionally, the analysis showed a slight reduction of high-water durations on Lower Twin Lake for all events and significant reductions to the duration of high-water on Ryan Lake.

5. *High-Flow France Avenue Weir Lowered*
   Lowering the high-flow portion of the France Avenue weir between Lower Twin Lake and Ryan Lake provides a more limited benefit to maximum water levels and high-water level durations compared to complete removal of the weir. Durations of high-water on Twin Lake are reduced by approximately 25% in exchange for slight increases in maximum water levels on Ryan Lake.

6. *Increased Pumping Rate from Crystal Lake (2.67 cfs)*
   The addition of a permanent stormwater lift station capable of pumping up to 2.67 cfs (1,200 gpm) from Crystal Lake to Ryan Lake, results in slight reductions to the modeled maximum water surface elevation only during the 100-year but provides significant reductions to the duration of the high-water on Crystal Lake. For the 10-, 50-, and 100-year events, the duration of high-water levels on Crystal Lake was reduced by more than half by adding the pump to Ryan Lake. The maximum water level on Ryan Lake increased by 0.1-0.3 feet and the duration of high-water was unchanged compared to Baseline 1, but there is no change to the maximum water surface elevation on Ryan Lake in the 50- and 100-year (when rounded to the closest tenth of a foot) compared to Baseline 2.

   Based on 1996-1999 water quality data for Ryan Lake, the average total phosphorus load to Ryan Lake is 263 kg/year. Based on the frequency of anticipated pumping of Crystal Lake provided by Robbinsdale city staff (approximately 30 days per year) and the average total phosphorus concentration in Crystal Lake, the addition of the permanent pump from Ryan Lake to Crystal Lake is likely to increase total phosphorus loading to Ryan Lake by up to four percent. Moreover, periods of high water levels are likely marked with reduced total phosphorus concentrations and Crystal Lake is scheduled to have an in-lake alum treatment to reduce total phosphorus in 2021. Therefore, we do not expect pumping from Crystal Lake to Ryan Lake to negatively impact the water quality of Ryan Lake.

Table 1 Anticipated Total Phosphorus Loading to Ryan Lake from 2.67 cfs (1,200 gpm) Pumping of Crystal Lake

Number of Operation Days per Year	Total Phosphorus Pumped from Crystal to Ryan Lake (kg)	Percent Increase in Annual Total Phosphorus Loading
10	3.5	1
30	10.6	4
60	21.2	8
183	64.4	24

7. *Increased Pumping Rate from Crystal Lake, redirected to Twin Lake*
   This alternative demonstrates that there are no impacts to Ryan Lake to the precision of 0.0 feet, when pumping from Crystal Lake to Twin Lake and comparing to Baseline 1. When compared to Baseline 2, which includes direct pumping from Crystal Lake to Ryan Lake, there is actually a small decrease in the peak water surface elevation on Ryan Lake.

8. *Increased Pumping Rate from Gaulke Pond (5.5 cfs) and Crystal Lake (2.67 cfs)*
   The addition of a permanent stormwater lift station capable of pumping up to 2.67 cfs (1,200 gpm) from Crystal Lake to Ryan Lake, results in slight reductions to the modeled maximum water surface elevations but provides significant reductions to the duration of the high-water on Crystal Lake for the 10-, 50-, and 100-year events compared to Baseline 1. The 2-year water surface does not exceed the no wake level. For the 10-, 50-, and 100-year events, the duration of high-water levels on Crystal Lake was reduced by more than half by adding the pump to Ryan Lake compared to Baseline 1. When compared to Baseline 2, there are 0.0 feet impacts to Ryan Lake during the 100-year.

   On the Gaulke Pond chain, the maximum water levels were reduced by 0.1-0.3 feet and the durations of high-water reduced by up to one-third. These benefits are most accrued at Hagemeister and Gaulke Pond because of the time of concentration for each of the four ponds. The smaller watersheds draining to Memory Pond and Brownwood Pond have a smaller time of concentration and the peak water level in these ponds occurs during the rainfall event. Because the Gaulke Pond pump is simulated to discharge only during dry weather, the increased pumping rate does not reduce the maximum water level in these ponds.

   The watershed contributing to Hagemeister and Gaulke Ponds is larger and must be routed through Memory and Brownwood Ponds, which attenuates the flow. The peak water level in Hagemeister and Gaulke Pond occurs after the conclusion of rainfall, meaning that a pump that starts discharging can lower the peak water levels.

9. Interestingly, because of the shape of the hydrographs and the relative height of the no wake zone above the normal water level, this alternative increases the duration of high-water on Twin Lake with a simultaneous reduction of high-water duration on Ryan Lake as shown in Figure 3 and Figure 4.

10. *Increased Pumping Rate from Gaulke Pond (5.5 cfs)*
    The results of Alternative #9 mirror those of Alternative #8, except there are no impacts to the peak water level on Ryan Lake during the 100-year event as shown in the comparison to Baseline 1.

Figure 3 Twin Lake 100-year Comparison Hydrograph

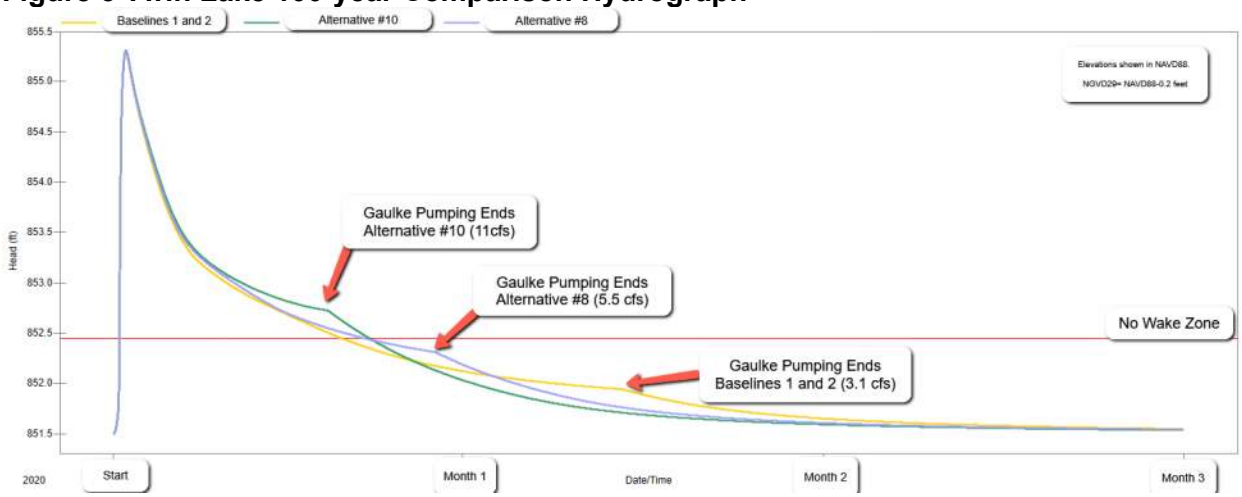
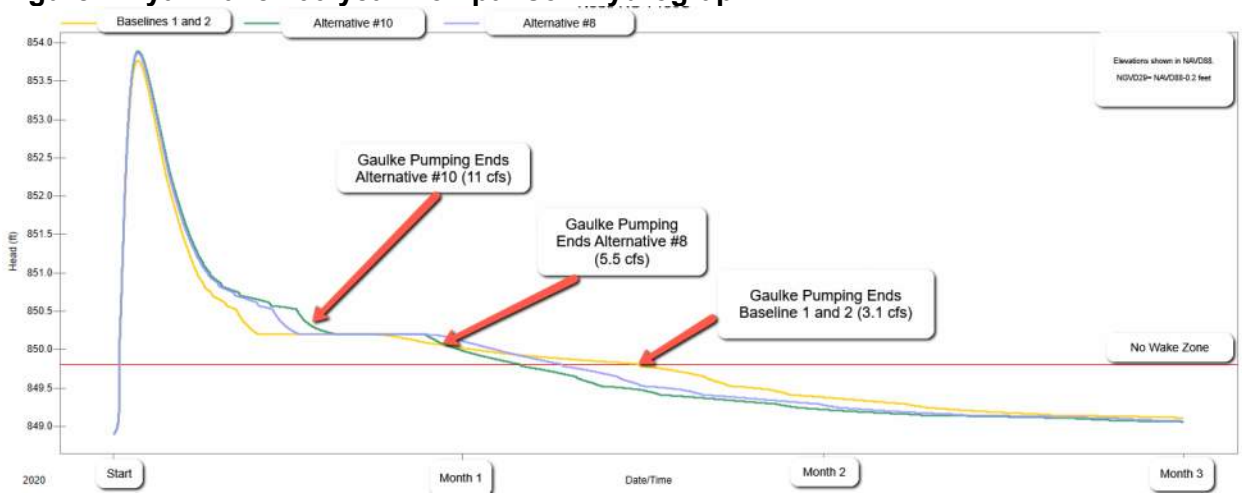


Figure 4 Ryan Lake 100-year Comparison Hydrograph



11. *Increased Pumping Rate from Gaulke Pond (11 cfs) and Crystal Lake (2.67 cfs)*
    The results of Alternative #10 mirror those of Alternative #8, except there are more signification reductions in the maximum water levels on the Gaulke Pond chain of up to 1.1-feet shown in the comparison to Baseline 1.

12. *Increased Pumping Rate from Gaulke Pond (11 cfs)*
    The results of Alternative #11 mirror those of Alternative #10, except there are no impacts to the peak water level on Ryan Lake during the 100-year event.

13. *Increased Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time*
    The results of Alternative #12 mirror those of Alternative #8, except there are more significant reductions in the maximum water levels on the Gaulke Pond chain of up to 0.6-feet shown in the comparison to Baseline 1. There appear to be no adverse impacts to the maximum water level of Twin Lake or Ryan Lake as a result of the change in timing of pumping and only minor changes to durations of high-water.

4.0 RECOMMENDATIONS

Based on our results presented in the preceding sections, we recommend the following:

Pumping Operations for Gaulke Pond and Crystal Lake

1. Changes to the pumping routines at Gaulke Pond and/or Crystal Lake will increase the 100-year flood elevation of Ryan Lake by up to 0.1 feet (1.2 inches) compared to Baseline 1. There is no change to the 100-year flood elevation when rounded to the nearest tenth of a foot compared to Baseline 2, which also represents an existing, permitted, operating condition. (Recall that Baseline 1 refers to Crystal Lake pumped to Minneapolis storm sewer, and Baseline 2 refers to Crystal Lake pumped to Ryan Lake.)
    a. Because there are impacts to the 100-year compared to Baseline 1 but not compared to Baseline 2, it is unclear if a Letter of Map Revision must be filed with FEMA along with an approved pump operation plan.
    b. There is some reduction in peak water level as a result on pumping on the Gaulke Pond chain and in Crystal Lake, but the greatest benefit is the reduction in duration of high-water. City staff report the significant reduction in duration of high water for Crystal Lake, Ryan Lake, and Gaulke Pond is of far greater benefit than the likely immeasurable impact of the Ryan Lake 100-year high water level increasing by one inch.
    c. It is feasible to pump from Crystal Lake to Ryan Lake at 2.67 cfs (1,200 gpm) and has a minimal impact to Ryan Lake and nearly no measurable impact compared to Baseline 2 in the 100-year. The pumping does not appreciably change maximum water levels on Crystal Lake but does significantly reduce the duration of high-water levels in the lake. Alternatively, Crystal Lake could be rerouted to Twin Lake, which results in a lower 100-year peak water level on Ryan Lake than the Baseline 2 condition.
    d. It is feasible to pump from Gaulke Pond up to 11 cfs (4,950 gpm) with minimal impact to Lower Twin Lake, Ryan Lake, and Shingle Creek. Proposed pump rates between 5.5 cfs (2,500 gpm) and 11 cfs (4,950 gpm) require that the 15-inch storm sewer between Adair Avenue and Zane Avenue be increased to an 18-inch diameter pipe to avoid street flooding. The timing of that pumping is more flexible than the 1962 inter-community agreement allows; however, pumping during extremely intense rainfall should still be limited due to capacity in the Robbinsdale storm sewer system between Adair Avenue and Yates Avenue (at 11-cfs the 18-inch pipe flows full). The pumping does not appreciably change maximum water levels on Memory Pond and Brownwood Ponds, somewhat reduces the maximum water levels of Hagemeister Pond and Gaulke Pond, but can reduce the duration of high-water levels on all four of these ponds.
2. We recommend periodic inspections of the Ryan Lake outlet channel and outlet pipe during pumping to ensure that the lake outlet remains open.
3. We recommend staff gages be installed at key waterbodies to assess flood risk during extreme events.

Other Floodplain Management Strategies and Changes

1. The Oregon Avenue pipe may be lined without impacts to the maximum water levels and high-water level durations of the modeled waterbodies.
2. We do not recommend flood storage expansion of the Fred Sim's Park as it provides minimal benefit at high cost.
3. Additional study of the France Avenue weir is not recommended. Changes to the high-flow weir do not significantly improve flooding outcomes and changes to the height of the normal flow weir are nearly impossible due to regulations included in Minnesota Statutes 103G.

Limitations and Assumptions

Using the 24-hour storm helps understand how pumping would impact maximum water levels and durations for an intense summertime-type thunderstorm. This analysis focused on those types of storms due to the complexity in modeling the Gaulke Pond pump operations during a prolonged wet period.

APPENDIX A

Gaulke Pond

1962 Inter-Community Agreement

CITY OF CRYSTAL

ADMINISTRATIVE OFFICE, 6424 - 54TH AVENUE NORTH

CRYSTAL 27, MINNESOTA

PHONE KEllogg 7-8421

April 10, 1962

Honorable Mayor and City Council
Robbinsdale 22, Minnesota

Re: Storm Drainage
Gaulke Pond

Gentlemen:

The overall storm drainage plan for the City of Crystal requires that the area known as Gaulke's Pond located immediately west of Adair School, be provided with a relief system.

As you may know, the pond presently has no outlet. It is proposed to construct a lift station on the pond and pump the water thru force mains.

It appears that the most feasible plan for disposal would be at a point where the least disruption, lowest cost, and greatest benefit might be obtained.

With the approval of the City of Robbinsdale we propose to connect to the Robbinsdale storm drainage system as it presently exists at 40th and Yates. This drainage empties into Twin Lake and would thus benefit the lake levels and at the same time remove this drainage area from the potential watershed of the now sorely overburdened Bassett's Creek.

The proposed pumping rate would not exceed 1400 gal per minute. Pumping would take place only during periods of "no-flow" or dry weather so that the existing system might not be overburdened.

The City of Crystal naturally expects to pay all expenses involved in construction and to restore the streets to the same or better condition then presently exist, and to maintain the facility insofar as may be consistent with the use by the City of Crystal.

It is requested that the City of Robbinsdale grant approval of this proposed use of the Robbinsdale facilities under the conditions stipulated above.

Very truly yours,

Wm. L. Sherburne

WILLIAM L. SHERBURNE, P.E.
City Engineer

wls/t
cc-H.M.Clark Engr.Co.
F. A. Allbee
File

RECEIVED
APR 12 1962
CITY OF ROBBINSDALE

A G R E E M E N T

THIS AGREEMENT made by and between the City of Crystal, a municipal corporation, its successors and assigns and the City of Robbinsdale, a municipal corporation, its successors and assigns.

PURPOSE: The purpose of this agreement is to facilitate and provide a means for the City of Crystal to dispose of storm water, into Twin Lakes from Gaulke's Pond through the storm sewer located in the City of Robbinsdale at 40th and Yates and flowing to Twin Lakes.

DEFINITIONS: STORM SEWER - Storm Sewer is defined as the storm sewer in the City of Robbinsdale flowing to Twin Lakes from 40th and Yates.

STORM SEWER EXTENSION - Storm Sewer Extension is defined as that part of the storm sewer to be constructed in the City of Robbinsdale by the City of Crystal with City of Crystal funds and at no cost or expense to the City of Robbinsdale.

WHEREAS, the City of Robbinsdale and the City of Crystal both have lands within their respective cities bordering upon and abutting said Twin Lakes,

WHEREAS, both municipalities have real properties which drain into Gaulke's Pond,

WHEREAS, the water level of Twin Lakes has dropped in the last several years to the detriment of the appearance of said Lake Shore and the use of said Twin Lakes for fishing and recreational purposes benefitting both cities, the inhabitants thereof and the public,

WHEREAS, it is in the interest of both Cities to maintain a high water level in said Twin Lakes so as to preserve a high valuation for Lake properties and lands adjacent thereto,

NOW THEREFORE, in consideration of the mutual covenants and agreements contained herein both the City of Crystal and the City of Robbinsdale agree as follows:

The City of Robbinsdale grants to the City of Crystal the right to use, drain and dispose of storm waters from Gaulke's Pond and such waters flowing

thereto into said City of Robbinsdale storm sewer located at 40th and Yates and flowing therein to Twin Lakes upon the following terms and conditions:

1. That the City of Crystal shall construct, at no cost and expense to the City of Robbinsdale, a storm sewer lift station and a storm sewer extension on 40th Avenue North in said City of Robbinsdale flowing into said City of Robbinsdale storm sewer at 40th and Yates, disposing of the waters from Gaulke's Pond and such storm water flowing thereto.

2. That the City of Crystal shall hold the City of Robbinsdale harmless from any and all liability to third persons which may result from the excavation and construction of said storm sewer lift station and said storm sewer extension.

3. That the City of Crystal shall repair above named street to as good or better condition as existed prior to the construction of said storm sewer lift station and said storm sewer extension.

4. That after the construction of both said storm sewer lift station and said storm sewer extension the City of Crystal shall own, operate and maintain said facilities.

5. That the City of Crystal shall operate said storm sewer lift station at such times when said storm sewer is not being used to any considerable extent for run-off from rains, or melting of snow to dispose of storm waters from Gaulke's Pond and such waters flowing thereto.

6. That the City of Crystal shall maintain said storm sewer extension as part of its storm sewer system in good working order and will keep said storm sewer extension located within the City of Robbinsdale in good repair.

7. That the City of Robbinsdale shall have the right to use, drain and connect up abutting real properties in the City of Robbinsdale to said storm sewer extension for and in consideration of granting the City of Crystal permission to use its storm sewer located at 40th and Yates and flowing therefrom into Twin Lakes.

IN WITNESS WHEREOF, the undersigned Mayor and Clerk of the City of Robbinsdale and the Mayor and City Manager of the City of Crystal have hereunto set their hands to this agreement which is executed in duplicate pursuant to the authority granted to them by their respective City Councils this _____ day of _____, 1962.

CITY OF ~~ROBBINSDALE~~ Crystal:

(SEAL)

Mayor

City ~~Clerk~~ Mgr.

CITY OF ~~CRYSTAL~~: Robbinsdale

Mayor

(SEAL)

City ~~Manager~~ Clerk

APPENDIX B

Gaulke Pond Discharge Rate Evaluation

WENCK ASSOCIATES

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Exceptional outcomes.

July 26, 2019
Mark Ray, PE
Public Works Director/City Engineer
City of Crystal, MN

Via: email

RE: Gaulke Pond Discharge Rate Evaluation

Dear Mr. Ray:

This letter presents the findings of the study completed for the discharge capacity from Gaulke Pond. For the study, Wenck evaluated the capacity of the storm sewer infrastructure from Gaulke Pond to 45th Avenue Pond in Robbinsdale and the impact that higher discharge rates from Gaulke Pond would have on that infrastructure. The site location is shown in Figure 1.

Background

Gaulke Pond is located in Crystal, south of 40th Avenue and east of Douglas Drive North. The pond site is bordered to the north by property owned by the City of Crystal, to the west by the Fair School, and to the south and west by residential properties. The pond currently collects runoff from the adjacent properties and other surrounding neighborhoods.

The City of Crystal requested this evaluation to determine the effect and possibility of decreasing the time that it takes to pump the pond to the desired normal water level, which would require increased pumping rates or other controls.

Existing Conditions

Gaulke Pond is an approximately 2.5-acre pond and is adjacent to the Fair School in Crystal. The pond is a stormwater basin that collects surface runoff from approximately 875 acres of mixed residential, institutional and commercial property in the cities of Crystal, New Hope, and Robbinsdale. About 239 acres of the tributary area is in Robbinsdale and Crystal and discharges directly to Gaulke Pond. The remaining 636 acres is collected in the Memory Lane Pond and Hagermeister Pond in Crystal prior to discharge into Gaulke Pond. About 40% of the total tributary area that discharges into Gaulke Pond is impervious.

The Gaulke Pond is landlocked so the stormwater collected is discharged by pumping into a storm sewer that goes through the city of Robbinsdale storm sewer system. The Robbinsdale storm sewer network that the pond is pumped into flows to the Graeser Pond and then the 45th Avenue Pond before discharging to Middle Twin Lake.

Storm Sewer Infrastructure Review

We reviewed available information on the storm sewer infrastructure to calculate the capacity of the existing storm sewers. The pond discharges into the Robbinsdale storm sewer at the intersection of Adair Avenue North and 40th Avenue North. The storm sewer trunk runs along 40th Avenue to Unity Avenue North, then north on Unity Avenue. The storm sewer trunk main eventually flows to Graeser Pond and the 45th Avenue Pond, and then into Middle Twin Lake. The storm sewer layout is shown in Figure 2.

The trunk storm sewer size and capacity vary along the route. The most restrictive storm sewer pipe is the 15-inch RCP pipe from Adair Avenue North to Zane Avenue North at pipe slope of 0.62%. Based on Manning's equation with a roughness coefficient of 0.012, the capacity of that pipe is about 5.5 cubic feet per second (cfs) while flowing full. The storm sewer from Zane Avenue to Yates Avenue is an 18-inch RCP at 0.8% grade, for a maximum capacity of about 10.2 cfs flowing full. The storm sewers downstream are all larger and higher flow capacities along 40th Avenue until the discharge into Graeser Pond.

We also modeled the pond, with the 15-inch and 18-inch storm sewers, in HydroCAD. HydroCAD takes the elevation head into consideration and not only full pipe flow capacity. We adjusted the pumped discharge rate to determine what rate the storm sewers can convey without surcharging the storm sewers by more than 3 feet above the storm sewer inverts. Based on the HydroCAD model the 15-inch storm sewer can convey up to 10 cfs without a significant surcharge at the catch basin. The next section of 18-inch diameter storm sewer can convey about 15 cfs without a significant surcharge. A printout of the HydroCAD modeling reports is provided in Appendix A.

Thus, based on the storm sewers that Gaulke Pond discharges to, the peak available discharge rate is about 5.5 cubic feet per second (cfs) based on full pipe flow and increased to about 10 cfs when a surcharge of 3 feet is allowed above the storm sewer invert. The peak discharge rate based on storm sewer capacity could be increased to 10.2 cfs (4,600 gpm) if the pond discharge is extended to the intersection of 40th Avenue North and Zane Avenue North, and about 15 cfs with the extended discharge if the storm sewer is allowed to surcharge. These maximum discharge rates assume that the discharge will only be allowed after a rainfall event has ended and the localized storm flow has cleared from the storm sewers.

Ponds/Outfall Review

Wenck reviewed available information related to Graeser Pond and the 45th Avenue Pond to determine if there were any restrictions that would prohibit an increased pumping rate from Gaulke Pond. The review included available storm sewer and pond information, existing topography, and the 2018 City of Robbinsdale Local Surface Water Management Plan (LSWMP).

The existing storm sewers from Gaulke Pond to Graeser Pond increase in size and are up to 54" diameter, which provide significantly more flow capacity than the calculated discharge rates from Gaulke Pond. The peak runoff from the area of the storm sewers in the area surrounding the trunk sewer from Gaulke Pond to Graeser and 45th Avenue Ponds is more than 250 cfs based on the City of Robbinsdale LSWMP. This is significantly higher than the peak runoff from the area to Graeser and 45th Avenue Pond as presented in the LSWMP. Based on this information, pumping at 10-15 cfs from Gaulke Pond will not have any negative effect on the ponds or on the storm sewer system downstream of the pond.

Summary and Conclusion

Based on the available data review, the maximum discharge rate for pumping from Gaulke Pond without adversely affecting the City of Robbinsdale stormwater systems is about 10 cfs during a dry period. That discharge rate could be increased to about 15 cfs if it were feasible and permissible to install a forcemain approximately one block along 40th Avenue to discharge to a storm sewer with slightly higher capacity. The pond discharge would likely be restricted or not allowed during a rainfall event and until that event has completely passed through the city

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storm sewers. There do not appear to be any restrictions to discharging to Graeser Pond and 45th Avenue pond, although discharge should be restricted if the water level is near the pond freeboard limits.

We appreciate this opportunity to assist the City of Crystal. Please contact either of us if you have any questions.

Sincerely,

Wenck Associates, Inc.

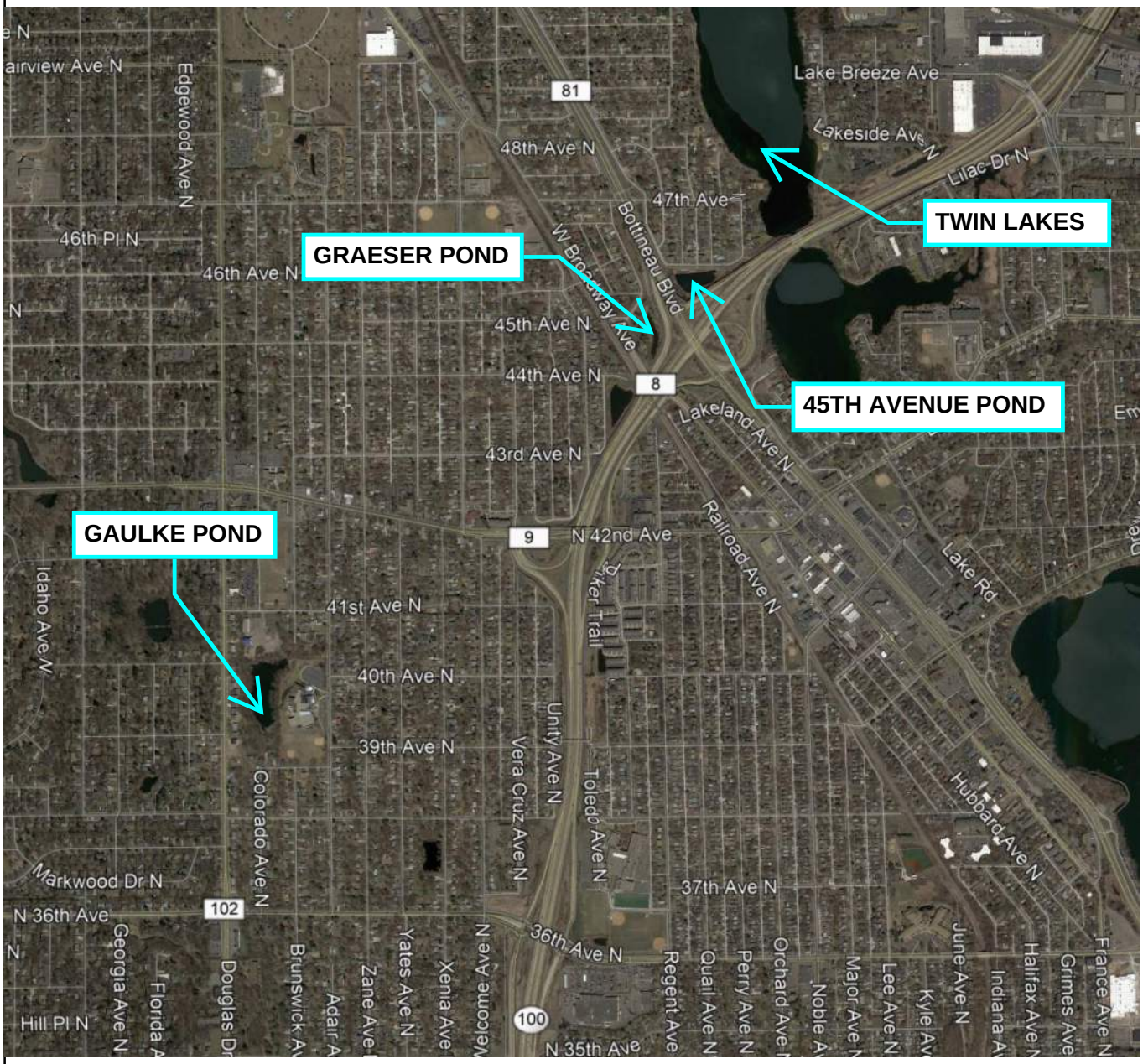
Brian Kallio, PE
Senior Engineer
763-252-6985

Ed Matthiesen, PE
Principal
763-252-6851

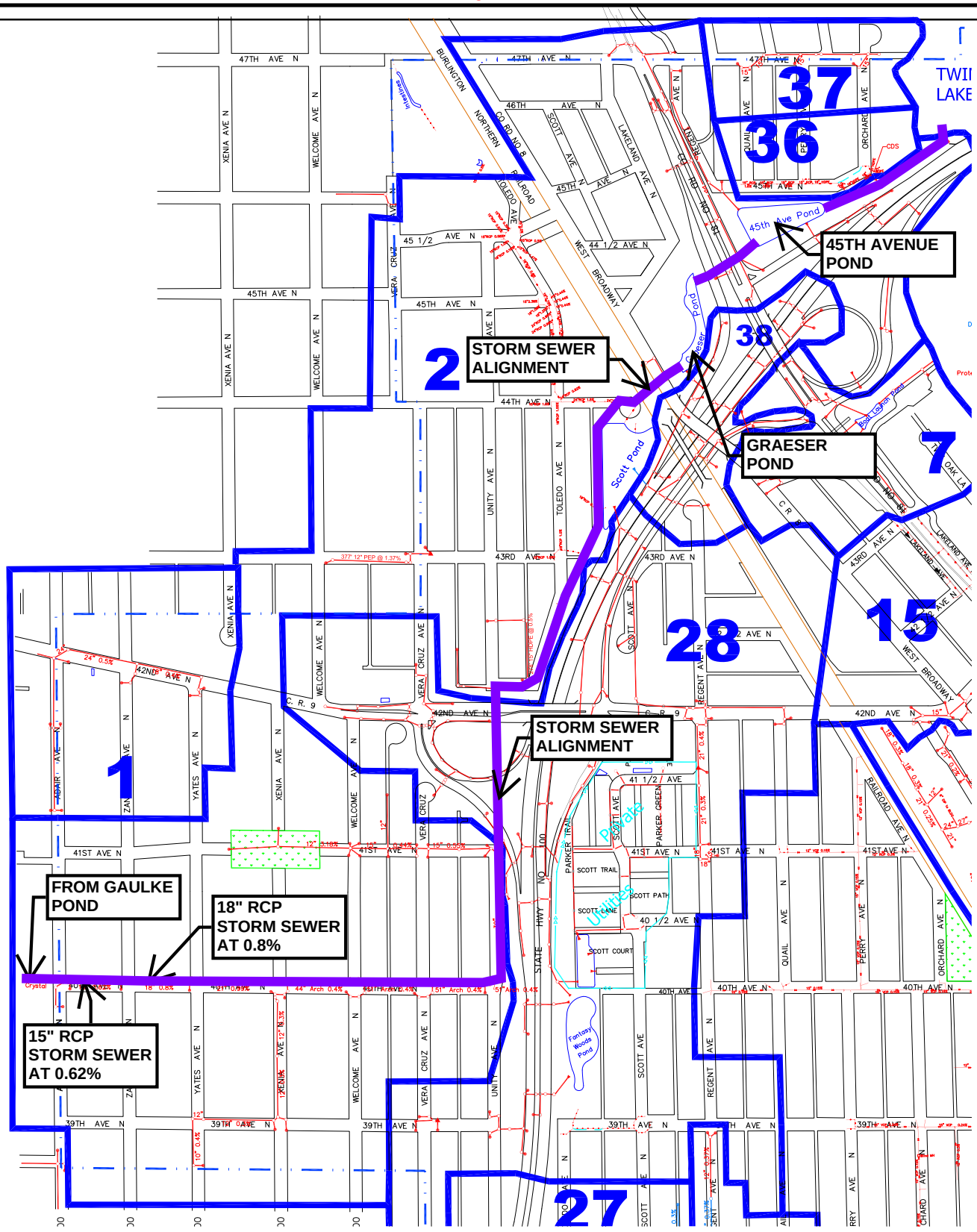
Figures

Location Map

Storm Sewers Map



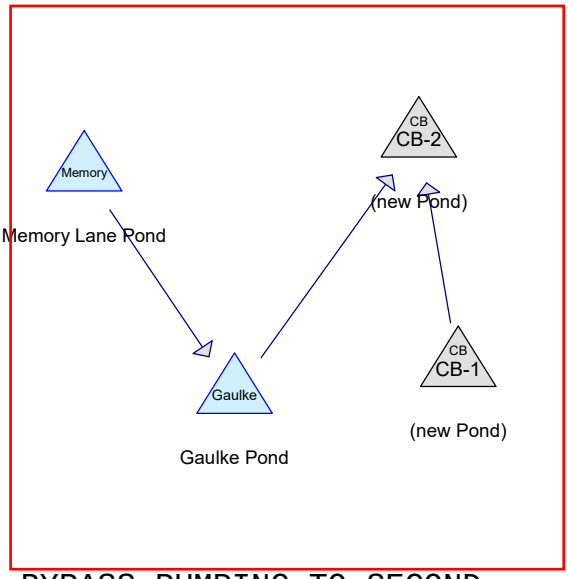
CITY OF CRYSTAL	WENCK Responsive partner. Exceptional outcomes.	JULY 2019
LOCATION MAP		Figure 1



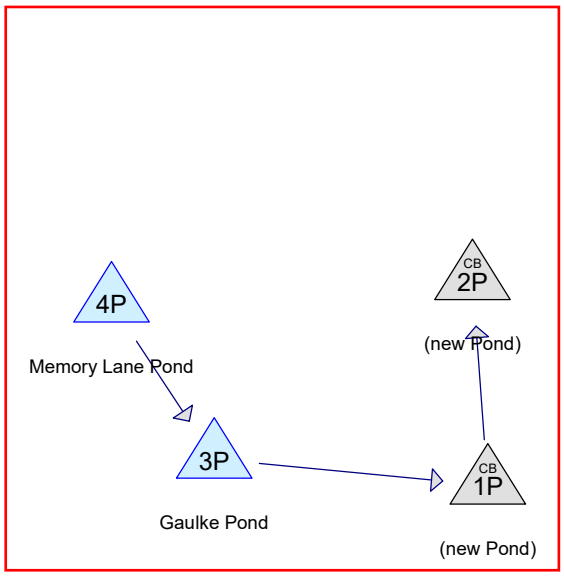
CITY OF CRYSTAL	WENCK Responsive partner. Exceptional outcomes.	JULY 2019
STORM SEWER MAP		Figure 2

Appendix A

HydroCAD Output Reports



BYPASS PUMPING TO SECOND MANHOLE



PUMPING TO ADJACENT MANHOLE

Subcat Reach Pond Link

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	**0**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**TOTAL AREA**	

Gaulke-15 cfs
Prepared by Wenck Associates Printed 7/16/2019

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	869.00	868.50	81.0	0.0062	0.012	15.0	0.0	0.0
2	2P	868.00	867.00	125.0	0.0080	0.012	18.0	0.0	0.0
3	4P	871.70	869.99	2,850.0	0.0006	0.013	18.0	0.0	0.0
4	CB-1	869.00	868.50	81.0	0.0062	0.012	15.0	0.0	0.0
5	CB-2	868.00	867.00	125.0	0.0080	0.012	18.0	0.0	0.0
6	Memory	871.70	869.99	2,850.0	0.0006	0.013	18.0	0.0	0.0

Time span=0.00-999.00 hrs, dt=0.20 hrs, 4996 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: (new Pond) Peak Elev=872.96' Inflow=10.00 cfs 148.253 af
15.0" Round Culvert n=0.012 L=81.0' S=0.0062 '/' Outflow=10.00 cfs 148.253 af

Pond 2P: (new Pond) Peak Elev=870.21' Inflow=10.00 cfs 148.253 af
18.0" Round Culvert n=0.012 L=125.0' S=0.0080 '/' Outflow=10.00 cfs 148.253 af

Pond 3P: Gaulke Pond Peak Elev=877.00' Storage=131.914 af Inflow=4.94 cfs 31.525 af
Outflow=10.00 cfs 148.253 af

Pond 4P: Memory Lane Pond Peak Elev=878.00' Storage=31.515 af Inflow=0.00 cfs 0.000 af
Outflow=4.94 cfs 31.525 af

Pond CB-1: (new Pond) Peak Elev=0.00'
15.0" Round Culvert n=0.012 L=81.0' S=0.0062 '/' Primary=0.00 cfs 0.000 af

Pond CB-2: (new Pond) Peak Elev=872.36' Inflow=15.00 cfs 148.294 af
18.0" Round Culvert n=0.012 L=125.0' S=0.0080 '/' Outflow=15.00 cfs 148.294 af

Pond Gaulke: Gaulke Pond Peak Elev=877.00' Storage=131.914 af Inflow=4.94 cfs 31.525 af
Outflow=15.00 cfs 148.294 af

Pond Memory: Memory Lane Pond Peak Elev=878.00' Storage=31.515 af Inflow=0.00 cfs 0.000 af
Outflow=4.94 cfs 31.525 af

Summary for Pond 1P: (new Pond)

[57] Hint: Peaked at 872.96' (Flood elevation advised)
[78] Warning: Submerged Pond 3P Primary device # 1 by 7.96'
[81] Warning: Exceeded Pond 3P by 3.93' @ 177.20 hrs

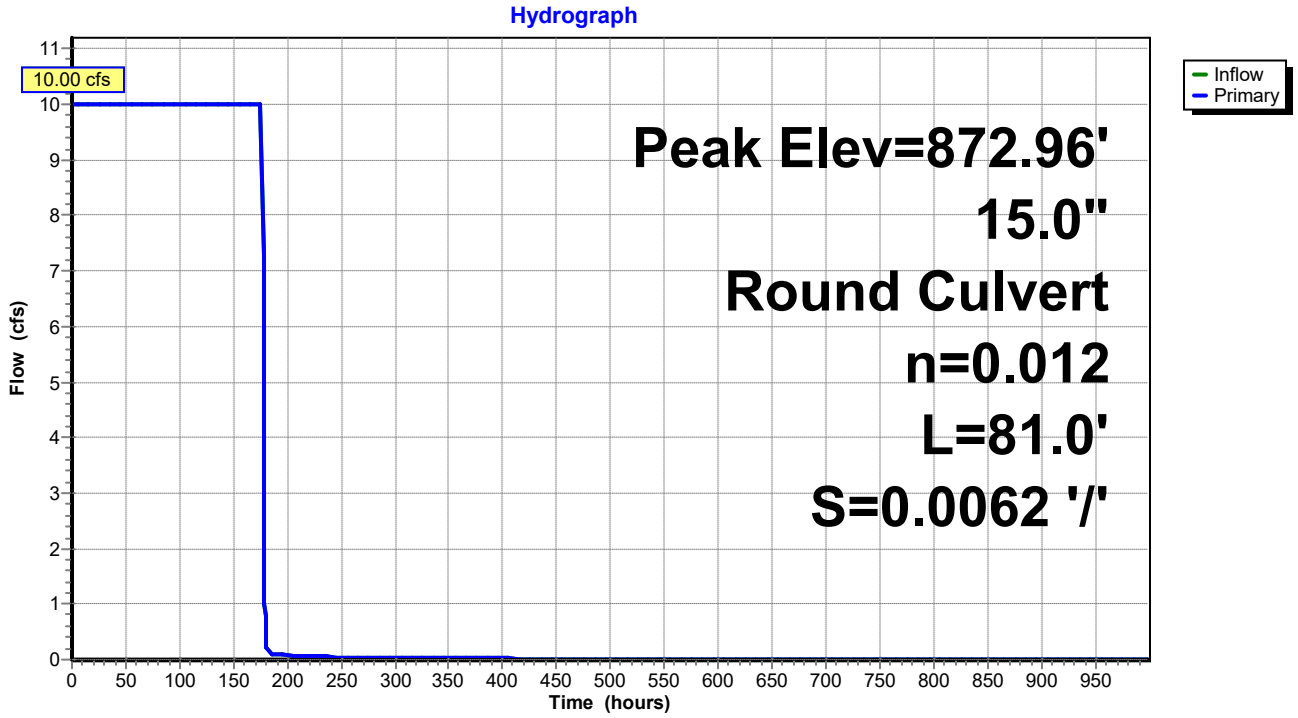
Inflow	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af
Outflow	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af, Atten= 0%, Lag= 0.0 min
Primary	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af

Routing by Stor-Ind method, Time Span= 0.00-999.00 hrs, dt= 0.20 hrs
Peak Elev= 872.96' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	869.00'	**15.0" Round Culvert** L= 81.0' Ke= 0.500 Inlet / Outlet Invert= 869.00' / 868.50' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=10.00 cfs @ 0.00 hrs HW=872.96' (Free Discharge)
1=Culvert (Barrel Controls 10.00 cfs @ 8.15 fps)

Pond 1P: (new Pond)



Summary for Pond 2P: (new Pond)

[57] Hint: Peaked at 870.21' (Flood elevation advised)
[79] Warning: Submerged Pond 1P Primary device # 1 INLET by 1.21'

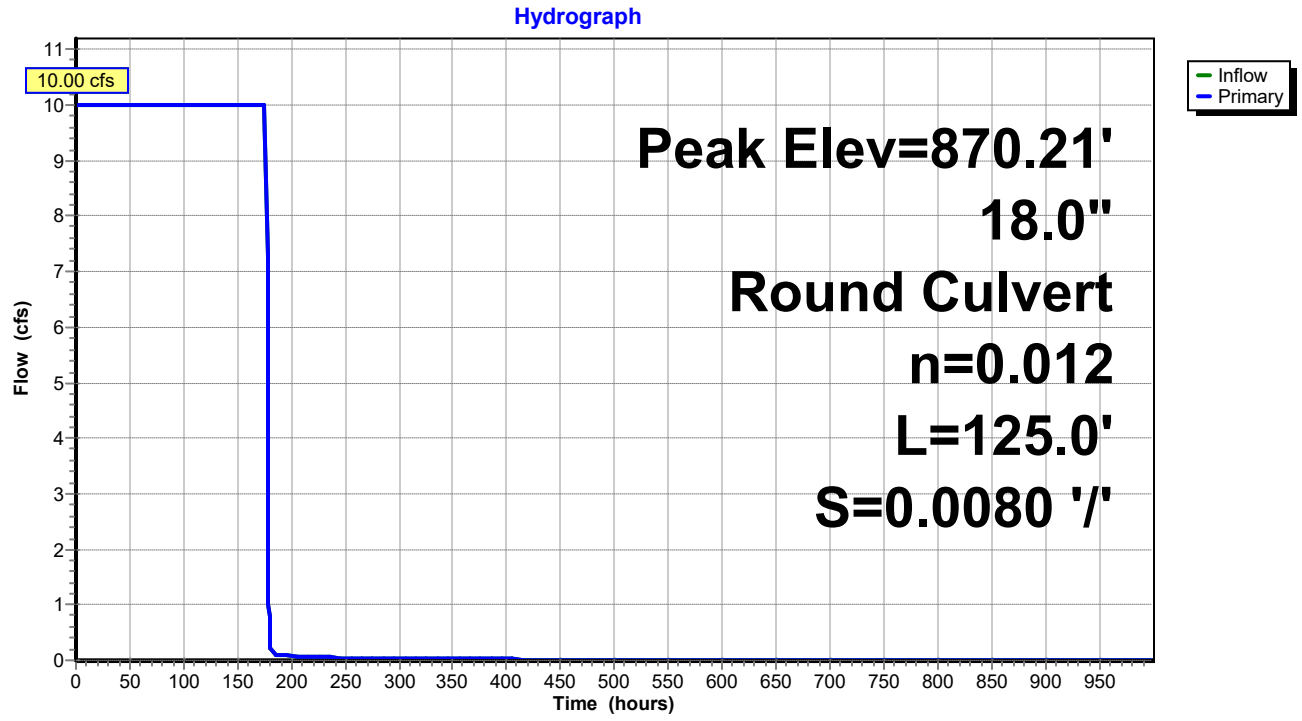
Inflow	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af
Outflow	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af, Atten= 0%, Lag= 0.0 min
Primary	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af

Routing by Stor-Ind method, Time Span= 0.00-999.00 hrs, dt= 0.20 hrs
Peak Elev= 870.21' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	868.00'	**18.0" Round Culvert** L= 125.0' Ke= 0.500 Inlet / Outlet Invert= 868.00' / 867.00' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=10.00 cfs @ 0.00 hrs HW=870.21' (Free Discharge)
1=Culvert (Barrel Controls 10.00 cfs @ 5.66 fps)

Pond 2P: (new Pond)



Summary for Pond 3P: Gaulke Pond

[81] Warning: Exceeded Pond 4P by 2.10' @ 84.40 hrs

Inflow	=	4.94 cfs @	0.00 hrs,	Volume=	31.525 af
Outflow	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af, Atten= 0%, Lag= 0.0 min
Primary	=	10.00 cfs @	0.00 hrs,	Volume=	148.253 af

Routing by Stor-Ind method, Time Span= 0.00-999.00 hrs, dt= 0.20 hrs
Starting Elev= 877.00' Surf.Area= 24.093 ac Storage= 131.874 af
Peak Elev= 877.00' @ 0.00 hrs Surf.Area= 24.097 ac Storage= 131.914 af (0.041 af above start)

Plug-Flow detention time= 9,557.0 min calculated for 16.338 af (52% of inflow)
Center-of-Mass det. time= 2,087.7 min (5,448.8 - 3,361.0)

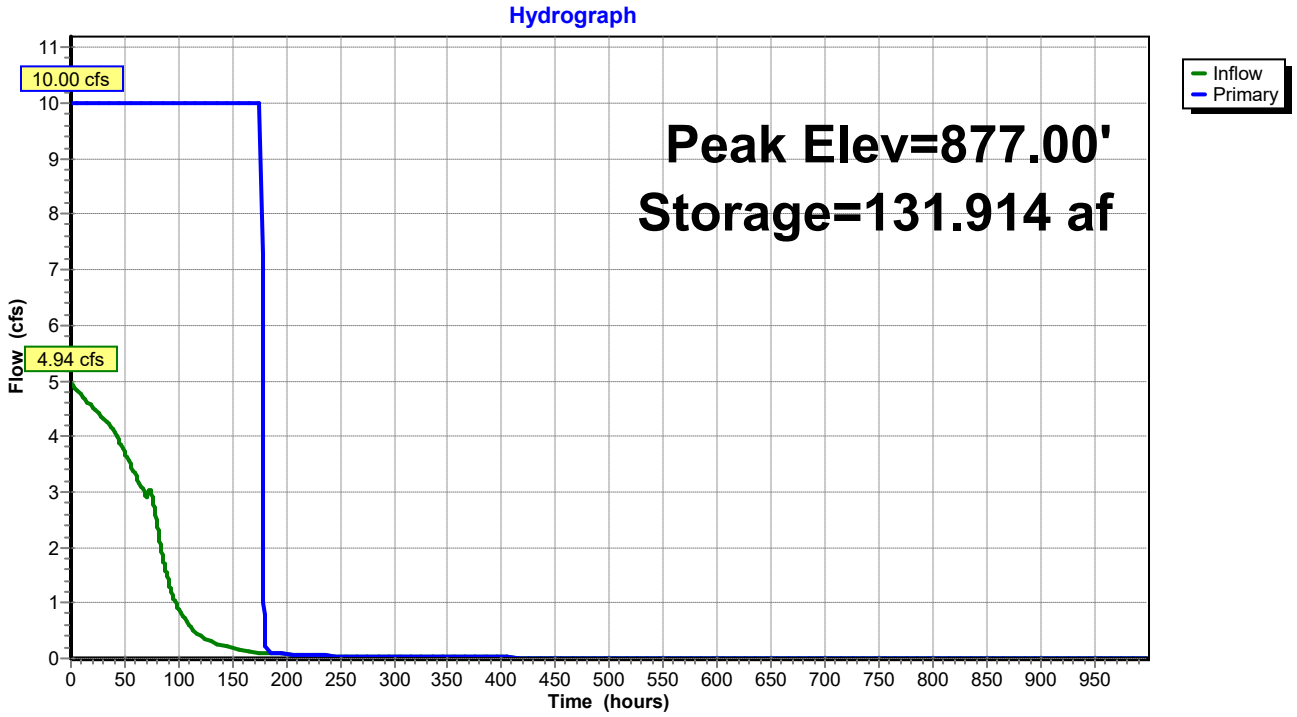
Volume	Invert	Avail.Storage	Storage Description
#1	865.00'	733.319 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
865.00	3.010	0.000	0.000
868.00	3.770	10.170	10.170
870.30	7.470	12.926	23.096
871.70	11.050	12.964	36.060
872.00	11.540	3.388	39.449
876.00	21.160	65.400	104.849
880.00	32.890	108.100	212.949
882.00	40.260	73.150	286.099
886.00	55.900	192.320	478.419
890.00	71.550	254.900	733.319

Device	Routing	Invert	Outlet Devices
#1	Primary	865.00'	**Gaulke Pond Pumped Outlet** Head (feet) 0.00 3.90 4.00 30.00 Disch. (cfs) 0.000 0.000 10.000 10.000

Primary OutFlow Max=10.00 cfs @ 0.00 hrs HW=877.00' (Free Discharge)
1=Gaulke Pond Pumped Outlet (Custom Controls 10.00 cfs)

Pond 3P: Gaulke Pond



Summary for Pond 4P: Memory Lane Pond

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	4.94 cfs @	0.00 hrs,	Volume=	31.525 af, Atten= 0%, Lag= 0.0 min
Primary	=	4.94 cfs @	0.00 hrs,	Volume=	31.525 af

Routing by Stor-Ind method, Time Span= 0.00-999.00 hrs, dt= 0.20 hrs
Starting Elev= 878.00' Surf.Area= 7.480 ac Storage= 31.515 af
Peak Elev= 878.00' @ 0.00 hrs Surf.Area= 7.480 ac Storage= 31.515 af

Plug-Flow detention time= (not calculated: no plugs found)
Center-of-Mass det. time= (not calculated: no inflow)

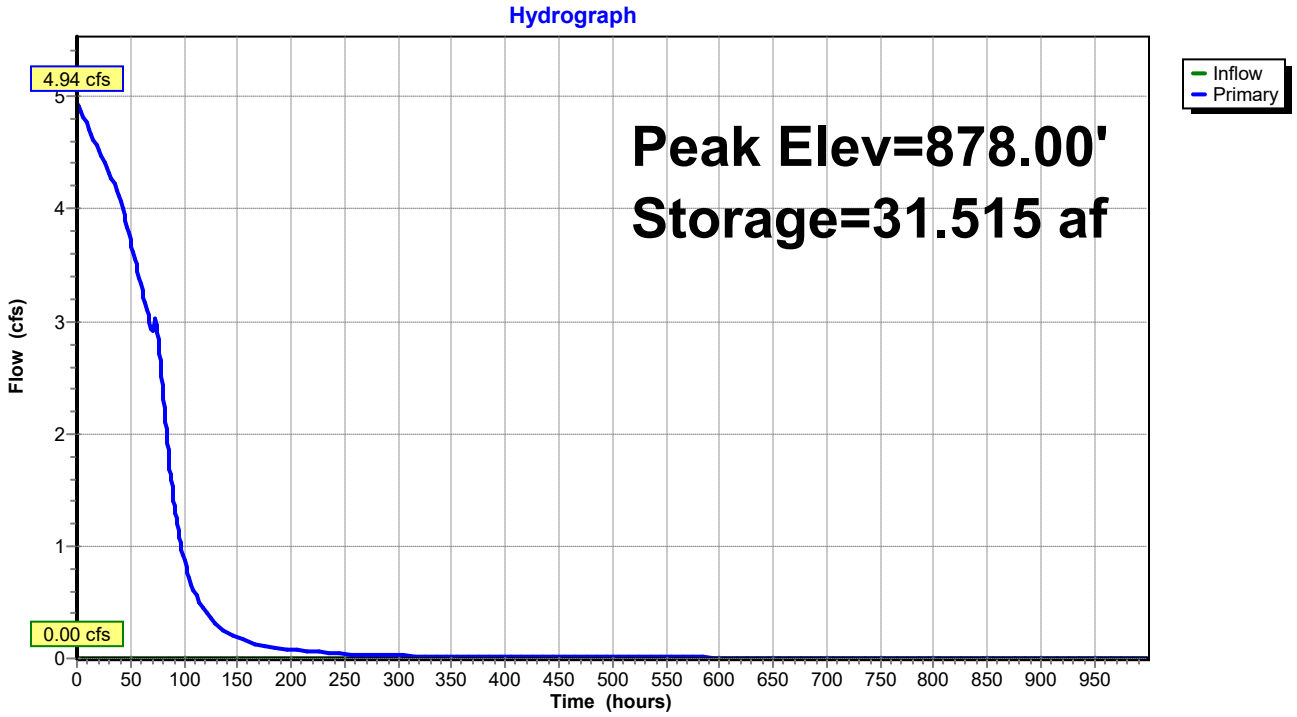
Volume	Invert	Avail.Storage	Storage Description
#1	871.70'	132.895 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
871.70	2.310	0.000	0.000
876.00	5.390	16.555	16.555
880.00	9.570	29.920	46.475
882.00	12.590	22.160	68.635
886.00	19.540	64.260	132.895

Device	Routing	Invert	Outlet Devices
#1	Primary	871.70'	**18.0" Round Culvert** L= 2,850.0' Ke= 0.500 Inlet / Outlet Invert= 871.70' / 869.99' S= 0.0006 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	883.00'	**50.0' long Broad-Crested Rectangular Weir** Head (feet) 0.50 1.00 1.50 2.00 2.50 3.00 4.00 5.00 Coef. (English) 3.25 3.25 3.25 3.25 3.25 3.25 3.25 3.25

Primary OutFlow Max=4.94 cfs @ 0.00 hrs HW=878.00' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.94 cfs @ 2.80 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Memory Lane Pond



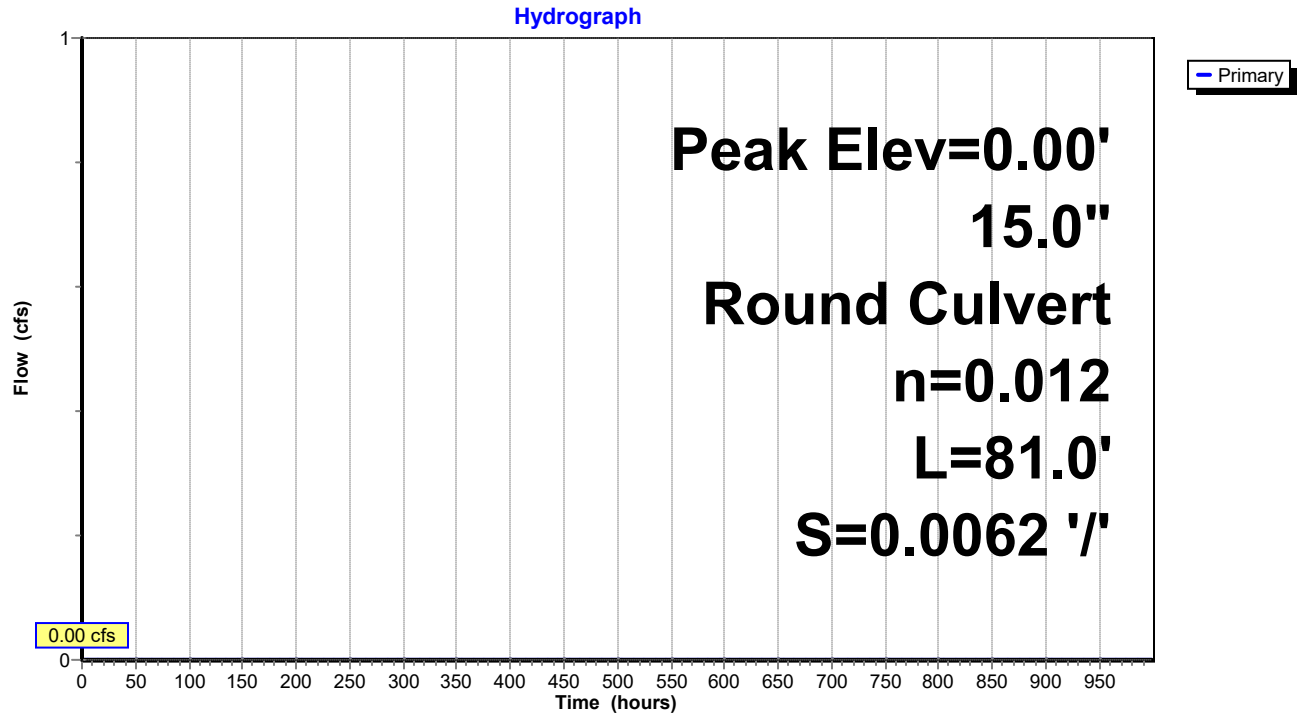
Summary for Pond CB-1: (new Pond)

[43] Hint: Has no inflow (Outflow=Zero)

Device	Routing	Invert	Outlet Devices
#1	Primary	869.00'	**15.0" Round Culvert** L= 81.0' Ke= 0.500 Inlet / Outlet Invert= 869.00' / 868.50' S= 0.0062 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond CB-1: (new Pond)



Summary for Pond CB-2: (new Pond)

[57] Hint: Peaked at 872.36' (Flood elevation advised)
[79] Warning: Submerged Pond CB-1 Primary device # 1 INLET by 3.36'
[78] Warning: Submerged Pond Gaulke Primary device # 1 by 7.36'
[81] Warning: Exceeded Pond Gaulke by 3.32' @ 117.20 hrs

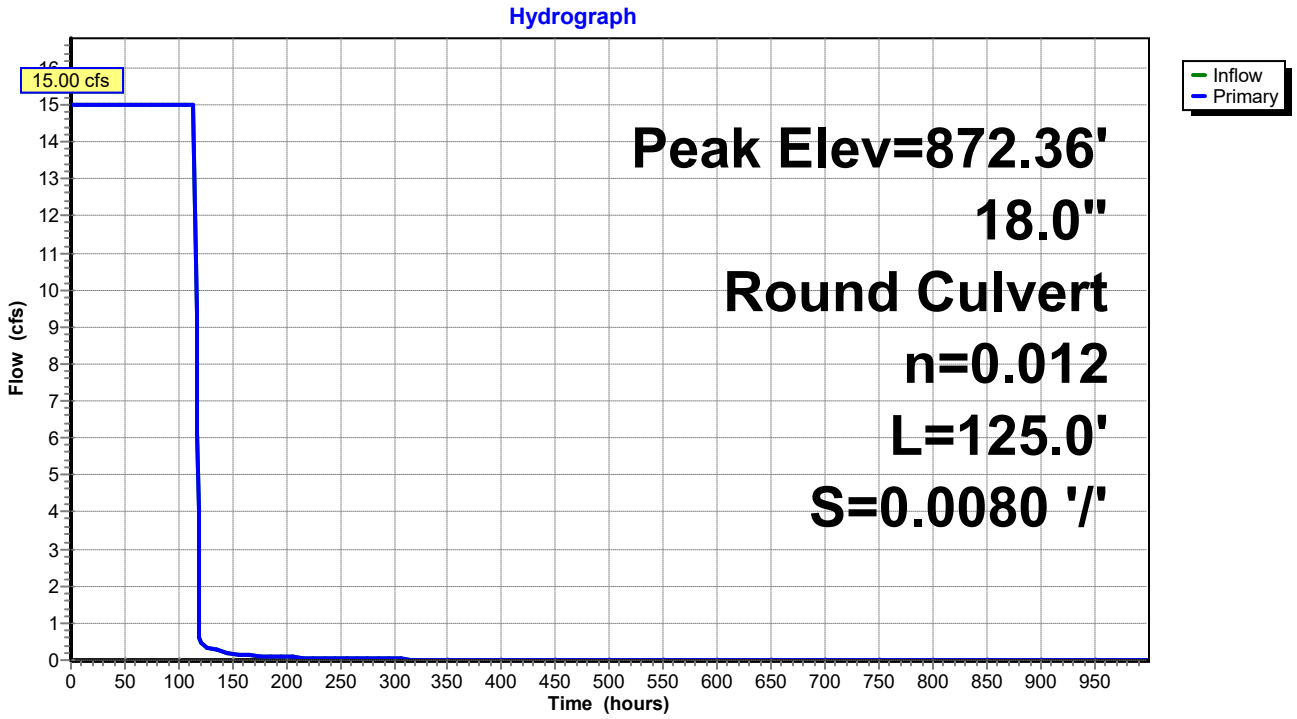
Inflow	=	15.00 cfs @	0.00 hrs,	Volume=	148.294 af
Outflow	=	15.00 cfs @	0.00 hrs,	Volume=	148.294 af, Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	0.00 hrs,	Volume=	148.294 af

Routing by Stor-Ind method, Time Span= 0.00-999.00 hrs, dt= 0.20 hrs
Peak Elev= 872.36' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	868.00'	**18.0" Round Culvert** L= 125.0' Ke= 0.500 Inlet / Outlet Invert= 868.00' / 867.00' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=15.00 cfs @ 0.00 hrs HW=872.36' (Free Discharge)
└**1=Culvert** (Barrel Controls 15.00 cfs @ 8.49 fps)

Pond CB-2: (new Pond)



Summary for Pond Gaulke: Gaulke Pond

[81] Warning: Exceeded Pond Memory by 0.07' @ 75.80 hrs

Inflow	=	4.94 cfs @	0.00 hrs,	Volume=	31.525 af
Outflow	=	15.00 cfs @	0.00 hrs,	Volume=	148.294 af, Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	0.00 hrs,	Volume=	148.294 af

Routing by Stor-Ind method, Time Span= 0.00-999.00 hrs, dt= 0.20 hrs
Starting Elev= 877.00' Surf.Area= 24.093 ac Storage= 131.874 af
Peak Elev= 877.00' @ 0.00 hrs Surf.Area= 24.097 ac Storage= 131.914 af (0.041 af above start)

Plug-Flow detention time= 6,472.1 min calculated for 16.380 af (52% of inflow)
Center-of-Mass det. time= 329.0 min (3,690.0 - 3,361.0)

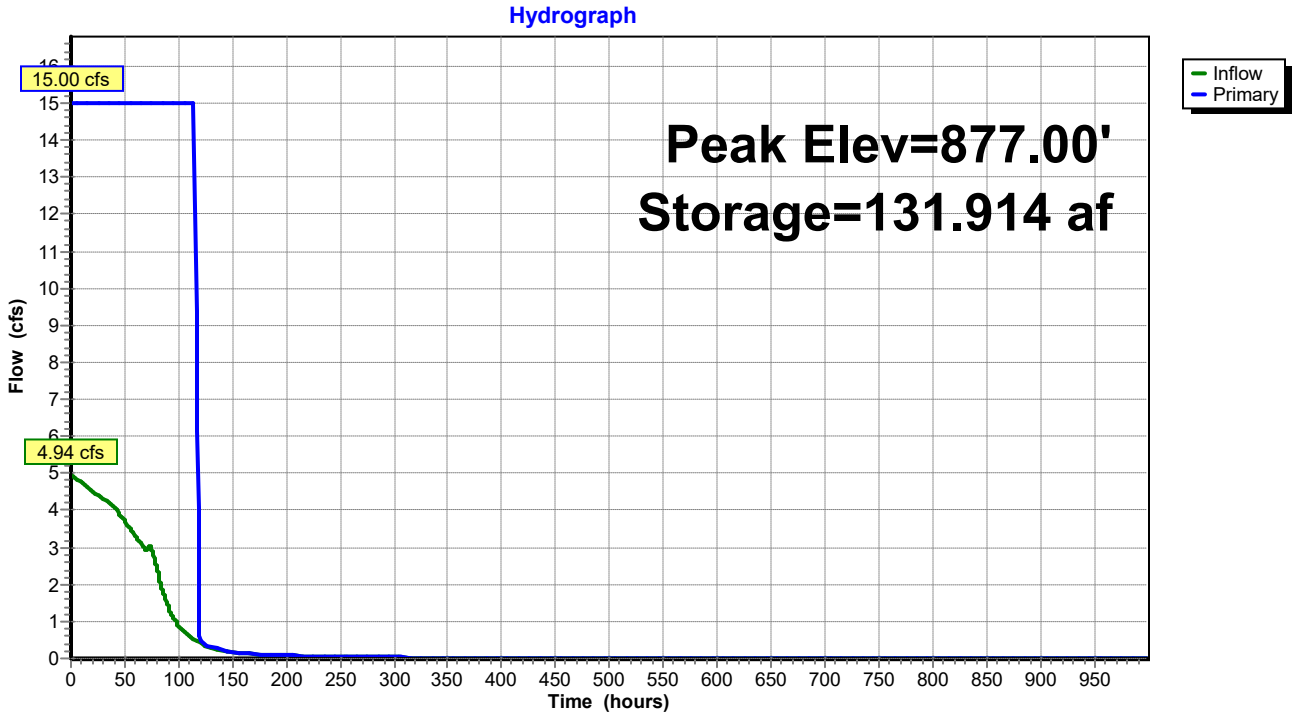
Volume	Invert	Avail.Storage	Storage Description
#1	865.00'	733.319 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
865.00	3.010	0.000	0.000
868.00	3.770	10.170	10.170
870.30	7.470	12.926	23.096
871.70	11.050	12.964	36.060
872.00	11.540	3.388	39.449
876.00	21.160	65.400	104.849
880.00	32.890	108.100	212.949
882.00	40.260	73.150	286.099
886.00	55.900	192.320	478.419
890.00	71.550	254.900	733.319

Device	Routing	Invert	Outlet Devices
#1	Primary	865.00'	**Gaulke Pond Pumped Outlet** Head (feet) 0.00 3.90 4.00 30.00 Disch. (cfs) 0.000 0.000 15.000 15.000

Primary OutFlow Max=15.00 cfs @ 0.00 hrs HW=877.00' (Free Discharge)
1=Gaulke Pond Pumped Outlet (Custom Controls 15.00 cfs)

Pond Gaulke: Gaulke Pond



Summary for Pond Memory: Memory Lane Pond

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	4.94 cfs @	0.00 hrs,	Volume=	31.525 af, Atten= 0%, Lag= 0.0 min
Primary	=	4.94 cfs @	0.00 hrs,	Volume=	31.525 af

Routing by Stor-Ind method, Time Span= 0.00-999.00 hrs, dt= 0.20 hrs
Starting Elev= 878.00' Surf.Area= 7.480 ac Storage= 31.515 af
Peak Elev= 878.00' @ 0.00 hrs Surf.Area= 7.480 ac Storage= 31.515 af

Plug-Flow detention time= (not calculated: no plugs found)
Center-of-Mass det. time= (not calculated: no inflow)

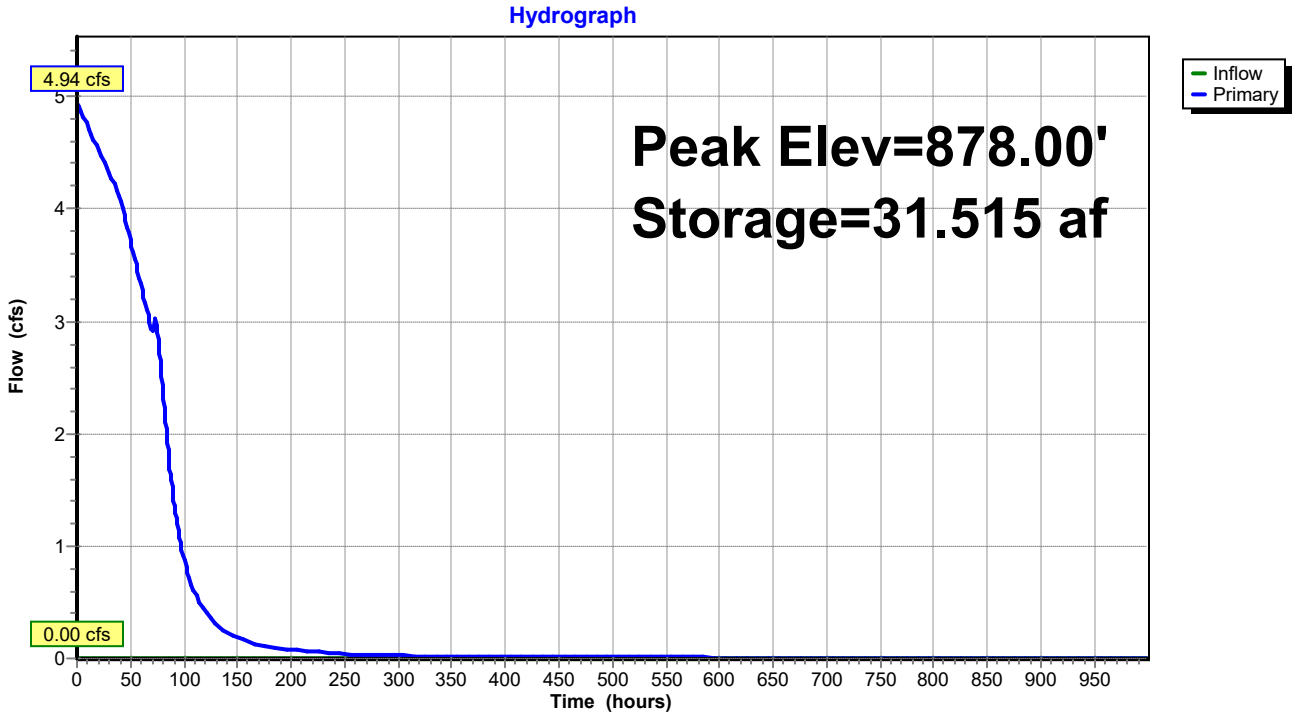
Volume	Invert	Avail.Storage	Storage Description
#1	871.70'	132.895 af	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
871.70	2.310	0.000	0.000
876.00	5.390	16.555	16.555
880.00	9.570	29.920	46.475
882.00	12.590	22.160	68.635
886.00	19.540	64.260	132.895

Device	Routing	Invert	Outlet Devices
#1	Primary	871.70'	**18.0" Round Culvert** L= 2,850.0' Ke= 0.500 Inlet / Outlet Invert= 871.70' / 869.99' S= 0.0006 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	883.00'	**50.0' long Broad-Crested Rectangular Weir** Head (feet) 0.50 1.00 1.50 2.00 2.50 3.00 4.00 5.00 Coef. (English) 3.25 3.25 3.25 3.25 3.25 3.25 3.25 3.25

Primary OutFlow Max=4.94 cfs @ 0.00 hrs HW=878.00' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.94 cfs @ 2.80 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Memory: Memory Lane Pond



APPENDIX C

Model Results Summary

2-year, 24-hour MSE3

Alternatives		Baseline 1 (Existing + Storage Expansion)	1. Oregon Avenue Pipe Lining	2. Upsizing of 40th Ave. North SS from 15" to 18"	3. Expansion of Fred Sim's Park Storage	4. France Ave. Weir Removed	5. High-Flow France Avenue Weir Lowered	6. Increased Pumping Rate from Crystal Lake	7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake	8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake	9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)	10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake	11. Increase Pumping Rate from Gaulke Pond (11 cfs)	12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain	5.5 cfs (2,500 gpm) Mid-Storm
Gaulke Storage		Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed
Waterbodies	**Duration Parameter**	Max Water Level (ft NGVD29) / High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	905.4 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Memory Lane Pond	Low House on Memory (881.5ft)	879.6 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.4 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Brownwood Pond	Low House on Brownwood (883.8ft)	879.3 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.4 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	875.5 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.1 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.3 / 0.0	-0.3 / 0.0	-0.8 / 0.0	-0.8 / 0.0	-0.6 / 0.0
Gaulke Pond	Low House on Gaulke (885.2ft)	875.5 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.1 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.3 / 0.0	-0.3 / 0.0	-1.1 / 0.0	-1.1 / 0.0	-0.6 / 0.0
Crystal Lake	No Wake (>848.0 ft)	848.4 / 6.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / -3.0	0.0 / -3.0	0.0 / -3.0	0.0 / 0.0	0.0 / -3.0	0.0 / 0.0	0.0 / 0.0
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	852.4 / 4.5	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-1.1 / -4.5	0.0 / -1.0	0.0 / 0.0	0.0 / 2.5	0.0 / 2.0	0.0 / 2.0	0.0 / 3.5	0.0 / 3.5	0.0 / 2.5
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	849.9 / 23.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.6 / -23.0	0.0 / 2.0	0.0 / 0.0	0.0 / 1.0	0.0 / -1.5	0.0 / -2.0	0.1 / -2.5	0.0 / -2.5	0.0 / -2.0
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	275	0	0	0	0	0	0	0	0	0	0	0	0
	Duration in days above 835' (approx. bankful)	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

10-year, 24-hour MSE3

Alternatives		Baseline 1 (Existing + Storage Expansion)	1. Oregon Avenue Pipe Lining	2. Upsizing of 40th Ave. North SS from 15" to 18"	3. Expansion of Fred Sim's Park Storage	4. France Ave. Weir Removed	5. High-Flow France Avenue Weir Lowered	6. Increased Pumping Rate from Crystal Lake	7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake	8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake	9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)	10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake	11. Increase Pumping Rate from Gaulke Pond (11 cfs)	12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain	,950 gpm) w/ 40th Ave N Improv: 15 Immediately after rain	5.5 cfs (2,500 gpm) Mid-Storm
Gaulke Storage		Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed
Waterbodies	**Duration Parameter**	Max Water Level (ft NGVD29) / High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)	Δ Max Water Level (ft) / Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	907.0 / 0.5	-0.1 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Memory Lane Pond	Low House on Memory (881.5ft)	882.9 / 1.0	0.0 / 0.0	0.0 / 0.0	-0.4 / -0.5	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Brownwood Pond	Low House on Brownwood (883.8ft)	882.4 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.3 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	878.7 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.2 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.3 / 0.0	-0.3 / 0.0	-0.8 / 0.0	-0.8 / 0.0	-0.5 / 0.0
Gaulke Pond	Low House on Gaulke (885.2ft)	878.7 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.2 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.3 / 0.0	-0.3 / 0.0	-1.1 / 0.0	-1.1 / 0.0	-0.5 / 0.0
Crystal Lake	No Wake (>848.0 ft)	849.0 / 15.5	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	0.0 / -8.0	0.0 / -8.0	0.0 / -8.0	0.0 / 0.0	0.0 / -8.0	0.0 / 0.0	0.0 / 0.0
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	853.2 / 12.5	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-1.0 / -12.5	0.0 / -4.5	0.0 / 0.0	0.0 / 2.0	0.0 / 2.5	0.0 / 3.5	0.0 / 2.0	0.0 / 2.5	0.0 / 3.5
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	850.3 / 35.0	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0	-0.3 / -3.0	0.4 / 0.0	0.3 / 0.0	0.0 / 1.0	0.3 / -5.5	0.0 / -5.0	0.3 / -8.0	0.0 / -7.0	0.0 / -5.0
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	437	0	0	0	-12	3	2	0	2	0	2	0	0
	Duration in days above 835' (approx. bankful)	3.5	0.0	0.0	0.0	-0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0

+ Increasing High-Water Level associated with scenario/increased number of days above duration parameter.
- Decreasing High-Water Level associated with scenario/decreased number of days above duration parameter.
All Elevations in NGVD29
Old Dutch and Brownwood Valves Assumed Opened

50-year, 24-hour MSE3

Alternatives		Baseline 1 (Existing + Storage Expansion)	1. Oregon Avenue Pipe Lining	2. Upsizing of 40th Ave. North SS from 15" to 18"	3. Expansion of Fred Sim's Park Storage	4. France Ave. Weir Removed	5. High-Flow France Avenue Weir Lowered	6. Increased Pumping Rate from Crystal Lake	7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake	8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake	9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)	10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake	11. Increase Pumping Rate from Gaulke Pond (11 cfs)	12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain	,950 gpm) w/ 40th Ave N Improv: 15 Immediately after rain	5.5 cfs (2,500 gpm) Mid-Storm
Gaulke Storage		Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed

Waterbodies	Duration Parameter	Max Water Level (ft NGVD29)	High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	909.4	1.5	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Memory Lane Pond	Low House on Memory (881.5ft)	884.6	4.5	0.0	0.0	0.0	0.0	0.0	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	-1.0	0.0	-2.0	0.0	-2.0	0.0	-1.5
Brownwood Pond	Low House on Brownwood (883.8ft)	883.7	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	882.1	9.0	0.0	0.0	0.0	0.0	-0.1	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-2.5	-0.1	-2.5	-0.5	-3.5	-0.5	-3.5	-0.3	-3.0
Gaulke Pond	Low House on Gaulke (885.2ft)	882.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.5	0.0	-0.5	0.0	-0.3	0.0
Crystal Lake	No Wake (>848.0 ft)	850.2	34.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-17.5	0.0	-17.5	0.0	-17.5	0.0	0.0	0.0	-17.5	0.0	0.0	0.0	0.0
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	854.4	17.5	0.0	0.0	0.0	0.0	0.0	-0.5	-0.9	-7.0	0.0	-6.0	0.0	0.0	0.0	4.0	0.0	2.0	0.0	2.5	0.0	2.5	0.0	3.0	0.0	2.5
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	852.4	42.5	0.0	0.0	0.0	0.0	0.0	0.0	-0.9	0.0	0.2	0.0	0.1	0.0	0.0	1.5	0.1	-6.5	0.0	-6.0	0.1	-9.5	0.0	-9.0	0.0	-6.5
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	732		0		0		0		-22		4		2		0		2		0		2		-1		0	
	Duration in days above 835' (approx. bankful)	6.7		0.0		0.0		0.0		-0.2		0.1		0.1		-0.1		0.1		-0.1		0.1		-0.1		-0.1	

100-year, 24-hour MSE3

Alternatives		Baseline 1 (Existing + Storage Expansion)	1. Oregon Avenue Pipe Lining	2. Upsizing of 40th Ave. North SS from 15" to 18"	3. Expansion of Fred Sim's Park Storage	4. France Ave. Weir Removed	5. High-Flow France Avenue Weir Lowered	6. Increased Pumping Rate from Crystal Lake	7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake	8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake	9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)	10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake	11. Increase Pumping Rate from Gaulke Pond (11 cfs)	12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A N/A	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) 24hr after start of rain	3.12 cfs (1,400 gpm) 24hr after start of rain	5.5 cfs (2,500 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" 24hr after start of rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" 24hr after start of rain	5.5 cfs (2,500 gpm) Mid-Storm
Gaulke Storage		Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed

Waterbodies	Duration Parameter	Max Water Level (ft NGVD29)	High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	910.4	1.5	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Memory Lane Pond	Low House on Memory (881.5ft)	885.0	7.5	0.0	0.0	0.0	-0.5	-0.1	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.0	-2.0	0.0	-3.0	0.0	-3.0	0.0	-2.0
Brownwood Pond	Low House on Brownwood (883.8ft)	884.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	883.2	11.5	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	-0.1	-2.5	-0.1	-2.5	-0.3	-4.0	-0.3	-4.0	-0.2	-3.0
Gaulke Pond	Low House on Gaulke (885.2ft)	883.2	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.3	0.0	-0.3	0.0	-0.2	0.0
Crystal Lake	No Wake (>848.0 ft)	850.9	46.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-24.0	-0.1	-24.0	-0.1	-24.0	0.0	0.0	-0.1	-24.0	0.0	0.0	0.0	0.0
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	855.1	19.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8	-7.0	0.0	-7.5	0.0	0.0	0.0	5.0	0.0	2.0	0.0	2.5	0.0	2.5	0.0	3.0	0.0	2.5
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	853.6	44.5	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.5	0.1	-1.5	0.1	0.0	0.0	2.5	0.1	-6.5	0.0	-6.0	0.1	-10.0	0.0	-9.5	0.0	-6.5
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	913		0		0		0		-24		3		2		0		2		0		2		0		0	
	Duration in days above 835' (approx. bankful)	8.1		0.0		0.0		0.0		-0.1		0.1		0.1		0.0		0.2		0.0		0.2		0.0		0.0	

+ Increasing High-Water Level associated with scenario/increased number of days above duration parameter.
- Decreasing High-Water Level associated with scenario/decreased number of days above duration parameter.
All Elevations in NGVD29
Old Dutch and Brownwood Valves Assumed Opened

2-year, 24-hour MSE3

Alternatives		Baseline 2 (Existing + Storage Expansion)	1. Oregon Avenue Pipe Lining	2. Upsizing of 40th Ave. North SS from 15" to 18"	3. Expansion of Fred Sim's Park Storage	4. France Ave. Weir Removed	5. High-Flow France Avenue Weir Lowered	6. Increased Pumping Rate from Crystal Lake	7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake	8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake	9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)	10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake	11. Increase Pumping Rate from Gaulke Pond (11 cfs)	12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	0 1.78 cfs (800 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain	5.5 cfs (2,500 gpm) Mid-Storm
Gaulke Storage		Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed

Waterbodies	Duration Parameter	Max Water Level (ft NGVD29)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	905.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Memory Lane Pond	Low House on Memory (881.5ft)	879.6	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brownwood Pond	Low House on Brownwood (883.8ft)	879.3	0.0	0.0	0.0	0.0	0.0	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	875.5	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3	0.0	-0.8	0.0	-0.8	0.0	-0.6	0.0
Gaulke Pond	Low House on Gaulke (885.2ft)	875.5	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3	0.0	-1.1	0.0	-1.1	0.0	-0.6	0.0
Crystal Lake	No Wake (>848.0 ft)	848.4	9.0	0.0	-3.0	0.0	-3.0	0.0	-3.0	0.0	-3.0	0.0	-3.0	-0.1	-6.0	-0.1	-6.0	-0.1	-6.0	0.0	-3.0	-0.1	-6.0	0.0	-3.0	0.0	-3.0
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	852.4	4.5	0.0	0.0	0.0	0.0	0.0	0.0	-1.1	-4.5	0.0	-1.0	0.0	0.0	0.0	2.5	0.0	2.0	0.0	2.0	0.0	3.5	0.0	3.5	0.0	2.5
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	849.9	23.5	0.0	-0.5	0.0	-0.5	0.0	-0.5	-0.6	-23.5	0.0	1.5	0.0	-0.5	0.0	0.5	0.0	-2.0	0.0	-2.5	0.1	-3.0	0.0	-3.0	0.0	-2.5
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	275		0		0		0		0		0		0		0		0		0		0		0		0	
	Duration in days above 835' (approx. bankful)	1.9		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	

10-year, 24-hour MSE3

Alternatives		Baseline 2 (Existing + Storage Expansion)	1. Oregon Avenue Pipe Lining	2. Upsizing of 40th Ave. North SS from 15" to 18"	3. Expansion of Fred Sim's Park Storage	4. France Ave. Weir Removed	5. High-Flow France Avenue Weir Lowered	6. Increased Pumping Rate from Crystal Lake	7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake	8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake	9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)	10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake	11. Increase Pumping Rate from Gaulke Pond (11 cfs)	12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	0 1.78 cfs (800 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain	2.56 cfs (1,150 gpm) N/A Start of rain
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	3.12 cfs (1,400 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	5.5 cfs (2,500 gpm) Immediately after rain	11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain	,950 gpm) w/ 40th Ave N Improv: 15 Immediately after rain	5.5 cfs (2,500 gpm) Mid-Storm
Gaulke Storage		Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed	Expanded as Proposed

Waterbodies	Duration Parameter	Max Water Level (ft NGVD29)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	907.0	0.5	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Memory Lane Pond	Low House on Memory (881.5ft)	882.9	1.0	0.0	0.0	0.0	0.0	-0.4	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brownwood Pond	Low House on Brownwood (883.8ft)	882.4	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	878.7	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3	0.0	-0.8	0.0	-0.8	0.0	-0.5	0.0
Gaulke Pond	Low House on Gaulke (885.2ft)	878.7	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3	0.0	-1.1	0.0	-1.1	0.0	-0.5	0.0
Crystal Lake	No Wake (>848.0 ft)	849.0	22.5	0.0	-7.0	0.0	-7.0	0.0	-7.0	0.0	-7.0	0.0	-7.0	-0.1	-15.0	-0.1	-15.0	-0.1	-15.0	0.0	-7.0	-0.1	-15.0	0.0	-7.0	0.0	-7.0
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	853.2	12.0	0.0	0.5	0.0	0.5	0.0	0.5	-1.0	-12.0	0.0	-4.0	0.0	0.0	0.0	2.5	0.0	3.0	0.0	4.0	0.0	2.5	0.0	3.0	0.0	4.0
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	850.4	35.5	-0.1	-0.5	-0.1	-0.5	-0.1	0.0	-0.5	-3.5	0.2	-0.5	0.1	0.0	-0.1	0.5	0.1	-6.0	-0.1	-5.5	0.1	-8.5	-0.1	-7.5	-0.1	-5.5
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	439		-1		-1		-1		-13		2		1		-1		1		-1		1		-1		-1	
	Duration in days above 835' (approx. bankful)	3.6		0.0		0.0		0.0		-0.2		0.1		0.0		0.0		0.0		0.0		0.0		0.0		0.0	

+ Increasing High-Water Level associated with scenario/increased number of days above duration parameter.
- Decreasing High-Water Level associated with scenario/decreased number of days above duration parameter.
All Elevations in NGVD29
Old Dutch and Brownwood Valves Assumed Opened

50-year, 24-hour MSE3

Alternatives		Baseline 2 (Existing + Storage Expansion)		1. Oregon Avenue Pipe Lining		2. Upsizing of 40th Ave. North SS from 15" to 18"		3. Expansion of Fred Sim's Park Storage		4. France Ave. Weir Removed		5. High-Flow France Avenue Weir Lowered		6. Increased Pumping Rate from Crystal Lake		7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake		8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake		9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)		10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake		11. Increase Pumping Rate from Gaulke Pond (11 cfs)		12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time	
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	0 1.78 cfs (800 gpm) Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain	
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		5.5 cfs (2,500 gpm) Immediately after rain		5.5 cfs (2,500 gpm) Immediately after rain		11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" Immediately after rain		,950 gpm) w/ 40th Ave N Improv: 15 Immediately after rain		5.5 cfs (2,500 gpm) Mid-Storm	
Gaulke Storage		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed	
Waterbodies	**Duration Parameter**		Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	909.4	1.5	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Memory Lane Pond	Low House on Memory (881.5ft)	884.6	4.5	0.0	0.0	0.0	0.0	0.0	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	-1.0	0.0	-2.0	0.0	-2.0	0.0	-1.5
Brownwood Pond	Low House on Brownwood (883.8ft)	883.7	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	882.1	9.0	0.0	0.0	0.0	0.0	-0.1	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-2.5	-0.1	-2.5	-0.5	-3.5	-0.5	-3.5	-0.3	-3.0
Gaulke Pond	Low House on Gaulke (885.2ft)	882.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.5	0.0	-0.5	0.0	-0.3	0.0
Crystal Lake	No Wake (>848.0 ft)	850.2	50.0	0.0	-15.5	0.0	-15.5	0.0	-15.5	0.0	-15.5	0.0	-15.5	-0.1	-33.0	-0.1	-33.0	-0.1	-33.0	0.0	-15.5	-0.1	-33.0	0.0	-15.5	0.0	-15.5
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	854.4	17.0	0.0	0.5	0.0	0.5	0.0	0.0	-0.9	-6.5	0.0	-5.5	0.0	0.0	0.0	4.5	0.0	2.5	0.0	3.0	0.0	3.0	0.0	3.5	0.0	3.0
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	852.4	49.0	-0.1	-6.5	-0.1	-6.5	-0.1	0.0	-1.0	-6.5	0.2	-6.5	0.0	0.0	0.0	-5.0	0.0	-13.0	0.0	-12.5	0.1	-16.0	0.0	-15.5	0.0	-13.0
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	733		-1		-1		-1		-23		3		1		-1		1		-1		1		-2		-1	
	Duration in days above 835' (approx. bankful)	6.7		0.1		0.1		0.1		-0.1		0.2		0.2		0.0		0.1		0.0		0.2		0.0		0.0	

100-year, 24-hour MSE3

Alternatives		Baseline 2 (Existing + Storage Expansion)		1. Oregon Avenue Pipe Lining		2. Upsizing of 40th Ave. North SS from 15" to 18"		3. Expansion of Fred Sim's Park Storage		4. France Ave. Weir Removed		5. High-Flow France Avenue Weir Lowered		6. Increased Pumping Rate from Crystal Lake		7. Increased Pumping Rate from Crystal Lake, redirected to Twin Lake		8. Increase Pumping Rate from Gaulke Pond (5.5 cfs) & Crystal Lake		9. Increase Pumping Rate from Gaulke Pond (5.5 cfs)		10. Increase Pumping Rate from Gaulke Pond (11 cfs) & Crystal Lake		11. Increase Pumping Rate from Gaulke Pond (11 cfs)		12. Increase Pumping Rate from Gaulke Pond (5.5 cfs) with Change in Start Time	
Crystal Pump	Pump #1 Flow (cfs) to Minneapolis Pump #2 Flow (cfs) to Ryan Lake Start (hr)	0 1.78 cfs (800 gpm) Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A N/A		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) to Twin Lake Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) 2.67 cfs (1,200 gpm) Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain		2.56 cfs (1,150 gpm) N/A Start of rain	
Gaulke Pump	Flow (cfs) Start (hr)	3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) Immediately after rain		3.12 cfs (1,400 gpm) 24hr after start of rain		3.12 cfs (1,400 gpm) 24hr after start of rain		5.5 cfs (2,500 gpm) Immediately after rain		5.5 cfs (2,500 gpm) Immediately after rain		11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" 24hr after start of rain		11 cfs (4,950 gpm) w/ 40th Ave N Improv: 15" to 18" 24hr after start of rain		5.5 cfs (2,500 gpm) Mid-Storm	
Gaulke Storage		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed		Expanded as Proposed	
Waterbodies	**Duration Parameter**		Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	HWL (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)	Δ Max Water Level (ft)	Δ High-Water Duration (days)
Old Dutch Pond	Elevation 906'	910.4	1.5	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Memory Lane Pond	Low House on Memory (881.5ft)	885.0	7.5	0.0	0.0	0.0	-0.5	-0.1	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.0	-2.0	0.0	-3.0	0.0	-3.0	0.0	-2.0
Brownwood Pond	Low House on Brownwood (883.8ft)	884.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hagermeister Pond	Low House on Hagermeister (879.6ft)	883.2	11.5	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	-0.1	-2.5	-0.1	-2.5	-0.3	-4.0	-0.3	-4.0	-0.2	-3.0
Gaulke Pond	Low House on Gaulke (885.2ft)	883.2	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.3	0.0	-0.3	0.0	-0.2	0.0
Crystal Lake	No Wake (>848.0 ft)	850.9	67.0	0.0	-20.5	0.0	-20.5	0.0	-20.5	0.0	-20.5	0.0	-20.5	-0.1	-44.5	-0.1	-44.5	-0.1	-44.5	0.0	-20.5	-0.1	-44.5	0.0	-20.5	0.0	-20.5
Lower Twin Lake	No Wake (>852.25ft). Low Basement at 850.7'	855.1	19.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.8	-7.0	0.0	-7.5	0.0	0.0	0.0	5.0	0.0	2.0	0.0	2.5	0.0	2.5	0.0	3.0	0.0	2.5
Ryan Lake	No Wake (>849.60ft). Note Low Home is 851.6'	853.6	51.5	-0.1	-7.0	-0.1	-7.0	-0.1	0.0	-1.1	-6.5	0.1	-8.5	0.0	0.0	0.0	-4.5	0.0	-13.5	0.0	-13.0	0.1	-17.0	0.0	-16.5	0.0	-13.5
Shingle Creek just D/S of 49th Ave.N	Peak Discharge (cfs)	914		-1		-1		-1		-25		2		1		-1		1		-1		1		-1		-1	
	Duration in days above 835' (approx. bankful)	8.1		0.0		0.0		0.0		-0.1		0.1		0.1		0.0		0.1		0.0		0.2		0.0		0.0	

+ Increasing High-Water Level associated with scenario/increased number of days above duration parameter.
- Decreasing High-Water Level associated with scenario/decreased number of days above duration parameter.
All Elevations in NGVD29
Old Dutch and Brownwood Valves Assumed Opened

Judie Anderson

From: Minnesota Board of Water and Soil Resources <mnbwsr@public.govdelivery.com>
Sent: Wednesday, June 30, 2021 3:07 PM
To: Judie Anderson
Subject: News Release: BWSR Accepting Applications for Clean Water Fund Grants

BWSR News Release

BWSR Accepting Applications for Clean Water Fund Grants

Grants will support conservation projects benefiting drinking water and improving water quality

June 30, 2021

ST. PAUL — The Minnesota Board of Water and Soil Resources (BWSR) is now seeking applications for its Clean Water Fund Competitive Grants Program. More than $12 million in grants and more than $7 million in loans are available to local governments in fiscal year 2022, which begins July 1. Eligible applicants include soil and water conservation districts, watershed districts, watershed management organizations, counties, joint powers boards and municipalities with approved water management plans.

"These grants are a key component in ongoing efforts to keep Minnesota's waters drinkable, fishable and swimmable," said BWSR Executive Director John Jaschke. "We look forward to partnering with local governments to make strides toward improving water quality throughout the state."

The application period opens June 30 and closes August 17. Interested applicants can find the Request for Proposals on BWSR's website.

About the Minnesota Clean Water Fund
Minnesota voters approved the Clean Water, Land and Legacy Amendment in 2008 to protect, enhance, and restore wetlands, prairies, forests, and fish, game, and wildlife habitat; to preserve arts and cultural heritage; to support parks and trails; and to protect, enhance, and restore lakes, rivers, streams, and groundwater. The Clean Water Fund receives 33 percent of the sales tax revenue generated by the Legacy Amendment. More information about the Clean Water Fund is available here.

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BWSR is the state soil and water conservation agency, and it administers programs that prevent sediment and nutrients from entering our lakes, rivers, and streams; enhance fish and wildlife habitat; and protect wetlands. The 20-member board consists of representatives of local and state government agencies and citizens. BWSR's mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners.

From: Diane F. Spector
Sent: Wednesday, June 30, 2021 4:44 PM
To: Chris J. Meehan <cmeehan@wenck.com>; Todd E. Shoemaker <tshoemaker@wenck.com>; Ed A. Matthiesen <ematthiesen@wenck.com>; Eileen J. Weigel <eweigel@wenck.com>; Erik R. Megow <emegow@wenck.com>; Peter G. Miller <pmiller@wenck.com>; Ross Mullen <rmullen@wenck.com>; Nico A. Cantarero <ncantarero@wenck.com>; Tom A. Berry <tberry@wenck.com>; Kent C. Torve <ktorve@wenck.com>; Steve K. Hegland <shegland@wenck.com>; 'Jason Quisberg' <jquisberg@wenck.com>
Cc: Katie L. Kemmitt <kkemmitt@wenck.com>
Subject: FW: News Release: BWSR Accepting Applications for Clean Water Fund Grants

BWSR Clean Water Fund grants are now open, due August 17. https://bwsr.state.mn.us/apply

- As usual, the grants required a 25% non-state match. $12 million is available for Projects and Practices, there are also some specialty loan programs. If awarded, funds would become available in **April 2022**.
- Eligible entities are counties, watershed districts, watershed management organizations, and soil and water conservation districts, and cities with approved local water management plans. Projects must be identified in an approved watershed plan or a TMDL or WRAPS.
- The following three high-level state priorities have been established for Clean Water Fund nonpoint implementation:
    1. Restore those waters that are closest to meeting state water quality standards
    2. Protect those high-quality unimpaired waters at greatest risk of becoming impaired
    3. Restore and protect water resources for public use and public health, including drinking water.
- Note that there are special requirements for stream restoration projects, and for lake internal load projects that may require upfront work to be completed prior to submitting a grant request.
- Note that applications must be submitted online in eLink.

Please let me know if you have any questions or are interested in pursuing a grant. I will download the application questions and make them available.

-Diane

WENCK now part of Stantec

To: Shingle Creek/West Mississippi WMO Commissioners

From: Ed Matthiesen, P.E.
Diane Spector

Date: July 2, 2021

Subject: Clean Water Fund Grants

Recommended Commission Action	Discuss. If desired, authorize staff to develop a Clean Water Fund grant application for the Palmer Lake Estates Bass Creek Restoration project.

The Board of Water and Soil Resources (BWSR) has opened the annual Clean Water Fund (CWF) Grants application period, which runs from June 30 to August 17, 2021. The Shingle Creek Commission has been very successful at obtaining grants from this Legacy Amendment funding.

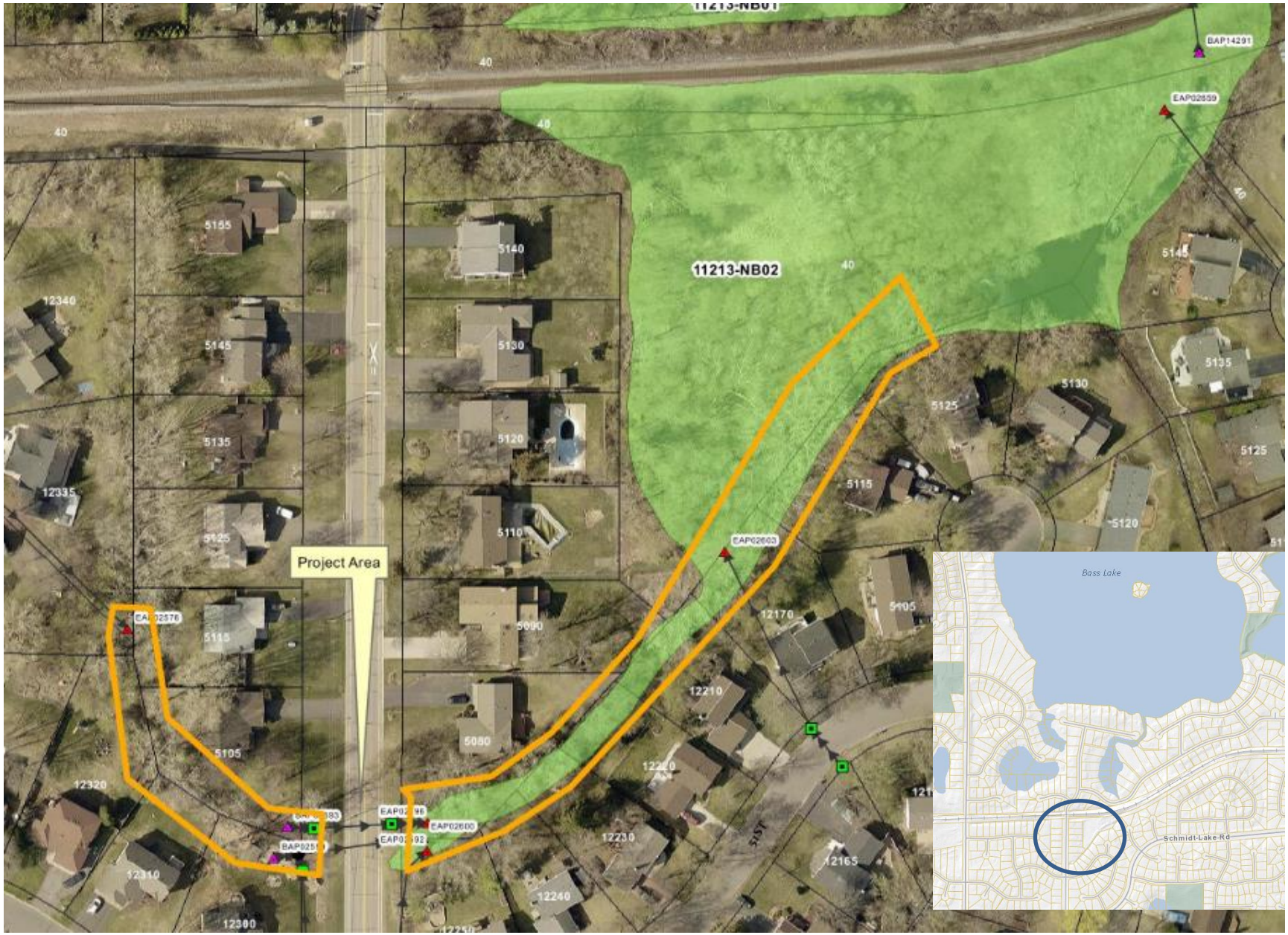
The Clean Water Fund grants are several pots of money that are available to fund state priorities. The largest pot is the Projects and Practices program, this year funded at $12 million. Grant funding will be released to successful applicants in about April 2022 and funds must be expended by December 31, 2024.

Projects must be identified in an approved watershed plan or a TMDL or WRAPS. The following three high-level state priorities have been established for Clean Water Fund nonpoint implementation:

1. Restore those waters that are closest to meeting state water quality standards
2. Protect those high-quality unimpaired waters at greatest risk of becoming impaired
3. Restore and protect water resources for public use and public health, including drinking water.

At this time the only project on either CIP that would be a good candidate for a CWF grant is the upcoming Palmer Lake Estates Bass Creek Restoration. The City is currently working on a feasibility study to refine the design concepts and cost estimate which should be complete by the time the CWF applications are due. Under the Commission's CIP cost share policy, the stabilization, water quality, and habitat enhancement portions of this project are eligible for 100% Commission funding, so obtaining a grant would reduce the cost to the Commission.

If the Commission so desires, staff can work with the City of Plymouth to put together a grant application and bring it back at the August meeting for review and approval. The Commission does budget funds in the operating budget for grant preparation.


11213-NB01
11213-NB02
Project Area
BAP14291
EAP02659
EAP02603
EAP02600
BAP02511
Bass Lake
Schmidt Lake Rd
5155
5140
5145
5130
5135
5120
5125
5115
5110
5105
5090
5080
12340
12335
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12310
12300
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12210
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12165
51ST

WENCK now part of Stantec

To: Shingle Creek/West Mississippi WMO Commissioners

From: Ed Matthiesen, P.E.
Diane Spector

Date: July 2, 2021

Subject: July 2021 Staff Report

Recommended Commission Action	For discussion and information.

General Updates

Partnership Cost Share. On June 24, 2021 Commissioners Ray Schoch and John Roach and Ed Matthiesen attended the ribbon cutting for the new children's playground at the Crescent Cove facility in Brooklyn Center. The program organizers thanked the Shingle Creek Commission for the partnership cost share funding to incorporate water quality components into the project. Attached is a Sun Post article and a nice WCCO story is here: https://minnesota.cbslocal.com/video/5720164-crescent-cove-gets-new-playground-baseball-field/

CIP Project. Brooklyn Park will hold a grand re-opening ceremony for its River Park project (see attached). West Mississippi contributed $121,250 of CIP levy funds and $35,442 of Watershed Based Implementation Funding to the water quality components of the project.

Project Updates

Crystal Lake Management Plan. As discussed last month, due to hot weather and an unexpected algae bloom, the alum applicator was only able to apply about ¼ a dose to the lake before pH conditions became unsafe. They will be back in the fall to complete the application. Carp management is being completed – see the separate agenda item for that report.

Bass and Pomerleau Lakes Management Plan. We continue to monitor water quality this year and take one final round of sediment cores to document project effectiveness. The grant expires at the end of 2021.

Meadow Lake Management Plan. We have restarted work on the drawdown permit and expect to get the water appropriation permit submitted later in July for drawdown in late fall 2021. Katie has been in contact with the DNR turtle expert and they will be helping refine the wildlife protection plan.

Connections II and Bass Creek Restoration Projects. We have obtained a signed scope of work from Brooklyn Park for the Bass Creek project and will begin design work shortly. We are finishing up revisions to the scope of work and cooperative agreement with Brooklyn Center for the Connections II project.

WENCK now part of Stantec

SHINGLE CREEK / WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSION
MONTHLY COMMUNICATION LOG
June 2021
6-7-2021

Date	From	To	SC	WM	Description
6-1-2021	Zach Webber @ Loucks Inc	Ed Matthiesen, Wenck/Stantec	X		Keller Williams proposed building in Maple Grove
6-1-2021	Sharon Feit @ Merjent	Ed M.	X	X	CenterPoint Energy Wyoming project in Brooklyn Park
6-1-2021	Bill Diede @ Bolton-Menk	Ed M.	X		Project review requirements for a new track at Patrick Henry HS in Minneapolis
6-3-2021	Dan Kalmon @ MWM O	Ed M.	X	X	Mississippi WMO 10-yr plan review
6-7-2021	Tara Anderson @ Crescent Cove	Ed M., Judie A.. JASS	X		Ribbon cutting invitation for Crescent Cove
6-7-2021	Derek Asche @ Maple Grove	Ed M.	X		10883 89th Ave Maple Grove Transit Site Improvements BMP requirements
6-14-2021	Mary Bray @ Arco	Ed M., Tony Kaster, Wenck/Stantec		X	Wetland question for 8901 101st Ave No, Brooklyn Park
6-21-2021	Marilyn Knudsen @ Brooklyn Center	Ed M.		X	6900 Willow Lane, Brooklyn Center. Resident concerns on ravine and slope protection for property next to the Mississippi River
6-22-2021	Kurt Carman @ Brooklyn Park	Ed M.	X		Lake Success resident asking for water quality data on Lake Success
6-23-2021	Bob Leba @ SRF	Ed M.	X	X	TH252 EIS
6-25-2021	Michael Kinning @ Kimley-Horn	Ed M.		X	Xylon Ave Extension in Brooklyn Park
6-28-2021	Roxy Robertson @ WSB	Ed M.		X	Nor Bella Senior Living Notice of Decision WM2021-06 in Champlin
6-28-2021	Nick Ellering	Katie Kemmitt, Wenck/Stantec.	X		Twin Lake resident asking about options for vegetation management on the lake
6-30-2021	Laura Scholl @ Metro Blooms	Ed M.	X		Brooks Landing vegetation plans
6-30-2021	Resident, Prior Lake	Diane Spector, Wenck/Stantec	X		Doing research on potential improvements for Spring Lake and came across a vendor working with the Schmidt Lake Assn on Schmidt Lake. Referred to city.

WENCK now part of Stantec

SHINGLE CREEK / WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSION
MONTHLY COMMUNICATION LOG
June 2021

Date	From	To	SC	WM	Description

Updating the Natural Resources Strategic Plan

Hennepin County is in the process of updating the Natural Resources Strategic Plan, which will define our natural resources goals and strategies for the next 10 years.

The plan guides the county's work to improve, protect, and preserve natural resources and provides a framework for our natural resources policies, programs, and partnerships.

We need your input

We all play a role in protecting our natural resources, and we need to hear from you as we update the Natural Resources Strategic Plan. We will be seeking input from the community throughout the year-long plan development process to ensure your values and priorities are reflected.

Current feedback opportunities

Take our survey by August 1, 2021, to help shape priorities and let us know how you would like to be engaged in the update of the plan.

Stay up to date

Sign up for Natural Resources Strategic Plan email updates to stay informed of the process and opportunities to provide feedback at each step.

See the Natural Resources Strategic Plan update factsheet (PDF) for a summary of the process and timeline

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Questions or comments about the plan? Contact

kristopher.guentzel@hennepin.us
Phone: 612-596-1171

Open all

About the plan and the county's role in protecting natural resources

From lakes and rivers to urban parks, forests and prairies, Hennepin County has an abundance of diverse landscapes and natural resources. These natural resources provide critical habitat for wildlife, protect water quality, offer recreational opportunities, and enhance our collective quality of life.

About the Natural Resources Strategic Plan

The updated Hennepin County Natural Resources Strategic Plan will define our natural resources goals and strategies for the next 10 years.

The Hennepin County Natural Resources Strategic Plan guides the county's work to improve, protect, and preserve natural resources and provides a framework for our natural resources policies, programs, and partnerships.

The plan guides the duties and authorities of the Soil and Water Conservation District, a role that Hennepin County fulfills. The plan also includes science and data-based information to guide staff in addressing the technical issues facing surface waters, groundwater, natural resources, wildlife, and soils of Hennepin County.

Review the current Natural Resources Strategic Plan (PDF), which was adopted by the county board in May 2016.

Hennepin County's role in protecting natural resources

Work the county does to protect land and water resources includes:

- Protecting and restoring natural areas, including managing and acquiring conservation easements to permanently protect the best remaining natural areas in the county
- Protecting and restoring wetlands, including enforcing the state's Wetland Conservation Act
- Improving water quality by partnering with local watershed management organizations and cities
- Preventing the spread of noxious weeds and aquatic invasive species by conducting inspections, educating residents, and working with partners on projects
- Improving and diversifying the tree canopy by growing, planting and maintaining healthy trees, working with partners on large-scale planting events and through grants, managing threats to the tree canopy, and educating the public
- Educating residents and providing technical and financial assistance to landowners on topics such as sustainable landscaping, agricultural best management practices, soil health initiatives, and other practices to protect water quality and wildlife habitat
- Managing navigational buoys and public access points for several public waters, including Lake Minnetonka, Lake Independence and Lake Sarah

Plan update process and timeline

Plan update process

The updated plan will seek to better align with new county initiatives, shifting demographics, and changing landscapes. This is the first opportunity to incorporate the county's climate and racial equity priorities into the foundation of the plan.

Staff are planning the update process now. We anticipate four phases, each of which will include community engagement.

Staff are committed to listening to understand community values about natural resources, learn about their priorities, and identify emerging issues or concerns that should be considered in the plan.

Each phase will include opportunities for the public to offer feedback and stay up to date on the progress toward the adoption of the updated plan. A variety of engagement tools will be used throughout the process, including surveys, meetings, and one-on-one conversations. Staff will share updates on the county's website and through social media and local news outlets.

Phases and timeline

Phase 1 – Information gathering: Summer and Fall 2021

- Create awareness about the county's process to update the plan and gather information about how the community wants to be engaged in the plan update.

- Listen to understand what the community values about natural resources, learn about their priorities, and identify emerging issues or concerns that should be considered in the plan.
- Finalize the plan update process and draft the goals, objectives, and strategies for the plan.

Phase 2 – Development: Winter 2021

- Share the draft goals, objectives, and strategies for the plan and gather feedback on what the community likes and areas for improvement.
- Gather feedback on what the community likes and areas for improvement to inform the drafting of the plan.
- Conduct county board briefing.

Phase 3 – Review: Spring 2022

- Share the draft plan and seek more detailed comments on plan's contents.
- Review the feedback received and make final edits to the plan.
- Discuss changes with commissioners and seek feedback on remaining issues.
- Submit for board consideration and adoption.

Phase 4 – Adoption: Summer and Fall 2022

- Conduct final public comment process where the board will consider any final feedback and decide if any additional updates are needed to the plan.
- Plan adopted by the county board.

Advisory groups

About the advisory groups

Staff are convening advisory groups comprised of county staff and external partners to provide ongoing feedback on the plan development.

County staff are in the process of forming these groups. More details will be shared once the groups are established.

Internal collaboration group

A group of county staff from across lines of business will provide guidance on existing partnerships within the county and suggest new opportunities for collaboration.

External partnership group

A group of external partners will include representatives from local and state government, federal agencies, local institutions, nonprofit organizations, and residents. The group will help define the plan's vision, establish partnership goals, suggest opportunities for collaboration, and identify gaps and roles for the county's natural resources programs and services.

Judie Anderson

From: Diane F. Spector <dspector@wenck.com>
Sent: Thursday, July 1, 2021 8:34 AM
To: Judie Anderson
Cc: Ed A. Matthiesen; Chris J. Meehan
Subject: TV in Shingle Creek

Some TV coverage of Shingle Creek projects:

Find the Commissioners.... And the storm water management
https://minnesota.cbslocal.com/video/5720164-crescent-cove-gets-new-playground-baseball-field/

A Crystal Lake carp story..
https://www.kare11.com/article/tech/science/environment/invasive-carp-removal-is-a-thing-and-the-video-is-really-cool/89-0c46ca9c-9ac6-4ae3-8f69-d793f62c32c5

Diane Spector
Senior Associate, Senior Environmental Planner

Phone: (763) 252-6880
Cell: (612) 868-5515

7500 Olson Memorial Hwy | Suite 300
Golden Valley, MN 55427

WENCK now part of Stantec

https://www.hometownsource.com/sun_post/community/over-2-000-carp-removed-from-robbinsdale-s-crystal-lake/article_0b93a812-d903-11eb-9cb9-cf4a8cb3e00b.html

Over 2,000 carp removed from Robbinsdale's Crystal Lake

City hopes to remove another 9,000 by the end of summer

Alaina Rooker
Jul 1, 2021

Carp removal was conducted in Robbinsdale's Crystal Lake mid-June.

(SUBMITTED PHOTOS)

To mitigate Crystal Lake's common carp infestation, a contractor for the city of Robbinsdale conducted the first round of carp removal mid-June. This yielded 2,361 carp, which the city estimates to be 20% of the lake's total carp population.

In a Facebook post, the city reported that the contractor plans to sell the collected fish to a commercial fish company or use them for fertilizer.

Crystal Lake does not currently meet the state quality standard for nutrients. The carp mitigation efforts, along with a recent alum treatment to minimize algae bloom, were planned by the city and the Shingle Creek Watershed Commission. Water is also treated by the city every summer at a facility in Lakeview Terrace Park.

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It was determined in 2020 that the carp population in Crystal Lake was so abundant that it was negatively affecting water quality. According to Marta Roser, Robbinsdale's water resources specialist, the fish are bottom-feeding, non-native fish and have been creating negative impacts on the lake by stirring up sediment, uprooting vegetation and removing habitat for native fish species.

Carp removal was conducted in Robbinsdale's Crystal Lake mid-June.

(SUBMITTED PHOTOS)

The fish were trapped using a combination of netting techniques in shallow, southern portions of the lake. The removal took place at night June 17 and 18. The city reported that when an adequate amount of carp are removed from the lake, the lake's ecosystem should be able to keep the carp population balanced. An example used was the presence of bluegills in the lake, which help eat eggs spawned by an adult carp (a single carp spawn can contain up to 300,000 eggs).

A second round of carp removal is expected in the coming weeks.

Alaina Rooker

New Hope-Golden Valley Community Editor

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ENVIRONMENT

Invasive carp removal is a thing and the video is really cool

Crystal Lake has an estimated population of around 10,000 common carp. The goal is to get it down to around 2,000.

https://www.kare11.com/video/news/local/invasive-carp-removal-is-a-thing-and-the-video-is-really-cool/89-a072e7a5-4513-478e-85b3-bb48aac6e524

Author: **Sharon Yoo**
Published: **6:29 PM CDT June 30, 2021**
Updated: **7:03 PM CDT June 30, 2021**

ROBBINSDALE, Minn. — Creatures of the night vary at Crystal Lake in Robbinsdale, and on Tuesday night going into Wednesday morning, the party included humans.

Jordan Wein and his team from WSB, an environmental consulting firm, geared up for the hunt. They put on waders and sprayed themselves down with bug spray.

"It's kind of like an arms race with these guys," Wein said. "They come up with a strategy to avoid what we have, and we come up with a new strategy to outsmart them in a different way."

The recipe this time around is silence, and complete darkness. Wein and his team take the common carp by surprise, by lifting the nets they had set out, days prior.

"Common carp are really bad for water quality, especially in large numbers," Wein said, who is an environmental scientist. "First step you find out how many you have, if that amount of carp for the area of the lake is above a certain threshold, then we recommend coming in and removing as many as you can."

Brought in by immigrants from Europe more than a hundred years ago, common carp are harmful to the native species of Minnesota fish in lakes, according to Wein.

They're also incredibly hardy.

"They find ways to move through almost no water," Wein said. "So I mean, basically--I heard a professor once say, if a drop of rain falls, carp can move through it. That makes it really tough,

This video cannot be played because of a technical error.
(Error Code: 200001)

because obviously in Minnesota, our watersheds are connected by little creeks and swamps and marshes and that makes it a great place for these guys to thrive."

So when a population gets out of hand, cities like Robbinsdale call guys like Jordan and Bo to take them out, and haul them away.

The method is usually fool-proof when it comes to avoiding catching other fish. Although they get surprises like an occasional snapping turtle, here and there.

"We get some fun stuff in our nets, but no other fish other than carp so, it will be just fine," Wein said, as he released a snapping turtle back into the water.

As for the slimy, unlucky bunch of carp, they get hauled away to a composting facility during the summer. During the winter, sometimes they are sold as food.

These guys will get turned into compost," Wein said. "We've been told that the compost is getting turned really well and they're getting fertilized for orchards."

Give a man a day and he'll fish hundreds of carp out of the water.

But nature will have you know, it's not an easy one to outsmart, at least, not overnight.

"Really you just have to have as many options as possible to keep chipping away," Wein said. "And after a bit, you'll get that population down and they'll be smarter and smarter to different techniques."

Wein said the project of culling the carp population to acceptable levels at Crystal Lake will take a few more attempts.

OTHER NEWS: Minnesota health officials make summer COVID testing recommendations

OTHER NEWS: Cut gas line prompts evacuations at Mille Lacs Island Resort

To: Shingle Creek WMO Commissioners

From: Ed Matthiesen, P.E.
Diane Spector

Date: July 2, 2021

Subject: Crystal Lake Carp Management

Recommended Commission Action	Discuss.

Two carp removals have taken place on Crystal Lake so far. (See attached article and coverage on KARE11 https://www.kare11.com/video/news/local/invasive-carp-removal-is-a-thing-and-the-video-is-really-cool/89-a072e7a5-4513-478e-85b3-bb48aac6e524). The first effort was extremely successful. 2,361 carp were removed which is about 20% of the estimated population. The second effort was a fraction of the first removal only around 200.

At the July 8 meeting we will present more detail about the carp removals. Between today and the meeting we will also reach out to our contractor WSB to discuss options for future removals. It appears we did luck out and hit the peak of spawning with the first removal and can't expect that success later in the season, although WSB thought the second removal was uncharacteristically low. Ideally, we'd like to remove 6,000-8,000 carp in total. We budgeted for just three removals, and we may need to consider adding another or adding a seining option. We do have some budget flexibility to add more carp removal if need be, which would require amending the Commission's contract with WSB.

Brooklyn Park Recreation & Parks

River Park
GRAND RE-OPENING CELEBRATION

SATURDAY JULY 31

11 AM Ribbon-Cutting Ceremony at the Scenic Overlook

12–3 PM Community Celebration

Community Celebration:

- Fishing clinic
- Nature Story Walk
- Nature play pods and playground
- Walking and biking trails
- Explore the new features and activities at the park
- Paddle Share information and kayak demonstrations
- Nature activities for all ages
- Three Rivers Park District environmental education and information
- Pickleball Demo
- Rec on the Go family games
- Food trucks
- Music

Brooklyn Park Recreation & Parks is proud to re-open River Park to the community with new and improved amenities. River Park is Brooklyn Park's only park along the banks of the Mississippi River; enjoy its natural beauty and outdoor recreation opportunities!

River Park is accessible off 81ST or 83RD Ave off West River Road and the West Mississippi Regional Trail.

Note: there is limited parking at River Park, 101 83RD Ave. N, Brooklyn Park. Shuttle service will be available from the Three Rivers Mississippi Gateway Regional Park, 10360 West River Road.

Questions: Brooklyn Park Recreation & Parks 763-493-8333 or brooklynpark.org/celebrate

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https://www.hometownsource.com/sun_post/news/local/children-s-respite-home-unveils-accessible-outdoor-play-space/article_8f6d1f12-d8e8-11eb-b1d2-b3a51859227f.html

Children's respite home unveils accessible outdoor play space

Kevin Miller
Jun 30, 2021

Nadine Gregerson, former Crescent Cove board member, and daughter Riley keep score on Crescent Cove's new wooden scoreboard.

After more than two years of development, Crescent Cove Respite and Hospice Home for Kids unveiled its new outdoor play space June 24.

The Brooklyn Center-based nonprofit offers wheelchair-accessible playground equipment for children who are unable or rarely able to play on conventional playground equipment.

Included in the equipment are a custom-built playground dubbed the "Dragonfly tower," a mini baseball diamond with artificial turf, and outdoor musical instruments, such as metal chimes and glockenspiels.

"Our home opened three years ago in May 2018, and today we celebrate another milestone in our short history, one that will enhance our ability to provide play and engagement to the children and families that we serve," said Geoff Kaufmann, board chair.

"The team has seamlessly been able to blend nature and honor the land we stand on with opportunity to provide our kids play – play they might not get to experience somewhere else."

Located on Twin Lakes, the facility is the only children's respite home in the state, and the third in the country. It provides children with life-threatening conditions and their families a home to utilize for short breaks, as well as end-of-life care in a home environment.

Founder and Executive Director Katie Lindenfelser said that before opening Crescent Cove, she and others involved in the project toured similar facilities in England, where children's hospice locations number in the hundreds.

At Acorns Hospice in Birminghmam, "we met a little boy named Jack," she said. Lindenfelser asked Jack what Crescent Cove ought to look like when it was built.

"He replied, 'Be sure there's a blue slide in the back garden,'" she said, looking towards the blue slide installed on the playground equipment. "And thanks to all of you, Jack's declaration came to be, and we are reminded of the visions and dreams

coming true for kids in Minnesota right here at Crescent Cove."

Approximately 80% of children staying at Crescent Cove live in wheelchairs, said Tara Anderson, director of engagement.

"This outdoor play space is meant to be an extension of the joy we feel inside," she said. "It was critical that any play structure that we put on our property allowed a wheelchair to run up and down and have access to the same excitement that other kids do. ... As you can imagine they might not have a lot of other spaces to just roam and be themselves."

Assisting in the purchase and installation of the equipment were donations from former Minnesota Vikings linebacker Chad Greenway's Lead the Way Foundation, as well as the Minnesota Twins, the Shingle Creek Watershed District, Rotary Clubs from several cities, and Toro, among other donors.

"It's the generosity and the commitment from Chad Greenway's Lead the Way Foundation that was really the impetus to get this project off the ground," Anderson said.

Funding from the Shingle Creek Watershed assisted with flood mitigation, water drainage and native plantings, according to Anderson.

Follow Kevin Miller on Facebook at facebook.com/mnsunpost

(SUN POST STAFF PHOTOS BY KEVIN MILLER)

Pictured during a ribbon cutting ceremony are Crescent Cove founder and executive director Katie Lindenfelser, former Minnesota Viking Chad Greenway and his daughters Beckett and Maddyn, and Crescent Cove Board Chair Geoff Kaufmann. They stand in front of the custom-built playground dubbed the "Dragonfly tower," at Crescent Cove.

Left to right are Crescent Cove Board Chair Geoff Kaufmann, Shingle Creek Watershed Management Commissioners Ray Schoch and John Roach, engineer Ed Matthiesen and Crescent Cove founder and executive director Katie Lindenfelser,

Jennifer Auger plays a glockenspiel during the opening ceremony for Crescent Cove's playground.

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Opening ceremony attendees toss native plant seeds into Crescent Cove's garden.

Kevin Miller
Community Editor

Kevin Miller is Community Editor for the Brooklyn Park Sun Post.

Virtual meeting survey - June 28, 2021									
					Question #1				
Respondents					1	Are you personally comfortable with returning to in-person meetings?			
	Comm	TAC	Staff			C	Yes, if all vaccinated		
BC	1	1				C	Yes		
BP						C	Yes, if all vaccinated; if not vaccinated wear masks		
Ch	1					C	Yes, but greatly enjoy flexibility to be able to attend virtually and would like to keep virtual as long as we can		
Crys	1	1				C	Yes		
MG		1				C	No objections or advice		
Mpls									
NH		1							
Os	2								
Plym	1	1				T	Yes		
Robb		2				T	Yes		
Tech			1			T	Yes		
Admin						T	Yes, as long as it includes social distancing, no communal food		
Legal						T	Yes		
Totals	6	7	1			T	Yes		
						T	Yes		
						S	No		

					Question #2				
						Do you think it is practical or prudent to start conducting meetings in person?			
						C	Yes		
						C	I like the Zoom until the governor calls off the emergency		
						C	Yes, if all vaccinated; if not vaccinated wear masks		
						C	No, I do not feel meetings would accomplish more if [held] in person		
						C	Yes		
						C	No objections or advice		
						T	No, unless all are vaccinated and the state statute allows for online meetings, seems wise to continue meeting virtually.		
						T	Yes		
						T	Yes		
						T	Yes		
						T	If people are comfortable.		
						T	No, I don't think we need to rush back to in-person, COVID is still a concern (especially with the Delta variant) and virtual		
							meetings work well enough for me to do in the meantime.		
						T	Yes		
						S	No		

					Question #3				
						Is it important to you that efforts be made to promote social distancing in the meeting room (to the extent possible)?			
						C	No, if meetings are to be held in person, there should be no social distancing. (unless you are not vaccinated –		
							but one cannot ask and it is all on the “honor system”)		
						C	No		
						C	Yes		
						C	Yes		
						C	Yes		
						C	No objections or advice		
						T	Yes		
						T	No		
						T	Yes, it is very important to me that social distancing is incorporated into any in-person meeting space		
						T	No		
						T	Yes		
						T	Yes		
						T	No		
						S	Yes		

				Question #4					
						Should the WMOs hire a company to help acquire and set up equipment (e.g., cameras, speakers, mics, etc.) in the meeting to			
						allow hybrid meetings where members or the public can participate in meetings electronically?			
						C	No, I am not in favor of the hybrid type		
						C	No		
						C	Yes, until pandemic is declared over.		
						C	No		
						C	Yes		
						C	Although an interactive set-up for transparency and outside inputs is generally fine with me, I am hoping it doesn't		
							become an albatross around our necks for either cost or timeliness. It would seem to make coordination harder for you as		
							well as the learning curve. PS; so long as we remain cognizant of public health conditions as our group seems to be, statistics		
							generally are not in our favor from other parts of the country.		
						T	No. We have a set up at new hope city hall that could potentially be used. I don't know logistics at this time but would be		
							happy to provide more [information] if the Commission wants to take a look and see if it would work for our format.		
							The hybrid WebEx meetings work alright. If you attend online it is often difficult for the cameras to be showing the correct		
							speakers and sometimes we have issues with the visual aids being shared correctly to online viewers, but for the most		
							part we have had good results. We have only used this for our work sessions or internal meetings so legal may need		
							to advise on if this format would work for an open meeting.		
						T	Not sure. A decision may need to be made on either going completely back to in-person or staying completely on Zoom.		
							It would not make sense to purchase cameras/speakers/mics for a temporary arrangement. Some City Councils have been		
							doing hybrid meetings for awhile, it may be an option to move the meetings to a Council Chambers if the desire is to be hybrid.		
							is to be hybrid.		
						T	Yes, I would be fine with hybrid meetings. I think getting access to microphone and speaker equipment makes sense in		
							general because some of the Commissioners seem to have a hard time hearing parts of the meeting when we are in person.		
						T	No.		
						T	If this is located at a city facility, the city should do this. I don't its necessary to hire someone to do it		
						T	No.		
						T	*No answer.*		
						S	No		

Judie Anderson

From: Ed A. Matthiesen <ematthiesen@wenck.com>
Sent: Friday, July 2, 2021 11:04 AM
To: Judie Anderson
Subject: FW: Spring 2021 Seed Grant Awards - MnDRIVE Environment

Judie:
Thought the Commissions would be interested in seeing an email I got yesterday morning announcing that two of the five post-doctoral MnDrives research grants that were funded are projects that started with Shingle Creek Commission work. Those are the biochar research projects for septic system improvements with Dr. Heger and PFAS capture with Dr. Zhang. Looks like an interesting next three years.

Ed

Ed Matthiesen, P.E. (MN)

Principal Engineer

Phone: (763) 252-6851
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Suite 300
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WENCK now part of Stantec

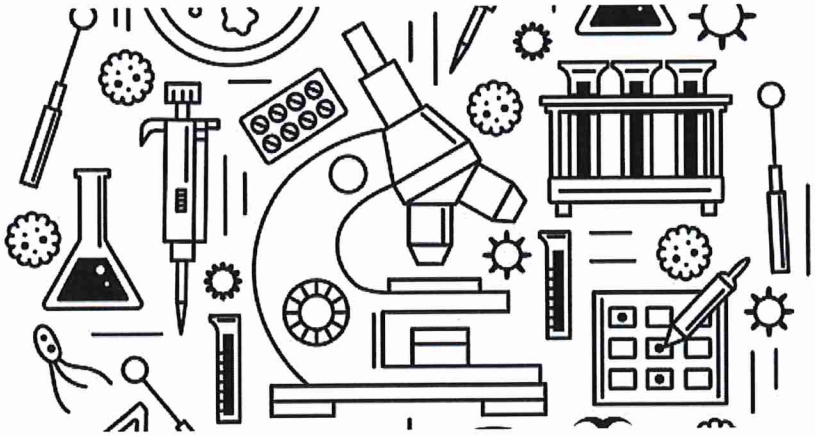
From: MnDRIVE Environment <standish@umn.edu>
Sent: Thursday, July 1, 2021 7:44 AM
To: Ed A. Matthiesen <ematthiesen@wenck.com>
Subject: Spring 2021 Seed Grant Awards - MnDRIVE Environment

[EXTERNAL EMAIL]

MnDRIVE
Advancing Industry,
Conserving our Environment

An initiative of the University of Minnesota

Announcing Our Spring 2021 Seed Grant Research Awards



MnDRIVE Environment is pleased to announce our Spring 2021 Seed Grant Awards from three separate categories - Postdoctoral, Graduate Student, and

Undergraduate Research Scholars. MnDRIVE Environment will soon have project profiles listed on our website to offer further information about each research project. The MnDRIVE Environment team wishes to thank the Review Panel for their time and expert analysis of another competitive group of proposals.

Note that those awards marked with ** have also received an **NRRI Travel Grant**. This supplemental travel funding is being offered by the Natural Resource Research Institute in partnership with MnDRIVE Environment to stimulate system wide collaboration and engagement.

Postdoctoral Research Scholar Awards

Selective Biomining Using Bacteria
Jeffrey Gralnick | CBS - Department of Plant and Microbial Biology

Evaluation of Biochar and Iron-Enhanced Sands in Septic Systems**
Sara Heger | CFANS - Department of Bioproducts and Biosystems Engineering

Advanced Biofilter for N2O Removal from Air**
Satoshi Ishii | CFANS - Department of Soil, Water, and Climate

Closing the Life Cycle Loop on Adhesives with Biological Remediation
Steve Severtson | CFANS - Department of Bioproducts and Biosystems Engineering

Mycoremediation of PFAS: Exploiting fungal pathways to tackle the "forever chemicals"**
Jiwei Zhang | CFANS - Department of Bioproducts and Biosystems Engineering

Graduate Research Scholar Awards

Sustainable Ways of microplastic Extraction Using Bioflocculants**
Cari Dutcher | CSE - Department of Chemical Engineering & Material Science

Enhancing PFAS Phytoremediation Using Novel Nanomaterials**
Christy Haynes | CSE - Department of Chemistry

Microbial Communities for Bioremediation of Personal Care Products: Metformin
Thomas Niehaus | CBS - Department of Plant and Microbial Biology

Undergraduate Research Scholar Awards

Remediating Hard-to-Reach Groundwater Contaminants Using Branching Microbes
Peter Kang | CSE - Department of Earth & Environmental Sciences

Paint Fragments: Sources of Microplastic Pollution
Lee Penn | CSE - Department of Chemistry

Mitigating Harmful Algal Blooms and Toxins Using Clays
Judy Yang | CSE - Department of Civil Engineering & Geo-engineering

MnDRIVE Environment

You are invited to a MnDRIVE Environment Event.

Our mailing address is:

University of Minnesota MnDRIVE Initiative

1479 Gortner Ave

St Paul, MN 55108

Add us to your address book

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You can update your preferences or unsubscribe from this list.