



August 27, 2019

Commissioners Shingle Creek and West Mississippi Watershed Management Commissions Hennepin County, Minnesota

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

Dear Commissioners:

Regular meetings of the Shingle Creek and West Mississippi Watershed Management Commissions will be held Thursday, September 12, 2019, at Edinburgh USA, 8700 Edinbrook Crossing, Brooklyn Park, MN. Lunch will be served at 12:00 noon and the meetings will convene concurrently at 12:45.

The Shingle Creek/West Mississippi Technical Advisory Committee (TAC) will convene at 11:30 a.m., prior to the regular meeting, to review proposed cost share projects and consider a Minor Plan Amendment to the Third Generation Management Plan.

The Commissions will suspend their regular meetings at 12:45 p.m. for the purpose of conducting a public hearing on the following improvement projects: 2019-01 Shingle Creek City Cost Share Retrofit Projects; 2019-02 Shingle Creek Partnership Cost Share BMP Projects; 2019-03 Crystal Lake Management Plan; 2019-04 West Mississippi City Cost Share Retrofit Projects.

The regular meeting will resume immediately after the public hearings conclude.

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

Your meal choices are:

- Grilled Chicken Caesar Salad, Garlic Croutons, Shaved Parmesan, freshly baked breads
- Bahn Mi, Roasted Pork, Pickled Carrot, Cucumber, Cilantro, Chili Mayo, Hoagie Roll, Kettle Chips (DF)
- Mushroom Lasagna, Swiss Chard, Parmesan, Boursin, Herbs, Balsamic Mushroom Glaze (V)
- I will be attending but DO NOT want a meal.
- I will not be attending the regular meeting.

We must make final reservations by noon Wednesday, September 4, 2019. Please make a reservation, even if you are not requesting a meal, so we can arrange for sufficient seating and meeting materials. Thank you.

Regards,

Judie A. Anderson Administrator

Alternate Commissioners Member Cites CC: Metropolitan Council

MPCA Z:\Shingle Creek\Meetings\Meetings 2019\09_Notice_Meeting.docx Troy Gilchrist DNR

TAC Members Wenck Associates



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A combined regular meeting of the Shingle Creek and West Mississippi Watershed Management Commissions will be convened on Thursday, September 12, 2019, at 12:45 p.m. at Edinburgh USA, 8700 Edinbrook Crossing, Brooklyn Park, MN. Agenda items are available at http://www.shinglecreek.org/minutes--meeting-packets.html.

- 1. Call to Order.
- SCWM a. Roll Call.
- v SCWM b. Approve Agenda.*
- ✓ SCWM c. Approve Minutes of Last Meeting.*
 - 2. Reports.
- v SC a. Treasurer's Report.**
- v SC b. Approve Claims^{**} voice vote.
- v WM c. Treasurer's Report.**
- v WM d. Approve Claims^{**} voice vote.

Suspend regular meetings.

- SCWM3.Public Hearing for 2019 Capital Improvement Projects.SCWMa.Staff Report.*SCWMb.Commission discussion.
 - SCWM c. Open Public Meeting.
 - SCWM 1) Receive Written Comments.
 - SCWM 2) Receive Comments from Public.
- SCWM d. Close Public Hearing.
- SCWM e. Commission Discussion.
- v SC f. Consider Resolution SC2019-03.*
- v WM g. Consider Resolution WM2019-03.*

Resume regular meetings.

- 4. Open Forum.
- 5. Project Reviews.
- ✓ WM a. WM2019-007 MCES Brooklyn Park-Champlin Interceptor, Phase II.*
- v WM b. WM2019-008 North Park Business Center, Brooklyn Park.**

		6.	Watershed Management Plan.
٧	SCWM		a. Initiate Minor Plan Amendment.*
٧	WM		b. River Park Application.*
			1) Trunk Storm Sewer Drainage Area.*
			2) Stormwater Plan.*
٧	SC		c. Enhanced Street Sweeper Application.*
		7.	Water Quality.
	SCWM		a Next TAC meeting -8:30 a.m., Thursday, September 26, 2019, Crystal City Hall.
		8.	Education and Public Outreach.
٧	SCWM		a. WMWA Contract Coordinator Proposal.*
			1) Position Description.*
	SCWM		b. Next WMWA meeting – 8:30 a.m., Tuesday, October 8, 2019, Plymouth City Hall.
		9.	Grant Opportunities and Updates.
	SC		a. Meadow Lake Management Plan.*
			1) Summary Responses.*
	SC		b. Shingle Creek Connections II.
			1) Summary Responses.*
	SC		c. Bass and Pomerleau Lakes Alum Treatment
	SC		d. Twin Lake Carp Management
	SC		e. Biochar and Iron Enhanced Sand Filters
	SC		f. Crystal Lake Management Plan
		10.	Communications.
	SCWM		a. Communications Log.*
	WM		b. Letter of Support River Park.*
		11.	Other Business.

12. Adjournment.

Z:\Shingle Creek\Meetings\Meetings 2019\09 Agenda Regular meeting and Public Hearing.docxpacket
** Emailed or available at meeting ***Previously transmitted **** Available on website v Item requires action



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MINUTES Regular and Public Meetings August 8, 2019

(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 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, August 8, 2019, at Edinburgh, USA, 8700 Edinbrook Crossing, Brooklyn Park, MN.

Present for Shingle Creek were: David Vlasin, Brooklyn Center; Steven Chesney, Brooklyn Park; Burton Orred, Jr., Crystal; Karen Jaeger, Maple Grove; Harold E. Johnson, Osseo; Andy Polzin, Plymouth; Wayne Sicora, Robbinsdale; Ed Matthiesen, Wenck Associates, Inc.; Troy Gilchrist, Kennedy & Graven; and Judie Anderson, JASS.

Not represented: Minneapolis and New Hope.

Present for West Mississippi were: David Vlasin, Brooklyn Center; Steven Chesney, Brooklyn Park; Gerry Butcher, Champlin; Karen Jaeger, Maple Grove; Harold E. Johnson, Osseo; Ed Matthiesen, Wenck Associates, Inc.; Troy Gilchrist, Kennedy & Graven; and Judie Anderson, JASS.

Also present were: Mitch Robinson and Alex Prasch, Brooklyn Park; Todd Tuominen, Champlin; Randy Bergstrom and Mark Ray, Crystal; Derek Asche, Maple Grove; Megan Hedstrom and Jodi Taitt, New Hope; Ben Scharenbroich, Amy Riegel, and Alex Larson, Plymouth; and Richard McCoy and Marta Roser, Robbinsdale.

II. Agendas and Minutes.

Motion by Orred, second by Johnson to approve the **Shingle Creek agenda.*** *Motion carried unanimously.*

Motion by Butcher, second by Chesney to approve the **West Mississippi agenda.*** *Motion carried unanimously.*

Motion by Johnson, second by Orred to approve the **minutes of the July regular meeting.*** *Motion carried unanimously.*

Motion by Jaeger, second by Vlasin to approve the **minutes of the July regular meeting.*** *Motion carried unanimously.*

III. Finances and Reports.

A. Motion by Orred, second by Jaeger to approve the Shingle Creek August Treasurer's Report.* *Motion carried unanimously*.



Motion by Orred, second by Chesney to approve the **Shingle Creek August claims.*** Claims totaling \$485,962.81 were *approved by roll call vote:* ayes – Vlasin, Chesney, Orred, Jaeger, Johnson, Polzin, and Sicora; nays – none; absent – Minneapolis and New Hope.

B. Motion by Butcher, second by Jaeger to approve the **West Mississippi August Treasurer's Report.*** *Motion carried unanimously*.

Motion by Johnson, second by Jaeger to approve the **West Mississippi August claims.*** Claims totaling \$16,319.85 were *approved by roll call vote:* ayes – Vlasin, Chesney, Butcher, Jaeger, and Johnson; nays – none.

[The regular meeting was suspended at 12:51 p.m. in order to conduct a public meeting.]

IV. Public Meeting. The Shingle Creek and West Mississippi Third Generation Watershed Management Plan and Capital Improvement Programs (CIP) are proposed for a Minor Plan Amendment (MPA).* The Plan would be revised to adopt the CIP cost sharing policy to include funding nonstructural Best Management Practices.

The Commissions initiated an MPA on July 11, 2019. Notice* was sent to the member cities, county, and reviewing agencies, and published as required by statute and the Plan. The purpose of this public meeting is to discuss the proposed minor plan amendment and any comments received prior to or at a public meeting. After that discussion, each Commission may consider a resolution adopting the MPA contingent on County Board approval of the Minor Plan Amendment, which will be heard at a County Board hearing in November 2019.

The **Cost Share Policy for Capital Improvements**^{*} is a new document, but much of the proposed policy is already in place in memos and guidance documents. This is the first time those operating policies have been gathered into a formal policy. What is new is most of the second paragraph under Capital Improvements which deals with the eligibility of structural and nonstructural activities, and the effectiveness of monitoring requirements in the guidelines section. The proposed Minor Plan amendment would modify the plan to state that the Commissions will implement the CIP using the Cost Share Policy.

The revision also specifies that the 2022 generic Lake Internal Load project on the CIP will be the Meadow Lake Management Plan and reschedules it to 2020.

A. **Open public meeting.** The public meeting was opened at 1:01 p.m.

1. The proposed minor plan amendment is included in the notice. BWSR has responded that they have no comments and Hennepin County has reviewed and approved the proposed amendment.

2. No comments on the proposed amendment were received from either the member cities or the public. No one was present from the general public.

3. The public meeting was closed at 1:02 p.m.

B. Commission Discussion.

C. Recommended Commission Action.

The Commissions should each adopt the Cost Share Policy and respective resolution adopting the proposed amendment.



Motion by Orred, second by Jaeger to adopt the Cost Share Policy. *Motion carried unanimously, Vlasin voting nay.*

Motion by Chesney, second by Jaeger to adopt the Cost Share policy. *Motion carried unanimously, Vlasin voting nay.*

Motion by Chesney, second by Sicora to adopt **Resolution 2019-02** Adopting a Minor Plan Amendment Revising the Cost Share Policy and the Capital Improvement Program.* *Motion carried unanimously.*

Motion by Johnson, second by Chesney to adopt **Resolution 2019-02** Adopting a Minor Plan Amendment Revising the Cost Share Policy and the Capital Improvement Program.* *Motion carried unanimously.*

[The regular meeting was reconvened at 1:03 p.m.]

V. Open Forum.

Scharenbroich introduced Amy Riegel. She will be working as a Senior Engineering Technician for the City of Plymouth.

VI. Project Review.

SC2019-010 Local Union 292 Corp. Office, 6700 West Broadway Avenue, Brooklyn Park. Construction of an office building with associated parking, storm sewer system, infiltration basin, and utilities on 4.35 acres. Following development, the site will be 72% impervious with 3.12 acres of impervious surface, an increase of ~3.12 acres. A complete project review application was received June 17, 2019.

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 on the east side of the property that has the capacity to infiltrate 1.3 inches of rainfall off new impervious surface (13,252 CF). The applicant meets Commission water quality treatment requirements.

Commission rules require that site runoff is limited to predevelopment rates for the 2-, 10-, and 100year storm events. The site does not discharge under existing conditions, even during a 100-year back-to-back rainfall event. Therefore, the site was designed to have a landlocked infiltration basin that also does not discharge during a 100-year back-to-back rainfall event. 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 2.8 acres, requiring infiltration of 13,352 CF within 48 hours. The applicant proposes to route runoff to an infiltration basin that has the capacity to infiltrate the required volume within 48 hours. The applicant meets Commission volume control 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.

SCWM Regular Meeting Minutes August 8, 2019 Page 4



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 infiltration basin according to Atlas 14 precipitation. The applicant meets Commission floodplain requirements.

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

A public hearing on the project was conducted on June 19, 2019 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 provided.

Motion by Chesney, second by Vlasin to advise the City of Brooklyn Park that Project 2019-010 is approved with the following conditions:

1. Provide a completed O&M agreement between the applicant and the City of Brooklyn Park for all stormwater facilities on the project site. (A draft agreement was provided with this application.)

2. Demonstrate by double ring infiltrometer or witness test that the site can meet the design infiltration rate of 0.45 inches/hour post construction.

Motion carried unanimously.

VII. Watershed Management Plan -

A. Earlier this year the Commissions undertook a Minor Plan Amendment to revise the Capital Improvement Program (CIP) for 2019 to specify that the 2020 lake internal load project would be the Crystal Lake Management Plan. The next step in the CIP process is to receive and discuss feasibility studies for the proposed projects and call for a public hearing on those projects that the Commissions desire to move forward. Feasibility summaries for the proposed capital projects are included in Staff's August 2, 2019 memo.*

B. 2019 CIP Projects.*

Project	Total Estimated	City/ Private	Grant	Commission Share	Total Levy
Cost share (city projects)	\$200,000	\$100,000	0	\$100,000	\$106,050
Crystal Lake Management Plan*	\$370,506	\$0	0*	\$370,506	\$392,915
Partnership cost share (private projects)	\$100,000	\$50,000	0	\$50,000	\$53,025
Subtotal	\$670,506	\$150,000	\$ 0	\$520,500	
5% additional for legal/admin costs				26,025	
Subtotal				546,525	
TOTAL LEVY (101% for uncollectable)				\$551,990	

Shingle Creek 2019 CIP Projects (2020 levy).

*The Commission has preliminarily been awarded a \$216,066 Section 319 grant from the MPCA, which is currently being processed for final approval at the EPA.



Project	Total Estimated	City/ Private	Grant	Commission Share	Total Levy
Cost share (city projects)	\$100,000	\$50,000	0	\$50,000	\$53,025
Subtotal	\$100,000	\$50,000	\$ 0	\$50,000	
5% additional for legal/admin costs				2,500	
Subtotal				52,500	
TOTAL LEVY (101% for uncollectable)				\$53,025	

West Mississippi 2019 CIP Projects (2020 levy).

C. Crystal Lake Management Plan Feasibility and Cost Estimate.*

The purpose of the proposed Crystal Lake Management Plan Project is to improve the water quality and ecological integrity of Crystal Lake, to restore beneficial uses, and to progress the lake toward achieving the state water quality standard for TP. As the largest lake in the city of Robbinsdale and with significant adjacent park acreage and a public access, it is a popular destination for water recreation and fishing. The proposed project takes a whole-lake management approach.

The first component of the project is a lake alum treatment to seal the sediments and reduce the need and frequency of withdrawing from the hypolimnion. To maximize the effectiveness of the alum treatment, it would be performed in two doses. Initial sediment cores would be used to compute the effective dose, and water column DO measurements would be used to identify the anoxic zone and the limits of alum treatment. One-half the recommended dose would be applied the first year and additional sediment cores taken and evaluated. Based on the initial results, dosing for the second treatment may be adjusted. Following the second treatment, a final set of sediment cores would be used to confirm the effectiveness of the treatment at reducing the sediment release rate. *Costs*: Grant – \$161,984; Commission - \$100,200; Total - \$262,184.

The second component is carp harvesting to reduce the population to a level well below the impairment threshold. An initial carp assessment was completed in September 2018 and concluded that the carp biomass was just above the critical impairment threshold. The relatively small size of the carp suggests that carp issues in the lake are likely to worsen as the carp grow and reproduce. Prior to the alum treatment, the carp population assessment would be repeated and RTF tags placed in a sample of the fish for radio-tracking to determine their overwintering locations. Based on an initial carp assessment, approximately 3,500-4,000 kg of carp will need to be removed from the lake to reduce the population density below the 100 kg/ha density threshold. The Commission will work with a commercial fisherman to harvest carp and other undesirable rough fish. *Costs*: Grant - \$24,214; Commission - \$28,000; Total -\$52,214.

Submersed Aquatic Vegetation (SAV) Management. Following alum treatment and carp removal, the project objective is to restore a healthy native aquatic vegetation community by treating invasive plants as water quality improves and take any necessary management steps to keep the lake healthy and native. Previously completed aquatic vegetation surveys showed an extreme lack of

SCWM Regular Meeting Minutes August 8, 2019 Page 6



submersed aquatic vegetation, with few native pondweed species common in healthy shallow and deep lakes throughout Minnesota. *Costs*: Grant – \$19,740; Commission - \$26,240; Total - \$45,980.

Semiannual reports will be completed and submitted to MPCA during the Grant term. A final report will be submitted to MPCA within 30 days from the end of the Grant. The final report will set forth dosing calculations and document treatment applied; detail monitoring data collected pre- and post-project; provide results of the before and after population carp assessment, record biomass removed from the lake; and document SAV treatment. Best Management Practices will be reported each year they are implemented to the Statewide eLINK data system. Invoices will be submitted to MPCA at least quarterly. Methods and findings will be compiled into a final technical report that will be submitted as part of the Final Report for this grant. *Costs*: Grant – \$10,128; Commission - \$0; Total - \$10,218.

Total Project Costs: Grant – \$216,066; Commission - \$154,440; Total - \$380,506.

As water clarity improves post alum treatment and carp removal, a positive vegetative response would be anticipated. Exactly what that would look like is unknown at this time. A desirable outcome would be one in which a diverse community of native vegetation becomes established, outcompeting aquatic invasive species (AIS) but remaining below nuisance levels. However, because AIS have been observed in the lake during plant surveys and anecdotal evidence suggests these species used to be at nuisance levels along the northwest shore, the possibility exists that AIS may try to reestablish, requiring active management. The Commission will monitor submersed aquatic vegetation for invasive aquatic plants and manage those by using spot treatments.

D. Motion by Vlasin, second by Sicora to receive the Staff Report and call for a public hearing on the proposed projects for September 12, 2019, during the regular meeting of the Commission. *Motion carried unanimously.*

Motion by Chesney, second by Butcher to call for a public hearing on the proposed project for September 12, 2019, during the regular meeting of the Commission. *Motion carried unanimously.*

VIII. Water Quality.

A. Verification and Certification of Stormwater MTDs.* Included in the meeting packet was a copy of a letter from the Bassett Creek Watershed Management Commission (BCWMC) dated July 26, 2019, addressed to Mike Trojan, Minnesota Pollution Control Agency (MPCA). The letter, to which the signatures from the Administrators from BCWMC, Nine Mile Creek WD, Ramsey-Washington Metro WD, and Riley Purgatory Bluff Creek WD and the Chairs of the Shingle Creek and West Mississippi WMOs were affixed, requests the MPCA to (1) cooperate with and support the implementation of the Water Environment Federation's (WEF) Stormwater Testing and Evaluation of Products and Practices (STEPP) verification program or (2) develop its own statewide program for evaluating and certifying stormwater MTDs, and, in either scenario, include verified/certified MTDs in the Minnesota Stormwater Manual if appropriate.

Motion by Sicora, second by Vlasin to ratify Chairman Polzin's signature to this letter. *Motion carried unanimously.*

Motion by Butcher, second by Johnson to ratify Chairman Butcher's signature to this letter. *Motion carried unanimously.*

item 01c

B. The next **Technical Advisory Committee (TAC) meeting** is tentatively scheduled for 8:30 a.m., Thursday, August 22, 2019, at Crystal City Hall. The July 25, 2019 TAC meeting minutes* are included in the meeting packet for informational purposes.

IX. Education and Public Outreach.*

A. The Freshwater Society is seeking sponsorship for its upcoming **19th Annual Road Salt Symposium**,* Thursday, October 24, 2019, in Vadnais Heights. This is the second symposium to be held in 2019 after a decision was made to move the event from winter to fall. The Commissions each sponsored the February 7, 2019 symposium with \$500. It was agreed by consensus not to sponsor the October symposium.

B. The **next WMWA meeting** is scheduled for 8:30 a.m., Tuesday, August 13, 2019, at Plymouth City Hall.

X. Grant Opportunities and Updates.

A. Meadow Lake Management Plan Feasibility and Cost Estimate. (Staff memo dated August 7, 2019*) Meadow Lake is a shallow eutrophic lake located in New Hope that discharges through storm sewer to Bass Creek, a tributary of Shingle Creek. In 2002 the Minnesota Pollution Control Agency (MPCA) listed the lake as impaired for excess nutrients. In 2010, Wenck completed a TMDL and Implementation Plan to assess nutrient loading concerns and provide strategies to reduce excess nutrient loading.

In 2019 the Commission completed a TMDL Five-Year Review, summarizing progress to date and updating the nutrient budgets and targets using more recent and complete monitoring data. The updated modeling shows that Meadow Lake requires an 82% reduction in TP, from both watershed and internal loading. An estimated 42 of the of the required 62 pound watershed reduction per year has been achieved through BMPs and street sweeping. Analysis of sediment cores suggests internal loading from sediment is on the high end, exceeding 75 percent of all lakes in the Commission's database.

The 2016 vegetation surveys for Meadow Lake showed low species diversity (four species observed) and a high abundance of curly-leaf pondweed (CLP). Only two fish species were observed during a 2017 assessment and the population was dominated by fathead minnow. In high densities, fathead minnow can have significant water quality impacts by feeding on zooplankton, through secretion, and sediment resuspension. It is highly likely that efforts to eradicate the fish would have positive impacts on water quality and the vegetation community. Water quality is variable but typically exceeds the standards for most of the growing season.

The TMDL 5-Year Review concluded with updated Implementation Plan activities for the coming 5-10 years to reduce both watershed and internal loading to Meadow Lake. Those activities are identified in Staff's memo. Since significant progress has been made in reducing watershed load, it is appropriate at this time to start to manage the internal load. The memo assesses the feasibility of one or more temporary drawdowns to reduce CLP and fathead minnows and restore the biotic integrity of the lake, followed by an aluminum sulfate (alum) treatment to reduce internal phosphorus loading, and the estimated project costs and longevity of the actions.

Data collection in the form of water quality monitoring, aquatic vegetation surveys, fish surveys, and sediment chemistry are described in the memo as are a number of management options,



including chemical treatments such as alum. Alum treatments have progressed significantly in the last decade and scientists and practitioners have found that they are more effective and successful if they are completed in multiple doses over two or more years. Initial, interim, and final sediment cores are taken and release rates measured to confirm and adjust dosing if necessary and to determine when the desired release rate has been achieved.

As proposed, the Meadow Lake Management Plan would be comprised of two phases: Phase 1 would be focused on reestablishing a balanced biology by removing the fathead minnow population and limiting recolonization, reducing curly-leaf pondweed to non-nuisance levels, and restoration of a healthy native aquatic vegetation community through a series of temporary drawdowns. Phase 2 would be focused on reducing phosphorus loading from the sediments. Annual monitoring would be conducted and would guide adaptive management until the desired outcome is achieved.

During Year 1 (spring 2020 to spring 2021, if a grant is awarded) a fall-winter drawdown will be conducted to consolidate sediments, eliminate fathead minnows and prevent recolonization, and reduce curly-leaf pondweed growth.

During Years 2-3-4 (beginning spring 2021) the impact of the drawdown will be evaluated and chemical treatment of curly-leaf pondweed and/or fish done as necessary.

During Years 4-5-6, alum will be applied in two doses one or two years apart. Between the doses sediment cores will be taken to verify second dose application rates.

The estimated costs for each phase of the project are shown in the memo. Total estimated costs are shown below:

Task #	Task	Tot Hrs	Staff Costs	Const. Costs	Lab Costs	Expense	TOTAL Cost
1	Project Coordination	64	\$12,360	\$0	\$0	\$0	\$12,360
2	Construction						
	Drawdown	40	\$8,160	\$50,000	\$0	\$0	\$58,160
	SAV Treatment	24	\$4,896	\$6,000	\$0	\$500	\$11,396
	Alum Treatment	36	\$7,560	\$70,000	\$0	\$500	\$78,060
	Fish Barriers	12	\$2,448	\$15,000	\$0	\$0	\$17,448
	Fish Treatment	24	\$3,076	\$5,000	\$0	\$500	\$8,576
3	Monitoring						
	Water Quality	258	\$30,897	\$0	\$16,740	\$6,300	\$53,937
	Fish Surveys and Permits	172	\$20,806	\$0	\$0	\$1,500	\$22,306
	SAV Surveys and Permits	216	\$13,500	\$0	\$0	\$5,700	\$19,200
	Sediment Coring	76	\$8,805	\$0	\$10,000	\$1,500	\$20,305
4	Report	66	\$8,124	\$0	\$0	\$0	\$8,124
5	Meetings	96	\$16,688	\$0	\$0	\$0	\$16,688
6	Grant Reporting	12	\$1,728	\$0	\$0	\$0	\$1,728
					Subtotal		\$328,288
					Contingency 10%		\$32,830
					TOTAL		\$361,118

SCWM Regular Meeting Minutes August 8, 2019 Page 9



The City of New Hope has reduced the watershed load to Meadow Lake through BMPs and enhanced street sweeping. Updated nutrient budgets and TMDL calculations suggest that Meadow Lake requires an estimated 93% internal load reduction. Phase 1 is estimated to reduce TP loading by 20-25 pounds per year, which is the modeled residual load and is approximately one-third the reduction required by the TMDL. More importantly, it is expected that the outcome of Phase 1 will be dramatically reduced chl-a concentrations and improved clarity. In Phase 2, alum treatments have reduced internal load by 90-99% on other Minnesota lakes. Sedimentation scenarios estimate a useful life of 17 years if no additional watershed load reductions are completed, and 59 years if the watershed load reduction targets are met. A 90% reduction in sediment load is 86 pounds.

Assuming the model residual load is reduced 20-25 pounds by the drawdown and fish and CLP control, and the alum treatment successfully reduces sediment loading by the estimated 86 pounds, achieving the updated internal load reduction of 110 pounds P/year is feasible. The cost of undertaking the proposed actions, excluding monitoring and administration is approximately \$125,000 for Phase 1 and \$120,000 for Phase 2, or about \$1,318 per pound TP.

Motion by Orred, second by Chesney directing Staff to proceed with a BWSR Clean Water Fund Competitive Grant application for this project. *Motion carried unanimously*. The application is due September 9, 2019, and will be prepared using Closed Project funds. Included in the meeting packet was a preliminary draft of the proposed CWF grant application.*

B. Shingle Creek Restoration – Regent/73rd Avenue to Brooklyn Boulevard. (Staff memo dated August 2, 2019*) Restoration of this reach of Shingle Creek is on the Commission's CIP for 2020. This is the segment between the restoration project done in conjunction with the Village Creek North development and the more recent Connections project on the east side of Brooklyn Boulevard and is the last significant non-wetland reach of Shingle Creek to be completed outside of the MPRB segments in Minneapolis.

Shingle Creek is an impaired water for excess chloride and *E. coli*, low DO, and biotic integrity (macroinvertebrates). The primary aquatic life stressors are altered habitat, altered flow, low DO, loss of connectedness, and chloride. Contributors to the low DO impairment include the over-widened, flat-bottomed channel that reduces natural reaeration and results in excess sediment oxygen demand. The origin of that sediment oxygen demand is the sediment and nutrients transported to the stream from the watershed and from erosion of the streambanks. These restoration projects are identified in the TMDL Implementation Plan, and focus on stabilizing streambanks, adding some roughness and aeration to the streambed, enhancing habitat, and adding or enhancing native buffers in the stream corridor.

In consultation with the cities of Brooklyn Center and Brooklyn Park, Staff have developed 30% conceptual plans for the restoration of this segment. They anticipate that the nature of the work will be very similar to the other reaches that have been completed; however, there are some segments of the reach that are experiencing severe erosion that will require more stabilization.

Staff have prepared a report for the cities setting forth conditions and conceptual plans. Three concepts were considered, including lining the stream with boulder toe; using native vegetation to restore and stabilize the streambanks; and using some riprap and root wads to slightly re-meander the stream within its existing valley. Because these improvements address impairments to the stream, this SCWM Regular Meeting Minutes August 8, 2019 Page 10



project would fall under the Commissions' revised cost share policy whereby the Commission would fund the cost of Load Allocation reduction projects 100%. This project is currently on the CIP in 2020 for \$400,000. The estimated project cost of the estimated 1,730 LF of stream at the 30% design level, including a 15% contingency, is about \$360,000. When design and monitoring are added Staff estimate a total project cost of \$400,000.

Since the proposed project would address the DO and biotic impairments, Staff recommend that a Clean Water Fund grant application be submitted for this project. With a project cost of \$400,000, the grant request would be \$320,000 and the Commission's match would be \$80,000.

Motion by Jaeger, second by Chesney to approve Staff's recommendation. *Motion carried unanimously.*

C. Ryan Lake Creek Assessment and Hydrologic and Hydraulic Monitoring. (Staff draft memo dated July 22, 2019*) Staff's memo summarizes the stream assessment and hydraulic modeling of Ryan Lake Creek from its outlet at Lower Twin Lake in the City of Robbinsdale to its outfall at Shingle Creek in Minneapolis. The stream assessment was completed through a survey and walkdown of the channel system. The hydrologic and hydraulic modeling was completed with PC-SWMM using a combination of existing hydrology, existing storm sewer inputs from the City of Minneapolis, and survey data from the stream assessment to model the open channel hydraulics.

To assess Ryan Lake Creek, Wenck surveyed the creek bottom, cross-sections, and hydraulic structure invert. The creek was surveyed from its outlet at Lower Twin Lake to where the creek enters the City of Minneapolis storm sewer near the intersection of 49th and Sheridan Avenues. To assess the condition of the storm sewer along 49th Avenue, the City of Minneapolis provided sewer televising data. Wenck also surveyed and assessed the outfall of Ryan Lake Creek at its confluence with Shingle Creek. Ryan Lake Creek is approximately 8,800 LF feet from Lower Twin Lake to the confluence with Shingle Creek with approximately the last 3,400 LF traveling through storm sewer under 49th Avenue. The creek was split into 16 reaches at hydraulic breaks (road crossings) or where channel geometry changed. Each reach and its condition are summarized in Staff's memo.

Although no areas of washout or excessive erosion were seen during the field investigation, the following reaches and areas were highlighted as being degraded or restricting flow:

1. Reach 1: At the outlet of Lower Twin Lake, excessive cattail growth that may restrict flow. However, the hydraulic restriction in this section is currently the downstream weir at France Avenue (Reach 3).

2. Reach 4-5: The channel through these reaches is not well-defined and has some excessive cattail build-up due to excessive inundation, likely due to the lack of hydraulic grade between France Avenue and Ryan Lake and the hydraulic restrictions in Reaches 6-8, directly upstream of Ryan Lake.

3. Reach 6: A downed tree and fallen limbs and branches in Reach 6 restrict flow and create excessive inundation in reaches 4-5.

4. Reach 7: Backyard debris and a chain link fence in this reach restrict flow to Ryan Lake.



5. Reach 8: Downed trees, limbs, and various debris restrict flow in this reach where the channel is not well-defined.

6. Reach 9: The outlet of Ryan Lake has some excessive cattail growth between the open water and the 54-inch RCP outlet. There is also a chain link fence with a floating silt curtain that is restricting flow.

The flow restrictions and channel conditions outlined above, except for the floating silt curtain, were included in an existing conditions hydrologic and hydraulic model. The channel widening, restrictions, and excessive vegetation were incorporated into the model with surveyed cross-sections and increased Manning's roughness values.

A summary of the existing conditions model and a discussion of the modeling results and recommended next steps, including developing an O&M Pumping plan for Crystal Lake that addresses pumping during Ryan Lake high water level conditions and channel clean-out, are outlined in the memo.

Motion by Vlasin, second by Sicora directing Staff to work with the affected cities to develop a BWSR Clean Water Fund Competitive Grant application for this project. *Motion carried unanimously*.

[Butcher departed 1:54 p.m.; Johnson departed 2:11p.m.]

XI. Communications.

July Communications Log.* No items required action.

XII. Other Business.

The terms of representatives from Champlin and Minneapolis expired January 31, 2019. Staff have not received updated appointments as of this date. The Commissioner position from the City of Brooklyn Park has become vacant and a new representative must be appointed by that city.

XIII. Adjournment. There being no further business before the Commissions, the joint meeting was adjourned at 2:16 p.m.

Respectfully submitted,

udie Athauson

Judie A. Anderson Recording Secretary JAA:tim

Z:\Shingle Creek\Meetings\Meetings 2019\08 Regular and Public Meeting Minutes.doc





Responsive partner.
Exceptional outcomes.

T	D:	Shingle Creek/West Mississippi WMO Commissioners				
Fi	rom:	Ed Matthiesen, P.E. Diane Spector				
D	ate:	September 6, 2019				
S	ubject:	Public Hearing 2019 Capital Projects Project 2019-01 Shingle Creek City Cost Share BMPs Project 2019-02 Shingle Creek Partnership Cost Share BMPs Project 2019-03 Crystal Lake Management Plan Project 2019-04 West Mississippi Cost Share BMPs				
Recommended Commission Action		ed Commission	Conduct the public hearing. Adopt resolutions ordering TAC/staff recommended projects and certifying levies.			

The Shingle Creek Commission has received a feasibility report on Project 2019-03 Crystal Lake Management Plan. At the August 8, 2019 meeting the Commissions called for a public hearing on September 12, 2019 to consider that project in addition to the annual City Cost Share and Partnership Cost Share projects. The cities and the county have been notified and notice has been duly published.

COMMISSION ACTION

The purpose of the public hearing is to present the proposed projects and proposed financing and to take comment from the member cities and the public. The recommended order of business is as follows:

- 1. Staff report on projects and proposed financing
- 2. Commissioner discussion
- 3. Each Commission should open a public hearing, which can run concurrently
- 4. Take comments from member cities
- 5. Take comments from the public
- 6. Close the public hearings
- 7. Commissioner discussion
- The Shingle Creek Commission should consider the following resolution (a 2/3 majority is required): A RESOLUTION ORDERING 2019 IMPROVEMENTS, MAKING FINDINGS AND CERTIFYING COSTS TO HENNEPIN COUNTY PURSUANT TO MINNESOTA STATUTES, SECTION 103B.251
- 9. The West Mississippi Commission should consider the following resolution (a 2/3 majority is required): A RESOLUTION ORDERING 2019 IMPROVEMENTS, MAKING FINDINGS AND CERTIFYING COSTS TO HENNEPIN COUNTY PURSUANT TO MINNESOTA STATUTES, SECTION 103B.251
- 10. Continue with regular meetings

Table 1. Shingle Creek 2019 CIP Projects (2020 levy).

Project	Total Estimated	City/ Private	Grant	Commission Share
Cost share (city projects)	\$200,000	\$100,000	0	\$100,000
Crystal Lake Management Plan	\$370,506	\$0	\$216,066*	\$154,440
Partnership cost share (private projects)	\$100,000	\$50,000	0	\$50,000
Subtotal	\$670,506	\$150,000	\$216,066	\$304,440
5% additional for legal/admin costs				15,220
Subtotal				319,660
TOTAL LEVY (101% for uncollectable)				\$322,860

*Section 319 grant from the MPCA/EPA has been approved by EPA.

Project	Total Levy
Cost share (city projects)	\$106,050
Crystal Lake Management Plan	\$163,785
Partnership cost share (private projects)	\$53,025
Total	\$322,860

Table 2. West Mississippi 2019 CIP Projects (2020 levy).

Project	Total Estimated	City/ Private	Grant	Commission Share
Cost share (city projects)	\$100,000	\$50,000	0	\$50,000
Subtotal	\$100,000	\$50,000	\$ O	\$50,000
5% additional for legal/admin costs				2,500
Subtotal				52,500
TOTAL LEVY (101% for uncollectable)				\$53,025

Project	Total Estimated
Cost share (city projects)	\$53,025
Total	\$53,025

Shingle Creek Projects

Commission Fund for Retrofit Cost Share (City Projects). This annual project provides cost sharing to retrofit smaller BMPs. The TAC developed policies and procedures to administer these funds, and makes recommendations to the Commissions on which projects should be funded. Brooklyn Park, Brooklyn Center, Minneapolis, Crystal, Robbinsdale, and New Hope have all received matching funds for small voluntary BMP projects. The annual levy is \$100,000, to be matched at least one-to-one by a member city or cities. Applications are open until funds are depleted. Potential cost-share projects for 2020 will be solicited in November-December 2019, but the program is open until all funds have been used.

Priority BMP Retrofits (Private Partnership Projects). Two projects have been funded, Phases 1 and 2 of Autumn Ridge). The annual levy is \$50,000, and funding does not require a match. Potential cost-share projects are open year round until the funds are depleted.

Crystal Lake Management Plan. This project is rough fish and aquatic vegetation management, alum treatments applied over two years, and lake monitoring. The Shingle Creek Commission has previously received a Feasibility Study for this project at the time the Section 319 grant application was approved in April 2019. It is attached for reference. Robbinsdale is the lead city on this project. The MPCA has confirmed that the EPA has since approved this application and that the MPCA is awaiting receipt of funds so a contract can be developed.

West Mississippi Projects

Commission Fund for Retrofit Cost Share (City Projects). Similar to Shingle Creek, this annual project provides cost sharing to retrofit smaller BMPs. No project applications have been received to date.

Staff Recommendation

Take public comment on the proposed projects. Approve resolutions ordering the projects and certifying the levies.

SHINGLE CREEK WATERSHED MANAGEMENT COMMISSION RESOLUTION NO. 2019-03

ORDERING 2019 IMPROVEMENTS, DESIGNATING MEMBER RESPONSIBLE FOR CONSTRUCTION, MAKING FINDINGS, AND CERTIFYING COSTS TO HENNEPIN COUNTY PURSUANT TO MINNESOTA STATUTES, SECTION 103B.251

WHEREAS, on April 11, 2013, the Shingle Creek Watershed Management Commission adopted its *Shingle Creek and West Mississippi Third Generation Watershed Management Plan*, which includes a Capital Improvement Program (CIP) that has subsequently been amended five times to modify the CIP; and

WHEREAS, the *Third Generation Watershed Management Plan* specified a county tax levy under Minn. Stat. § 103B.251 as the source of the Commission's share of funding for capital projects proposed in the Commission's CIP; and

WHEREAS, the CIP includes annual allocations for Shingle Creek Cost Share BMPs, hereby known as "Project 2019-01," and Shingle Creek Partnership BMPs, hereby known as "Project 2019-02," and specified a county tax levy under Minn. Stat. § 103B.251 as the source of the Commission's share of funding; and

WHEREAS, the Commission has received a Feasibility Study on proposed CIP project "Project 2019-03 Crystal Lake Management Plan;" and

WHEREAS, on September 12, 2019, following published and mailed notice in accordance with the Commission's Joint Powers Agreement and Minn. Stat. § 103B.251, the Commission conducted a public hearing on the projects.

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of the Shingle Creek Watershed Management Commission as follows:

1. The 2019 Projects will be conducive to the public health and promote the general welfare and are in compliance with Minn. Stat. § 103B.205 to 103B.255 (the "Act") and with the Commission's surface water management plan as adopted and amended in accordance with the Act.

Project	Total Estimated	City/ Private	Grant	Commission Share
Cost share (city projects)	\$200,000	\$100,000	0	\$100,000
Crystal Lake Management Plan	\$370,506	\$0	\$216,066*	\$154,440
Partnership cost share (private projects)	\$100,000	\$50,000	0	\$50,000
Subtotal	\$670,506	\$150,000	\$216,066	\$304,440
5% additional for legal/admin costs				15,220
Subtotal				319,660
TOTAL LEVY (101% for uncollectable)				\$322,860

2. The cost of the projects is estimated to be:

Project	Total Levy
Cost share (city projects)	\$106,050
Crystal Lake Management Plan	\$163,785
Partnership cost share (private projects)	\$53,025
Total	\$322,860

- 3. The Commission receives, accepts and approves the feasibility report for Project 2019-03, Crystal Lake Management Plan prepared by Wenck, which project is hereby ordered. The Project is described generally as rough fish and aquatic vegetation management, alum treatments, and lake monitoring on Crystal Lake in Robbinsdale.
- 4. Up to \$163,785 of the cost of Project 2019-03 will be paid by the Commission from proceeds received from Hennepin County pursuant to Minn. Stat. § 103B.251. Additional costs will be paid by a grant from the Minnesota Pollution Control Agency, but no costs will be charged to members of the Commission.
- 5. The City of Robbinsdale is designated as the member responsible for contracting for the construction of Project 2019-03, and the engineer designated for preparation of plans and specifications is the Robbinsdale City Engineer, or other substitute engineers selected and retained by the City of Robbinsdale. Contracts for construction shall be let in accordance with the requirements of law applicable to the City of Robbinsdale. A Cooperative Agreement for Project 2019-03 between the Commission and the City of Crystal will be prepared when the MPCAS contract is presented for approval.
- 6. On July 11, 2014 the Commission adopted Guidelines and procedures governing the use of the Commission City Cost Share BMPs Program. The Shingle Creek Watershed Management Commission will complete Project 2019-01 in accordance with those Guidelines.
- 7. On December 10, 2015 the Commission adopted Guidelines and procedures governing the use of the Commission Partnership Cost Share BMPs Program. The Shingle Creek Watershed Management Commission will complete Project 2019-02 in accordance with those Guidelines.
- 8. The Commission's \$322,860 share of the cost of the 2019 Projects is hereby certified to Hennepin County in accordance with Minn. Stat. § 103B.251 for payment by the County in accordance with Minn. Stat. § 103B.251, Subd. 6 and the Commission's joint powers agreement. The Commission understands that the County may pay such costs with taxes levied in 2019 and paid in 2020. The Secretary is directed to transmit a certified copy of this resolution to Hennepin County prior to October 1, 2019.

Adopted by the Commissioners of the Shingle Creek Watershed Management Commission the 12th day of September, 2019.

ATTEST:

R.A. Polzin, Chair

Judie Anderson, Recording Secretary

State of Minnesota

Hennepin County

I, Judie Anderson, do hereby certify that I am the custodian of the minutes of all proceedings had and held by the Board of Commissioners of said Shingle Creek Watershed Management Commission, that I have compared the above resolution with the original passed and adopted by the Board of Commissioners at a meeting thereof held on the twelfth day of September, 2019, at 12:45 pm., that the above constitutes a true and correct copy thereof, that the same has not been amended or rescinded and is in full force and effect.

In witness whereof, I have hereunto placed my hand and signature this twelfth day of September, 2019.

Print				
name:	Judie Anderson	Title: _ Admir	nistrator	
Authorized signature:		Date:		
(NO SEAL)				

WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSION

RESOLUTION NO. 2019-03

ORDERING 2019 IMPROVEMENTS, MAKING FINDINGS, AND CERTIFYING COSTS TO HENNEPIN COUNTY PURSUANT TO MINNESOTA STATUTES, SECTION 103B.251

WHEREAS, on April 11, 2013, the West Mississippi Watershed Management Commission adopted its *Shingle Creek and West Mississippi Third Generation Watershed Management Plan*, which includes a Capital Improvement Program (CIP) that has subsequently been amended three times to modify the CIP; and

WHEREAS, the *Third Generation Watershed Management Plan* specified a county tax levy under Minn. Stat. § 103B.251 as the source of the Commission's share of funding for capital projects proposed in the Commission's CIP; and

WHEREAS, the CIP includes an annual allocation for West Mississippi Retrofit Projects, hereby known as "Project 2019-04," and specified a county tax levy under Minn. Stat. § 103B.251 as the source of the Commission's share of funding; and

WHEREAS, on September 12, 2019, following published and mailed notice in accordance with the Commission's Joint Powers Agreement and Minn. Stat. § 103B.251, the Commission conducted a public hearing on the projects.

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of the West Mississippi Watershed Management Commission as follows:

- 1. The 2019 Project will be conducive to the public health and promote the general welfare and is in compliance with Minn. Stat. § 103B.205 to 103B.255 (the "Act") and with the Commission's surface water management plan as adopted and amended in accordance with the Act.
- 2. The cost of the project is estimated to be \$100,000.
- 3. On July 11, 2014 the Commission adopted Guidelines and procedures governing the use of the Commission Fund for Retrofit Projects. The West Mississippi Watershed Management Commission will complete Project 2019-04 in accordance with those Guidelines.
- 4. The Commission's \$50,000 share of the cost of the 2019 Projects with an additional \$3,025 levied for legal and administrative costs and the cost of uncollectable levy is hereby certified to Hennepin County in accordance with Minn. Stat. § 103B.251 for payment by the County in accordance with Minn. Stat. § 103B.251, Subd. 6 and the Commission's joint powers agreement. The Commission understands that the County may pay such costs with taxes levied in 2019 and paid in 2020. The Secretary is directed to transmit a certified copy of this resolution to Hennepin County prior to October 1, 2019.

Adopted by the Commissioners of the West Mississippi Watershed Management Commission the 12th day of September, 2019.

ATTEST:

David Vlasin, Vice Chair

Judie Anderson, Recording Secretary

State of Minnesota

Hennepin County

I, Judie Anderson, do hereby certify that I am the custodian of the minutes of all proceedings had and held by the Board of Commissioners of said Shingle Creek Watershed Management Commission, that I have compared the above resolution with the original passed and adopted by the Board of Commissioners at a meeting thereof held on the twelfth day of September, 2019, at 12:45 pm., that the above constitutes a true and correct copy thereof, that the same has not been amended or rescinded and is in full force and effect.

In witness whereof, I have hereunto placed my hand and signature this twelfth day of September, 2019.

Print name:	Judie Anderson	Title:	Administrator
Authorized			
signature:		Date:	

(NO SEAL)

item 05a 9/6/19

WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSION

PROJECT REVIEW WM2019-007: Brooklyn Park-Champlin Interceptor Renewal Phase II

Owner:	Jeannine Clancy
<u>Company:</u>	Metropolitan Council Environmental Services
Address:	390 North Robert Street
	St. Paul, MN 55101

Engineer:	Alison Sumption
Company:	HR Green, Inc.
<u>Address:</u>	2550 University Ave W, STE 400N
	St. Paul, MN 55114
Phone:	651-659-7725
Fax:	651-644-9446
Email:	asumption@hrgreen.com

- **Purpose:** Rehabilitation of existing sanitary sewer interceptor. The improvements will include Cured in Place Pipe (CIPP) lining of 5,208 linear feet of existing 48"-66" diameter sewer pipe, construction of approximately 4,025 linear feet of 72" Reinforced Plastic Mortar Pipe (RPMP), construction of approximately 8,085 linear feet of 8" PVC city sanitary sewer, replacement of sewer and watermain in construction areas, temporary conveyance and pumps, and construction of a city submersible pump station. The project will disturb approximately 14.2 acres.
- **Location:** Linear project (approximately 17,318 ft.) at two sites. Site 2 along West River Road and Riverview Lane N between 83rd Avenue N and 89th Avenue N. Site 3 along Riverview Lane N, 81st Avenue N (Figures 1 and 2).
- **Exhibits:** 1. Project review application and project review fee of \$1,100, dated 7/26/19, received 8/1/19.
 - 2. Site plan, preliminary plat, grading, utility, erosion control, and landscaping plans dated 7/15/19, received 8/1/19 (Figure 3).
- **Findings:** 1. The proposed project is the rehabilitation of sanitary sewer through lining, replacement, and construction of sanitary sewer pipe, and the construction of a city submersible pump station. The site is 14.2 acres. Following development, there will be a negligible increase in impervious surface (i.e., 189 square feet of additional impervious surface). The site will have 7.0 acres of impervious surface and will therefore be 49.2 percent impervious.
 - 2. The complete project application was received on 8/1/19. To comply with the 60-day review requirement, the Commission must approve or deny this project no later than the 9/12/19 meeting. Sixty calendar-days expires on 9/30/19.
 - 3. Typically, 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. However, the increase of impervious surface at this site is negligible, so the applicant meets Commission water quality treatment requirements.

WM 2019-007: Brooklyn Park-Champlin Interceptor Renewal

- 4. Commission rules require that site runoff is limited to predevelopment rates for the 2-, 10-, and 100-year storm events. Because the increase in impervious surface at this site is negligible, the applicant meets Commission rate control requirements.
- 5. Commission rules require the site to infiltrate 1.0 inch of runoff from new impervious area within 48 hours, but because the increase in impervious area is negligible, the applicant meets Commission volume requirements.
- 6. The erosion control plan includes perimeter silt fence, double-row silt fence surrounding wetlands, inlet protection, and native seed specified on pond slopes. The erosion control plan meets Commission requirements.
- 7. Wetlands are absent from most of the study area. However, the National Wetlands Inventory identifies three potential and/or probable wetlands in the project area, all of which are in Brooklyn Park. The applicant has submitted a memo to the WCA LGU for Brooklyn Park (i.e., West Mississippi WMC). The applicant believes this information will lead to the conclusion that none of these sites are wetlands. This memo has not yet been reviewed, so it is not yet known if the applicant meets Commission wetland requirements.
- 8. There are no Public Waters on this site. The applicant meets Commission Public Waters requirements.
- 9. There is FEMA 100-year floodplain in two areas within the project boundaries. First, there is FEMA floodplain on the portion of the site adjacent to County Ditch No. 5 (Mattson Brook), but this floodplain will not be affected by the proposed work. The second site within the project area containing FEMA floodplain is the site of the proposed lift station, adjacent to 8030 Mississippi Lane N. Here, FEMA floodplain elevation (of the Mississippi River) is 822 ft., and grading associated with the lift station proposes to fill this floodplain with 734 cubic feet. Consequently, the applicant proposes to provide 766 cubic feet of compensatory storage adjacent to the lift station. The applicant meets Commission floodplain requirements.
- 10. There have been several public meetings about this project, including a presentation at National Night Out on 8/6/19. A neighborhood meeting will be held as construction gets closer. The applicant meets Commission public notice requirements.
- 11. A Project Review Fee of \$1,100 has been received.

Recommendation: Recommend approval with the following condition:

1. Resolve WCA issues at the three potential/probable wetland sites.

Wenck Associates, Inc. Engineers for the Commission

Ed Matthiesen, P.E.

Page 2 of 5

WM 2019-007: Brooklyn Park-Champlin Interceptor Renewal



Figure 1. Site location- aerial imagery.





Figure 3. Plan and profile drawing index.

WM 2019-007: Brooklyn Park-Champlin Interceptor Renewal







Responsiv	e partner.
Exceptiona	outcomes.

Т):	Shingle Creek/West Mississippi WMO Commissioners			
Fı	om:	Ed Matthiesen, P.E. Diane Spector			
D	ate:	September 12, 2019			
Subject: Initiate Minor Plan Amendment		Initiate Min	or Plan Amendment		
Recommended Commission Action		led Action	Staff recommends that each Commission authorize proceeding with the attached minor plan amendment and set the date for the public meeting as the October 10, 2019 regular meeting.		

Technical

Memo

The proposed Minor Plan Amendment would be to add two projects to the CIP. The first is Brooklyn Park's proposed River Park Stormwater Improvements project requested to be added to the West Mississippi CIP The TAC will be reviewing this project at the September 12 TAC meeting just prior to the Commission meeting and will have a recommendation at the meeting. The second is Plymouth's Enhanced Street Sweeper proposed to be added to the Shingle Creek CIP, in accordance with the newly revised and adopted Cost Share Policy. Attached are applications for each of these proposed CIP revisions.

CIP revisions may also be completed by Minor Plan Amendment. If the Commissions choose to go forward with the Minor Plan Amendment, we recommend setting October 10, 2019 as the public meeting at which it would be discussed. The Minor Plan amendment would then be forwarded to Hennepin County for consideration by the Hennepin County Board.

Attached is the proposed Notice of Minor Plan Amendment. Because you have a joint Plan both Commissions must authorize proceeding with the Minor Plan Amendment. The Commissions must send a copy of the proposed minor plan amendment to the member cities, Hennepin County, the Met Council, and the state review agencies for review and comment, and must hold a public meeting (not a hearing) to explain the amendment. This meeting must be public noticed twice, at least seven and 14 days prior to the meeting.

Staff recommends you proceed with the Minor Plan Amendment process to revise the Third Generation Management Plan and CIP as set forth on the attached Notice of Minor Plan Amendment, and set the date of the required public meeting as October 10, 2019, at your regular meeting.

Notice of Minor Plan Amendment Shingle Creek and West Mississippi Watershed Management Commissions

The Shingle Creek and West Mississippi Watershed Management Commissions propose to amend their joint *Third Generation Watershed Management Plan* to adopt a revision to the Plan and to the Capital Improvement Program (CIP). This revision revises capital project cost share policies and adds one project and specifies the location of one project on the Shingle Creek CIP.

The proposed minor plan revision is shown as additions (<u>underlined</u>) or deletions (strike outs).

Table 4.5. Shingle Creek WMC Third Generation Plan Implementation Plan is hereby revised to add as
follows:

Action	2018	2019	2020	2021	2022
Plymouth Enhanced Street Sweeper			<u>350,000</u>		
-Commission Contribution			75,000		
-Local Contribution			275,000		

Table 4.6. West Mississippi WMC Third Generation Plan Implementation Plan is hereby revised as follows:

Action	2018	2019	2020	2021	2022
River Park Stormwater Improvements			<u>485,000</u>		
-Commission Contribution			121,250		
-Local Contribution			363,750		

Appendix F, CIP Descriptions is hereby revised to add as follows:

Plymouth Enhanced Street Sweeper

<u>Plymouth will purchase and operate a regenerative air street sweeper to enhance its street</u> <u>sweeping program to four full city sweeps per year. Enhanced street sweeping was been identified in</u> <u>the Bass, Schmidt & Pomerleau TMDL, the Cedar Island, Pike and Eagle Lake TMDL and the Pike Lake</u> <u>Subwatershed Assessment as a cost effective BMP for nutrient reductions.</u>

River Park Stormwater Improvements

Brooklyn Park's River Park Master Plan includes stormwater improvements that will provide water guality treatment for 250 acres of mixed use lands that currently discharge into the Mississippi River with no treatment. The stormwater improvements are also intended to provide an improved habitat for animals and insects and an educational space for the residents of the community to learn about water guality.

Date:	August 26 2019
City:	Brooklyn Park
Contact Name:	Mitch Robinson
Telephone:	763-493-8291
Email:	Mitchell.robinson@brooklynpark.org
Project Name:	River Park
Proposed CIP Year:	2020
Total Estimated Cost:	\$ 485,000.00
Total Estimated Commission	\$121,250.00
Share: (Maximum smaller of 25%)	

Shingle Creek and West Mississippi Watershed Management Commissions Capital Improvement Program Proposal

In no more than two pages, please address the following questions. Attach a conceptual or preliminary site plan, and if available a drainage plan, and estimated benefiting area.

- 1. Please describe:
 - a. The proposed improvement and its estimated cost for construction, engineering, easement or land acquisition, and any other costs;
 - b. Its purpose;
 - c. The water resource(s) that would be affected by the project;
 - d. The anticipated improvement that would result from the proposed project, for example, estimated pounds of phosphorus removed annually; linear feet of streambank stabilized with native vegetation; square feet of vegetated buffer added; and
 - e. Data from by literature or academic/practitioner experience and documentation demonstrating the effectiveness of the proposed nonstructural practice.
- 2. Please describe how the proposed project addresses as many of the following as apply:
 - a. Improved water quality.
 - b. Prevention of flooding.
 - c. Prevention or correction of erosion.
 - d. Groundwater recharge.
 - e. Protection and/or enhancement of fish and wildlife habitat.
 - f. Improvement or creation of water recreation facilities.
- 3. Does the project address one or more TMDL requirements, and if so, which and by how much?
- 4. How does the proposed project implement a strategy identified in one or more TMDL Implementation Plans, Subwatershed Assessments, other special or feasibility study?
- 5. Do all the cities responsible for sharing the 75 percent balance of the cost of the project agree to go forward with the project? (It is not necessary to have a final agreement on the precise cost sharing yet.)
- 6. Is the project in your CIP and the CIP of other cost-sharing cities?
- 7. For nonstructural practices, how do you propose to monitor and demonstrate effectiveness?

Project Background

The River Park Master Plan establishes a vision for the park and provides guidelines for its further development to accommodate an increased natural experience while providing more opportunity to view and access the Mississippi River. Stormwater improvements are included in the proposed updates to River Park as part of the Master Plan. The proposed stormwater improvements are intended to provide an improved habitat for animals and insects and an educational space for the residents of the community to learn about water quality.

Stormwater Existing Conditions

Roughly 300 acres within the City of Brooklyn Park drains to the existing stormwater outlet to the Mississippi River at the southern end of the park. The current outlet is a 60" concrete pipe connected to a concrete spillway which slopes down to the river's edge. **Table 1** provides the existing hydrologic conditions at the discharge point into the river.

Storm Event	Discharge Rate	Discharge Volume	
	(cfs)	(ac-ft)	
1-inch	63.7	6.8	
2-year	220.9	26.7	
10-year	376.7	47.0	
100-year	619.5	101.8	

Table 1: Existing Hydrologic Conditions

There is currently no water quality treatment provided prior to the discharge into the Mississippi River for much of the 300 acres that drains through the park outlet. There are two stormwater ponds upstream which treat roadway drainage from Trunk Highway 252. However about 250 acres remain untreated prior to discharge. **Table 2** provides the existing annual total suspended solids (TSS) and total phosphorus (TP) loads discharging through River Park.

TSS	TP
(lbs/yr)	(lbs/yr)
65,494	222.9

Table 2: Existing Water Quality Conditions

Proposed Stormwater Improvement Options

The City wishes to incorporate water quality treatment into the design of River Park both to reduce the loads on the impaired Mississippi River and to provide an educational space for residents to learn about water quality treatment. The stormwater best management practice (BMP) will contribute to the overall natural feel of the park while adding additional benefit for the residents, animals and insects.

A stormwater pond is proposed near the exiting 60" piped outlet to the river. The pond would be designed to have a natural feel, with slight drops in elevation from one cell of the pond to the next and slowly sloping to the river. A diversion structure would be placed upstream of the ponds with the primary outlet routed to the pond and the secondary outlet routed directly to the river. During low flow storm events the majority of the water would be routed through the pond and would be treated prior to discharge into the river. During larger storm events, high flows would bypass the stormwater pond and discharge directly to the river similar to existing

conditions. This would provide water quality treatment during small events while reducing the risk of washing out of the stormwater pond during larger events. **Table 3** shows the proposed hydrologic conditions with the stormwater pond and diversion structure.

	0 /	0
Storm Event	Inflow Discharge Rate	Discharge Volume
	(cfs)	(ac-ft)
1-inch	24.8	5.8
2-year	37.5	16.6
10-year	46.6	24.9
100-year	50.4	40.1

Table 3: Flow Through Stormwater Pond Hydrologic Conditions

This section of the Mississippi River is listed as an impaired waterbody for nutrients, fecal coliform and PCB in fish by the Minnesota Pollution Control Agency (MPCA). The proposed stormwater pond would address the nutrient portion of the impairment by reducing phosphorous while also reducing the turbidity.

A pretreatment device consisting of a sump manhole with a SAFL baffle will be placed downstream of the diversion device and upstream of the pond to provide additional treatment and to reduce the maintenance requirements for the stormwater pond. **Table 4** shows the proposed water quality treatment provided by the pond.

Load to Miss	sissippi River	Removed by BMP		Removal	Efficiency
TSS	TP	TSS	TP	TSS	TP
(lbs/yr)	(lbs/yr)	(lbs/yr)	(lbs/yr)	(lbs/yr)	(lbs/yr)
32,008	169.4	31,260	50.1	60%	29%

Table 4: Stormwater Pond Water Quality Conditions

The existing 60" concrete pipe/spillway outlet would be relocated to accommodate the proposed stormwater pond. The pipe would be extended towards the river, under the proposed island feature in the park to conceal the outlet to visitors of the park and to enhance the natural feel of park.

Funding from this project will come from the City of Brooklyn Park storm sewer funds and is identified in the Capital Improvement Plan. **Table 5** includes cost estimates for the different portions of the proposed stormwater pond.

Table 5. Co	st estimate
Construction Costs	\$ 351,325.00
Contingencies	\$ 70,270.00
Indirect Costs	\$ 63,240.00
Total	\$ 484,835.00

For this project, the City of Brooklyn Park will be requesting a 25% cost share from the West Mississippi Watershed Management Commissions. The estimated cost share for this project is approximately \$121,250.00.



 Exhibit C: River Park Trunk Storm Sewer Drainage Areas

 Brooklyn Park
 City of Brooklyn Park

item 06b1)







wsb	Brooklyn Park 🔊	SCALE: AS SHOWN PLAN BY: CKJ	DESIGN BY: KF CHECK BY: BA	NO.	DATE	BY	СНК	REVISION	I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. BILL ALMS, PE
WSB PROJECT NO.: 013799-000									DATE: XX/XX/2019 LIC. NO: XXXXX

RIVER PARK STORMWATER PLAN

CITY OF BROOKLYN PARK



100 - YEAR FLOOD PLAIN = 821.4 FT ANNUAL RIVER FLUCTUATION AT RIVER PARK= 802.5 FT - 811.5 FT ORDINARY HIGH WATER LEVEL (OHWL) = 810.96 FT DATUM NAVD 88



EXHIBIT B - PROPOSED STORMWATER TREATMENT PONDS

SHEET 2 OF 2





Shingle Creek and West Mississippi Watershed Management Commissions Request to Add a Project to the Capital Improvement Program

The Shingle Creek and West Mississippi Watershed Management Commissions share the cost of high watershed-priority capital improvements and demonstration projects through the Commissions' Capital Improvements Program (CIP). High-priority watershed capital improvements are those activities that go above and beyond general city management activities to provide a significant improvement to the water resources in the watershed. Thus, a local street flooding issue is not of watershed priority, but a local flooding issue that creates significant erosion and sedimentation impacting a downstream resource may be a watershed priority.

The Commissions' Cost Sharing Policy provides for up to 25 percent of the cost of qualifying projects to be shared by all property in the watershed, with the balance of project cost funded by the local governments participating in or benefiting from the improvement. *The Commissions' maximum share is \$250,000.* The Commissions have developed a set of criteria by which proposed projects would be scored, with those projects scoring a minimum number of points on the proposal form screening questions advancing to a prioritization stage by the Technical Advisory Committee (TAC). Prioritization will be based on cost effectiveness, amount of improvement achieved, and regional significance.

Because the Commissions intend to utilize Hennepin County's ad valorem tax levy to finance the watershed share of most of these projects, preference will be given to "bricks and mortar" –type construction projects. However, some management-type projects such as rough fish control may be considered for cost sharing through the Commission budget.

Shingle Creek and West Mississippi Watershed Management Commissions Capital Improvement Program Proposal

Date:	3-8-2019
City:	Plymouth
Contact Name:	Ben Scharenbroich
Telephone:	763-509-5527
Email:	bscharenbroich@plymouthmn.gov
Project Name:	Enhanced Street Sweeper
Proposed CIP Year:	2020
Total Estimated Project Cost:	\$350,000
Total Estimated Commission	\$75,000
Share: (Maximum smaller of 25%	
or \$250,000)	

In no more than two pages, please address the following questions:

- 1. Please describe:
 - a. The proposed project and its estimated cost for construction, engineering, easement or land acquisition, and any other costs;
 - a. The City is looking to purchase a high-efficiency street sweeper to improve street sweeping efficiency and reduce pollutant loading to Elm Creek.
 - b. Its purpose;
 - a. Street sweeping is one of the most cost effective best management practices for improving water quality and reducing pollutant loading to impaired waters. Plymouth is bringing our street sweeping program in-house in 2019 and is committed to expanding our street sweeping program to address water quality concerns going forward.
 - c. The water resource(s) that would be affected by the project;
 - a. All water resources that are within and downstream of the City of Plymouth could be affected by the enhanced street sweeping effort.
 - d. The anticipated improvement that would result from the proposed project, for example, estimated pounds of phosphorus removed annually; linear feet of streambank stabilized with native vegetation; square feet of vegetated buffer added; and
 - a. There are 71 centerline (142 curb miles) in the City of Plymouth within the Shingle Creek Watershed. As such, the following are the estimated pollutant removals from this practice based on the Minnesota Stormwater Manual.

Pollutant Reduction Estimates for 4 full city sweeps per year: Phosphorus = 105 pounds per sweep or 420 pounds per year Nitrogen = 705 pounds per sweep or 2,820 pounds per year Chloride = 40 pounds per year or 160 pounds per year.

- e. The nature of the improvement.
 - a. Equipment purchase to further enhance street sweeping effectiveness.

Attach a conceptual or preliminary site plan, and if available a drainage plan, and estimated benefiting area.

All streets that are maintained by the City of Plymouth will be swept as recommend by the Minnesota Stormwater Manual

(https://stormwater.pca.state.mn.us/index.php?title=Street_sweeping_for_trees)

- 2. Please describe how the proposed project addresses as many of the following as apply:
 - a. Improved water quality.
 - a. Street sweeping is one of the most cost effective best management practices for improving water quality and reducing pollutant loading to impaired waters. Plymouth is bringing our street sweeping program in-house in 2019 and is committed to expanding our street sweeping program to address water quality concerns going forward.

b.

c. Prevention of flooding.

a. N/A

d. Prevention or correction of erosion.

a. N/A

e. Groundwater recharge.

a. N/A

f. Protection and/or enhancement of fish and wildlife habitat.

a. Will reduce nutrient and chloride loading to lakes and streams

- g. Improvement or creation of water recreation facilities.
 - a. N/A
- 3. Does the project address one or more TMDL requirements, and if so, which and by how much?
 - a. Yes, enhanced street sweeping is one of the most cost effective best management practices to help work towards meeting TMDL goals.

There are 71 centerline (142 curb miles) in the City of Plymouth within the Shingle Creek Watershed. As such, the following are the estimated pollutant removals from this practice based on the Minnesota Stormwater Manual.

Pollutant Reduction Estimates for 4 full city sweeps per year: Phosphorus = 105 pounds per sweep or 420 pounds per year Nitrogen = 705 pounds per sweep or 2,820 pounds per year Chloride = 40 pounds per year or 160 pounds per year.

- 4. How does the proposed project implement a strategy identified in one or more TMDL Implementation Plans, Subwatershed Assessments, other special or feasibility study?
 - a. Enhanced street sweeping was been identified in the Bass, Schmidt & Pomerleau TMDL, The Cedar Island, Pike and Eagle Lake TMDL and the Pike Lake Subwatershed Assessment (Wenck 2017) as a cost effective BMP for nutrient reductions.
- 5. Do all the cities responsible for sharing the 75 percent balance of the cost of the project agree to go forward with the project? (It is not necessary to have a final agreement on the precise cost sharing yet.)
 - a. N/A
- 6. Is the project in your CIP and the CIP of other cost-sharing cities?
 - a. Yes



WEST METRO WATER ALLIANCE 3235 FERNBROOK LANE | PLYMOUTH, MN 55447 763.553.1144 | judie@jass.biz westmetrowateralliance.org

To:		WMWA Pai	rtner WMOs
Fro	m:	WMWA Ste	ering Committee
Dat	e:	September	3, 2019
Sub	ject:	Proposed W	/MWA Contracted Coordinator
F	Recommend	ed	Approve the WMWA Project Coordinator position description, and authorize the Shingle Creek WMO, acting as fiscal agent, to contract with a

Projects 2019 and 2020 budgets.

At recent WMWA and Commission meetings we've discussed contracting for a part-time coordinator for WMWA. Given our limited staff and volunteer time availability, we have not been able to make meaningful progress towards achieving the goals of this consortium. A coordinator would be able to take on the routine tasks of implementation as well as special projects, allowing WMWA to serve primarily as an oversight and advisory group. We used this model for the highly successful Watershed PREP program, contracting with part-time educators for school lessons and community events.

part-time Project Coordinator to be funded from the WMWA Special

The Steering Committee drafted the attached Project Coordinator job description for consideration by the member commissions. We identified primary job duties to start with, and some priority tasks. We also identified some additional job duties that are now part of the administrative budget that could be considered for this position in the future.

We estimate that at the start, the contractor would work 8-10 hours per week or about 30 hours per month on average, at \$40/hour, similar to the educators. For the balance of 2019 we suggest that WMWA and the member Commissions fund this contract coordinator through the Special Projects budget (see Table 1). The four partners each budgeted \$2,000 for 2019 for Special Projects, but since there was carryover funding from 2018 sufficient to cover existing 2019 activities, that \$8,000 has not yet been invoiced and received. Billing that amount now and adding the \$8,000 budgeted in 2020 would cover most of the position for 2019 and 2020.

rable 1. Froposed Froject Coordinator running.	
2019 Special Projects unbilled balance	\$8,000
3 months * 30 hours * \$40	\$3,600
Expected special projects carryover to 2020 + 2020 budget	\$4,400 + \$8,000 = \$12,400
12 months * 30 hours * \$40 (360 hours)	\$14,400
Deficit	\$2,000

Table 1. Proposed Project Coordinator funding.

Commission Action

As part of the 2021 budget process next spring, WMWA and the Commissions can evaluate progress and consider modifying the WMWA budget to fully fund 2020 and beyond, as the existing annual Special Projects budget would be inadequate to fund this contract on an ongoing basis.

The WMWA partner agreement states that uses of the Special Projects funds are required to be reviewed and approved by the four Commissions. The WMWA Steering Committee recommends approval. There is an individual, Catherine Cesnik, who is interested in this position. She currently is the alternate Plymouth Commissioner to both Bassett Creek WMC and Elm Creek WMC and has been actively involved in the WMWA Steering Committee. If the Commissions are in agreement, the Steering Committee will work with the Shingle Creek attorney to draft a contract for services similar to the contract used with the WMWA Educators or WMWA Social Media/Outreach Consultant.

West Metro Water Alliance Project Coordinator

DRAFT Position Description August 2019

This position would serve at the discretion of the West Metro Water Alliance (WMWA) partners as a contractor (non-staff member) with an hourly rate and no benefits, under a contract with a defined duration.

Average hours per week: 8-10

Primary Job Duties:

- 1. Attend monthly WMWA partner meetings
- 2. Maintain the WMWA Education and Outreach Plan (amended 2015)
 - a. Consider and suggest updates and revisions to the plan in order to refine and focus on the WMWA mission
 - b. Periodically contact staff with member cities to determine existing or future educational gaps where WMWA work would be valued
- 3. Develop recommendations on core audiences, messages, and desired outcomes where WMWA should focus its work and budget
- 4. Develop potential projects and programs to advance the mission of WMWA
- 5. Carry out WMWA projects and programs as directed by the WMWA partners
- 6. Update and maintain WMWA website
- 7. Coordinate Metro Blooms workshops

Additional Job Duties to Consider in the future:

- 1. Coordinate monthly WMWA meetings secure location, develop agenda, send meeting notices, draft minutes
- 2. Develop proposed annual WMWA budget and workplan for consideration by WMWA partners
- 3. Receive and review reports from WMWA Educators and Outreach Consultant; summarize and present to WMWA partners
- 4. Receive and review reports from social media/outreach consultant; summarize and present to WMWA partners

Priority Tasks:

- 1. Review and update the 2015 WMWA Education and Outreach Plan
 - a. Contact staff with member cities to determine existing or future educational gaps where WMWA work would be valued
 - b. Determine how/if a survey of residents is needed to help focus WMWA and its work
- 2. Coordinate the fabrication of a "roots display" for use at future watershed/city/WMWA events





Responsive partner. Exceptional outcomes.

To: Shingle Creek WMC

From:	Ed Matthiesen, P.E.	Joe Bischoff
	Jeff Strom	Diane Spector

Date: August xx, 2019

Subject: Meadow Lake Management Plan Feasibility and Cost Estimate

INTRODUCTION AND BACKGROUND

Meadow Lake is a shallow eutrophic lake located in New Hope, MN. Meadow Lake discharges through storm sewer to Bass Creek, a tributary of Shingle Creek. In 2002 the Minnesota Pollution Control Agency (MPCA) listed the lake as impaired for excess nutrients. In 2010, Wenck completed a TMDL and Implementation Plan to assess nutrient loading concerns and provide strategies to reduce excess nutrient loading (<u>Wenck 2010a, 2010b</u>). Table 1 below shows the physical characteristics of the lake and its lakesheds. Information about water quality, fish, and aquatic vegetation may be found in Appendix A.

Parameter	Meadow Lake
Surface Area (ac)	12
Average (Maximum) Depth (ft)	1.9 (4)
Volume (ac-ft)	23
Residence Time (years)	0.1
Littoral Area (ac)	11 (100%)
Watershed Size (ac)	88

Table 1. Physical characteristics of Meadow Lake.

In 2019 the Commission completed a TMDL Five Year Review, summarizing progress to date and updating the nutrient budgets and targets using more recent and complete monitoring data (<u>Wenck 2019</u>). Figure 1 depicts the lakeshed, subwatersheds, and BMPs used for hydrologic and hydraulic, water quality, and lake response modeling.

The updated modeling shows Meadow Lake requires an 82% reduction in TP, both from the watershed and from internal load (Table 2). An estimated 42 of the of the required 62 pound watershed load reduction per year has been achieved through an enhanced street sweeping program and various other BMPs implemented by the City of New Hope (Table 3).

Analysis of sediment cores suggests internal loading from sediment is on the high end, exceeding 75 percent of all lakes in our database. The 2016 vegetation surveys for Meadow Lake showed low species diversity (four species observed) and a high abundance of curly-leaf pondweed (CLP).

Only two fish species were observed during a 2017 assessment and the population was dominated by fathead minnow. In high densities, fathead minnow can have significant water quality impacts by feeding on zooplankton, through secretion, and sediment resuspension.

It is highly likely that efforts to eradicate the fish would have positive impacts on water quality, particularly water clarity, as well as the vegetation community. Water quality is variable but typically exceeds State water quality standards for most of the growing season.

	Judicu chisting				
Source		Existing TP Load	Allowable TP Load	Estimated Load Reduction	
		[lbs/yr]	[lbs/yr]	lbs/yr	Percent
Wasteload	Watershed	87.2	25.7	61.5	71%
Lood	Atmospheric	2.8	2.8	0.0	0%
Load	Internal	117.7	7.7	110.0	93%
	TOTAL LOAD	207.7	36.2	171.5	83%

Table 2. Updated exis	ting and allowable TP	loads for Meadow Lake.
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Table 3. Estimated watershed load reductions achieved to date

Type of BMP	Annual TP Load Reduction (lbs/yr)
Structural BMPs	24
Street Sweeping	18
Other	-
TOTAL	42

The TMDL 5 Year Review concluded with updated Implementation Plan activities for the coming 5-10 years:

- Reduce watershed loading to Meadow Lake
 - Continue promoting and working with property owners throughout watershed to identify and implement curb-cut raingardens near/above existing catch basins
 - Continue promoting Adopt-a-Drain program
 - Continue working with lakeshore owners on lakeshore restorations and native plantings
 - Continue enhanced street sweeping program throughout Meadow Lake subwatershed and document effectiveness (e.g. number of sweepings, amount of sediment removed)
 - Collect water quality samples, bathymetric surveys, and sediment cores, and assess fish populations on New Hope Golf Course Ponds that are connected to the lake to determine if these ponds are a potential source of TP and fish to Meadow Lake
- Reduce internal loading to Meadow Lake
 - Conduct water level drawdown(s) during late fall/winter to expose and consolidate sediment, promote winterkill of existing fish population, reduce CLP seedbank, and promote native vegetation growth
 - Conduct sediment treatment (e.g. aluminum sulfate (alum), Phoslock ®, iron filings) to reduce phosphorus release from the sediment
 - Develop long-term plan to treat, manage, and monitor CLP and fish populations following water level drawdown(s) and sediment treatment

Efforts should continue to identify and implement additional watershed load reductions, and to assure that those achieved to date maintain effectiveness. However, since significant progress has been made in reducing watershed load, it is appropriate at this time to start to manage the internal load. This technical memorandum assesses the feasibility of one or more temporary drawdowns to reduce CLP and fathead minnows and restore the biotic integrity of the lake, followed by an aluminum sulfate (alum) treatment to reduce internal phosphorus loading, and the estimated project costs and longevity of these actions.



Figure 1. Subwatersheds and BMPs in the Meadow Lake lakeshed.

DATA COLLECTION

Water Quality. Periodic water quality monitoring has been conducted on Meadow Lake since the original TMDL study. Much of the data was collected through the Metropolitan Council Environmental Services' Citizen Assisted Monitoring Program (CAMP) and the Minnesota Pollution Control Agency's Citizen Lake Monitoring Program. The Commission monitored water quality on Meadow Lake in 2016 through its Intensive Lake Monitoring Program. Results of these monitoring efforts are presented in the Commission's Annual Water Quality Reports (<u>link to reports</u>). Average annual total phosphorus (TP), chlorophyll-a (chl-a), and Secchi depth over the past 20 years is also summarized in Appendix A of this report.

Aquatic Vegetation Surveys. Spring and summer vegetation surveys were performed by the Commission on Meadow Lake in 2016 (Wenck 2017) as part of the routine Intensive Lake Monitoring Program. To the Commission's knowledge, no other systematic vegetation surveys have been performed on Meadow Lake to date. The surveys showed low species diversity (four species observed) and an FQI score of 5.5 (well below the 17.8 shallow lake threshold). Plant abundance was high (100% coverage) during the June 2016 survey and low (19% coverage) during the August 2016 survey. The most common species observed during the June and August surveys were CLP (57%) and Elodea (19%), respectively. Eurasian water milfoil was not observed during either survey. Copper sulfate was applied to the lake in the 1990s to suppress algae and vegetation growth with limited success. There was some native vegetation response to a partial drawdown in 2006, which was undertaken to facilitate dredging sediment deltas at the storm sewer outfalls, but the effect was temporary.

Fish Surveys. A fisheries assessment was completed on Meadow Lake in early August 2017. Only two species were observed during the 2017 assessment and the population was dominated by fathead minnow. Previous surveys conducted on Meadow Lake by others for academic research showed that the minnow population varies significantly annually, with sampling some years finding no minnows and others thousands of individuals. Fathead minnow are very tolerant of winter-kill conditions, however, Meadow Lake is likely not deep enough to support the species year-round. It is likely that fish over winter in the adjacent golf course ponds and/or recolonize the lake from Bass Creek during high water levels. Minnows could also be introduced by human sources, such as dumping a bait bucket into the lake. In high densities, fathead minnow can have significant water quality impacts through feeding on zooplankton, secretion, and sediment resuspension. Thus, it is highly likely that fathead minnows contribute to poor water quality conditions in Meadow Lake.

Sediment Chemistry. Sediment data collected in 2009 were used to characterize potential for sediment phosphorus release. Four sediment cores were collected from a single location using a gravity sediment coring device equipped with an acrylic core liner. The sediment cores were transported to the University of Wisconsin-Stout laboratory where they were analyzed for sediment release rate under anoxic conditions. Additionally, the uppermost 10 cm of one of the sediment cores was homogenized for assessment to provide sediment chemistry data.

Meadow Lake profundal sediment exhibited an anoxic rate of P release of 12.4 mg·m⁻²·d⁻¹. This rate is high and exceeds the 75th percentile of lakes in Wenck's database of over 100 lakes throughout Minnesota. Iron-bound and loosely-bound phosphorus (redox-P) are the fractions of phosphorus associated with sediment P release during periods of low dissolved oxygen (<2 mg/L). Sediments with more iron-bound or redox-P typically have higher phosphorus release rates. Sediments that do have high internal release rates have a large peak of iron-bound P near the sediment-water interface. We find that redox-P

concentrations greater than 0.1 mg/g are associated with lake sediments that have high phosphorus release rates. Sediments collected from Meadow Lake had redox-P concentrations of 0.190 mg/g in the uppermost 10 cm. These are moderately high and are consistent with the high release rates observed in Meadow Lake sediments.

MANAGEMENT OPTIONS

Fish and Aquatic Vegetation. There are a number of methods for controlling nuisance or invasive fish populations and invasive submersed aquatic vegetation (SAV) such as CLP. The chemical rotenone is often used to kill undesirable fish. It is non-selective, meaning it will kill all fish, and is often used to "reset" a waterbody prior to fish restocking. Several herbicides are effective at reducing CLP, although since the reproductive turions can remain dormant on the lake bed for years it typically takes several years of repeated treatment to bring the plant coverage down to non-nuisance levels.

As an alternative to ongoing chemical treatment with pesticides and herbicides, temporary winter lake drawdowns can be effective at achieving multiple objectives. Pumping as much water out of the lake as possible allows the sediment to freeze and consolidate. The CLP turions in the sediment are also killed by the freeze. Sediment consolidation encourages native plant seed germination, reduces muck, and reduces sediment resuspension. Temporary drawdowns in summer months can also stimulate germination of the native seedbank. Drawdowns mimic the natural hydrology of undisturbed wetlands and shallow lakes, where lake levels are dependent on the amount of precipitation received that year rather than by an outlet structure. As noted above, a partial drawdown was completed on Meadow Lake to facilitate dredging at storm sewer outfalls, and an immediate response was observed, although short-lived. This suggests that there is a high likelihood of success, especially if the four-foot deep lake can be pumped completely dry.

Sediment Phosphorus Release. The Meadow Lake sediment core anoxic rate of P release of 12.4 mg·m⁻²·d⁻¹ is high, although the extent and duration of anoxia in the lake, like most shallow, polymictic lakes, is difficult to predict. Nurnberg (2004) developed a method of estimating a Shallow Lake Anoxic Factor using lake morphometry, and application of that formula to Meadow Lake suggests that on average the sediments may be releasing about 96 pounds of phosphorus annually into the water column. However, this does not adequately account for the entirety of lake internal loading. Updated lake response modeling estimates a 20-25 pound annual "residual load" that is not accounted for by hydrologic and hydraulic (H & H) modeling or sediment load estimation. The source of this "residual load" could be release from aquatic vegetation as it senesces and is broken down, excretions from fish and other wildlife, excessive resuspension of sediments, or model underestimation.

Properly dosed chemical treatments such as alum routinely achieve 90-95% reduction of release. Assuming a conservative 90% reduction, a chemical treatment has the potential to reduce annual internal loading by an estimated 86 pounds per year. While the TMDL requires a 62 pound reduction, updated H & H and lake response modeling using the sediment core data estimates the required reduction to be closer to 110 pounds per year from sediment and residual sources.

Chemical treatments such as alum have progressed significantly in the last decade. Scientists and practitioners have found that alum treatments are more effective and successful if they are completed in multiple doses over two or more years. Initial, interim, and final sediment cores are taken and release rates measured to confirm and adjust dosing if necessary and to determine when the desired release rate and redox-P concentrations have been achieved.

MEADOW LAKE MANAGEMENT PLAN

The Meadow Lake Management Plan would be completed in two phases: Phase 1 would be focused on reestablishing a balanced biology by removing the fathead minnow population and limiting recolonization, reducing curly-leaf pondweed to non-nuisance levels, and restoring a healthy native aquatic vegetation community through a series of temporary drawdowns and supplemental SAV chemical treatments if needed. Phase 2 is focused on reducing phosphorus loading from the sediments. Annual monitoring would be conducted throughout both phases of the plan and would guide adaptive management until the desired outcome – a clear water lake with a healthy biologic community – is achieved.

<u>PHASE 1.</u> This phase would be completed over 3-5 years, depending on the lake's response to the proposed actions. Adaptive management would use a decision-tree approach to determine the most appropriate actions to take based on monitoring results (Figure 2).

Year 1: Conduct a fall-winter drawdown to consolidate sediments, eliminate fathead minnows and prevent recolonization, and reduce curly-leaf pondweed growth

This phase would span spring 2020 to spring 2021 and has two primary activities: engineering and water quality and biological monitoring. Engineering would focus on 1) designing, permitting, and implementing the fall drawdown, which would be expected to occur in late August to early-September to accommodate migration of wildlife such as turtles and amphibians to designated refuge location(s) such as the adjacent golf course ponds, with pumps estimated to be in place 2-3 months until freezeover; 2) determining whether it is hydraulically necessary to connect the lake and golf course ponds; 3) if the connection is to remain, undertaking any desired pipe and outfall improvements; and 4) designing and installing fish barriers on the lake outlet structure and if necessary the outfall from the golf course ponds.

When conducting the drawdown, the pump must be appropriately sized so that it can remove the runoff from a storm within 24 hours of its occurrence. Meadow Lake is an 11.8 acre lake in a 96.6 acre drainage area. According to the New Hope climate station, 2016 had the most precipitation in the August-October period of any year since 1990. The greatest amount of precipitation of any of the storms occurring in this period of 2016 was 2.70 inches. A precipitation event of this size would result in 6.2 acre-feet of runoff to Meadow Lake, which, in order to be drained within 24 hours, requires a pump rate of 1,400 GPM. This rate would also allow the full lake volume to be drained in 155 hours. Once the water has been removed from the lake, it would be transported to a storm sewer catch basin downstream of the lake. The water surface elevation of the lake is 893.5' and the elevation of the street where the basin is located is 912'. The lake also reaches a maximum depth of roughly 4 ft. This will require less than 500 ft of horizontal displacement and 20 ft of static discharge head. The pump will likely be gas-powered, and because the site is located in a residential area, noise-control measures would be required.

Year one monitoring would include monthly water quality sampling (TSS, chl-a, SD, and surface and bottom TP and OP) and DO/ temperature profiles, a fish survey, spring and summer aquatic vegetation surveys, and monthly phyto- and zooplankton surveys. Four pre-drawdown sediment cores would be taken and tested for bulk density and loss-on-ignition (a test for organic content) while an additional core would also be tested for phosphorus fractionation.

Years 2-3-4: Evaluate impact of fall drawdown on fish and aquatic vegetation. Chemical treatment of curly-leaf pondweed and/or fish if necessary.

This phase would begin in spring 2021 and includes water quality and biologic monitoring as in year one and fish and aquatic vegetation management as necessary if the drawdown has not reduced curly-leaf pondweed or eradicated the fathead minnow population. In year three (spring 2022), if native vegetation response is not satisfactory, a summer drawdown may be completed to encourage additional native plant growth.

Four pre-drawdown sediment cores would be taken and tested for bulk density and loss-onignition (a test for organic content) while an additional core would also be tested for phosphorus fractionation. When the desired fish and vegetation response has been achieved (in year 3 or 4), then the Plan will turn to Phase 2.

<u>PHASE 2.</u> This phase would be completed over 2-3 years. Treat the lake sediments with alum or other chemical treatment to bind phosphorus in the water column and limit release from the sediments.

Years 4-5-6: Apply alum in two doses one or two years apart.

Two factors are considered when calculating an alum dose: redox-P concentration and the depth of anoxia. Anoxic depth is defined as the sediment area that is exposed to dissolved oxygen lower than 2 mg/L, which is represents the area that will be treated with alum. The second factor is the depth of sediment that will be treated with alum. DO data indicates that the average anoxic depth in Meadow Lake is approximately 3.4 feet. Since the maximum depth of Meadow Lake is about four feet, as a conservative estimate the one foot contour was selected as the alum treatment area, or about 9 acres of the lake's 11 acres. Lab results determined that the 0-10 cm sediment sample contained 0.140 mg/g redox P, which provides us the total amount of redox-P in the uppermost 5 cm of sediment, which is typically the sediment depth used to determine alum dosing rates. Using these results, it is estimated that Meadow Lake will require an alum application of approximately 11,180 gallons to convert redox-P in the uppermost 5 cm to aluminum bound P.

Alum should be applied in two doses. Between the doses, sediment cores will be taken to verify second dose application rates. Monitoring will include water quality sampling as in year one. Monitoring may also include aquatic vegetation and fish and zoo- and phytoplankton surveys as warranted.



Figure 2. Meadow Lake decision tree.

ESTIMATED LOAD REDUCTION AND LONGEVITY

Phase 1 drawdown. The first phase of the proposed project is focused on restoring the biology of the lake to improve water clarity and chlorophyll-a concentrations. Based on experience gained from other shallow lake drawdowns (see for example Cleary Lake in Carver County, Vlach and Barten 2008), the initial lake response is likely a dramatic decrease in chl-a concentration and improvement in transparency. While it is difficult to say with certainty what the numeric TP benefit would be, lake response modeling using Walker's BATHTUB estimates a residual annual load of 20-25 pounds TP that cannot be accounted for from the watershed or from sediment release based on the measured release rate. This may be the load attributable to resuspension from minnows foraging in the sediments, and from wind resuspension of the unconsolidated sediments. That residual is based on use of Nurnberg's shallow lakes equation for the anoxic factor, which may be conservative and attribute too much load to sediment release and not to residual.

Phase 2 alum treatment. Wenck's experience with internal load reduction using alum suggests that P release rates will decrease by more than 90%. In many cases P release rates will decrease by 95-99%. Sediment core release rates suggest the current internal load from sediments in Meadow Lake is about 96 pounds per year. A 90% reduction is 86 pounds. With the targeted residual reduction of 20-25 pounds, achieving a total internal load reduction of 110 pounds P/year (Phase 1 and Phase 2 combined) is feasible.

Longevity. To estimate the effectiveness of the alum, we consider the questions, "What is the potential longevity of an alum treatment and what factors will impact longevity of alum treatments?" Our goal is to be able to assess how long it will take to bury the alum layer after the alum application. The important factor is how much P sedimentation is occurring and not just overall sediment. We focused on the P sedimentation from the lake response models. We used the Canfield-Bachmann sedimentation term (Equation 1) to estimate how long it would take to replace inactivated phosphorus in the top 5 cm of sediment. It is important to note that this analysis should not be interpreted as the exact life of an alum treatment. The goal of this analysis is to assess whether a treatment will be quickly buried based on phosphorus settling and if additional watershed load should be reduced prior to an alum treatment.

Equation 1.

 $P_{sed} = C_P \times C_{CB} \times \left(\frac{W_P}{V}\right)^b \times [TP] \times V$

We ran two scenarios to assess potential longevity of an alum treatment. The first scenario was to assess the longevity based on current watershed loading conditions. The second scenario assessed the potential longevity assuming TMDL watershed load reductions have been met (Table 4). This data suggests that additional watershed reductions would increase the longevity of the alum treatment for both lakes.

Table 4. Expected longevity of alum treatment effectiveness.

Longevity (years)					
Current	TMDL				
Watershed Load Rate	Watershed Load Rate				
17	50				

COST AND FEASIBILITY

The estimated costs of the two phases of the Meadow Lake Management Plan are set forth in Tables 5 and 6 and totaled in Table 7.

				Const.				
Task #	Task	Tot Hrs	Staff Costs	Costs		Lab Costs	Expense	TOTAL Cost
1	Project Coordination	32	\$6,088					\$6,088
2	Construction							
	Drawdown	40	\$8,160	\$	50,000			\$58,160
	SAV Treatment	24	\$4,896	\$	6,000		\$500	\$11,396
	Fish Barriers	12	\$2,448	\$	15,000			\$17,448
	Fish Treatment	24	\$3,076	\$	5,000		\$500	\$8,576
3	Monitoring							
	Water Quality	129	\$15,252			\$8,370	\$3,150	\$26,772
	Fish Surveys and Permits	86	\$10,274				\$750	\$11,024
	SAV Surveys and Permits	108	\$6,660				\$2,850	\$9,510
	Sediment Coring	31	\$3,555			\$4,000	\$600	\$8,155
4	Report	36	\$4,004					\$4,004
5	Meetings	48	\$8,220					\$8,220
6	Grant Reporting	6	\$852					\$852
							Subtotal	\$170,205
						Contingency 10%		\$17,020
						TOTAL		\$187,225
						SAY		\$190,000

Table 5. Phase 1 estimated costs.

Table 5. Phase 2 estimated costs.

Task #	Task	Tot Hrs	Staff Costs	Const. Costs	Lab Costs	Expense	TOTAL Cost
1	Project Coordination	32	\$6,272				\$6,272
2	Construction						
	Alum Treatment	36	\$7,560	\$ 70,000		\$500	\$78,060
3	Monitoring						
	Water Quality	129	\$15,645		\$8,370	\$3,150	\$27,165
	Fish Surveys and Permits	86	\$10,532			\$750	\$11,282
	SAV Surveys and Permits	108	\$6,840			\$2,850	\$9,690
	Sediment Coring	45	\$5,250		\$6,000	\$900	\$12,150
4	Report	30	\$4,120				\$4,120
5	Meetings	48	\$8 <i>,</i> 468				\$8,468
6	Grant Reporting	6	\$876				\$876
						Subtotal	\$158,083
					Con	tingency 10%	\$15,810
					TOTAL		\$173,893
						SAY	\$175,000

Task #	Task	Tot Hrs	Staff Costs	Const. Costs	Lab Costs	Expense	TOTAL Cost
1	Project Coordination	64	\$12,360	\$0	\$0	\$0	\$12,360
2	Construction						
	Drawdown	40	\$8,160	\$50,000	\$0	\$0	\$58,160
	SAV Treatment	24	\$4,896	\$6,000	\$0	\$500	\$11,396
	Alum Treatment	36	\$7,560	\$70,000	\$0	\$500	\$78,060
	Fish Barriers	12	\$2,448	\$15,000	\$0	\$0	\$17,448
	Fish Treatment	24	\$3,076	\$5,000	\$0	\$500	\$8,576
3	Monitoring						
	Water Quality	258	\$30,897	\$0	\$16,740	\$6,300	\$53,937
	Fish Surveys and Permits	172	\$20,806	\$0	\$0	\$1,500	\$22,306
	SAV Surveys and Permits	216	\$13,500	\$0	\$0	\$5,700	\$19,200
	Sediment Coring	76	\$8,805	\$0	\$10,000	\$1,500	\$20,305
4	Report	66	\$8,124	\$0	\$0	\$0	\$8,124
5	Meetings	96	\$16,688	\$0	\$0	\$0	\$16,688
6	Grant Reporting	12	\$1,728	\$0	\$0	\$0	\$1,728
					Subtotal		\$328,288
					Contingency	10%	\$32,830
					TOTAL		\$361,118
					SAY		\$365,000

Table 7. Total estimated cost, Meadow Lake Management Plan.

The City of New Hope has reduced watershed load to Meadow Lake through BMPs and by enhanced street sweeping. Updated nutrient budgets and TMDL calculations suggest that Meadow Lake requires an estimated 93% internal load reduction.

Phase 1 is estimated to reduce TP loading by 20-25 pounds per year, which is the modeled residual load and is approximately one-third the reduction required by the TMDL. More importantly, it is expected that the outcome of Phase 1 will be dramatically reduced chl-a concentrations and improved water clarity.

In Phase 2, alum treatments have been shown to reduce internal load by 90-99% in other Minnesota lakes. Sedimentation scenarios estimate a useful life of approximately 17 years if no additional watershed load reductions are completed, and 59 years if the watershed load reduction targets are met. A 90% reduction in sediment load is 86 pounds.

Assuming the model residual load is reduced 20-25 pounds by the drawdown and fish and CLP control, and the alum treatment successfully reduces sediment loading by the estimated 86 pounds, achieving the updated internal load reduction of 110 pounds P/year is feasible.

The cost of undertaking the proposed actions, excluding monitoring and administration is approximately \$125,000 for Phase 1 and \$120,000 for Phase 2, or about **\$1,318 per pound TP**.

References

Nürnberg, G. K. 2004. Quantified Hypoxia and Anoxia in Lakes and Reservoirs. The Scientific World Journal, 4: 42-54. <u>downloads.hindawi.com/journals/tswj/2004/276509.pdf</u>

Vlach, B. and J. Barten. 2008. Cleary Lake Drawdown to Improve Water Quality by Controlling Curlyleaf Pondweed.

Wenck Associates Inc. 2010a. Meadow Lake Nutrient TMDL. https://www.pca.state.mn.us/sites/default/files/wg-iw8-18e.pdf

Wenck Associates Inc. 2010b. Meadow Lake Nutrient TMDL Implementation Plan. https://www.pca.state.mn.us/sites/default/files/wq-iw8-18c.pdf



Figure A.1. Historic water quality data for Meadow Lake.



Figure A.2. 2016 curly-leaf pondweed surveys.

Sample Year	TP (ug/L)	Chl-a (ug/L)	SD (m)	Fathead Minnow (g)	Black Bullhead (g)	Creek Chub (g)
2009		10		2,400	0	0
2010		23		350	0	0
2011	251	212	0.42	0	11,900	0
2017		131		8,782	0	10

Table A.1. Meadow Lake fish survey data.



Figure A.3. The 2017 fish survey netted almost 4,100 fathead minnows, 104 painted turtles and 6 snapping turtles. Note: 2009-2011 fish and chl-a data collected by Dr. Kyle Zimmer, University of St. Thomas.

Project Summary

Project Abstract (5 points): Succinctly describe what you are trying to achieve and how you intend to achieve those results, including the type and quantity of projects and/or practices included in the application budget and anticipated outcomes.

The purpose of the Meadow Lake Management Plan is to improve water quality and biotic integrity in Meadow Lake in the City of New Hope, an Impaired Water for excess nutrients that also suffers from nuisance curly-leaf pondweed and fathead minnow infestations. This application is for phase one of this project, which includes one or more whole-lake drawdowns to control the invasive fish and vegetation, consolidate sediments, and regenerate the native seed bank; installation of fish barriers; and development and implementation of education and outreach and maintenance practices to help protect future water quality. Phase two, not included in this application, is an alum application to seal the lake sediments.

Does your organization have any active CWF competitive grants? If so, specify FY and percentage spent. Also, explain your organization's capacity (including available FTEs or contracted resources) to effectively implement additional Clean Water Fund grant dollars.

Yes, the Crystal Becker Park Infiltration Project. Commission as grantee has expended 52%, but the City of Crystal as project lead has expended 100% and is awaiting reimbursement from the Commission. The funds will be fully expended by 12/31/19.

Water Resource: Identify the water resource the application is targeting for water quality protection or restoration.

Meadow Lake, 27-0057-00, in the City of New Hope in Hennepin County.

Proposed Measurable Outcomes: Succinctly describe the proposed measurable outcomes of this grant application.

- Eliminate as much of the fathead minnow population as possible and prevent recolonization by adding fish barriers to the outlet and the outfall from an upstream pond system and educating lake users not to dispose of their unused bait in the lake.
- 2) Reduce curly-leaf pondweed to non-nuisance levels and restore the native vegetation community.
- 3) Consolidate sediments to limit wind-driven resuspension.
- Collect additional sediment cores to prepare for potential alum application in Phase 2 of this project.

Prioritization (Relationship to Plan) Question 1. (17 points):

(A) Describe why the water resource was identified in the plan as a priority resource. For the proposed project, identify the specific water management plan reference by plan organization (if different from the applicant), plan title, section, and page number.

Thirteen of the 16 lakes in the Shingle Creek watershed were designated Impaired Waters by the MPCA for excess nutrient concentrations, and TMDLs were completed during 2007-2010. The

Commission and the cities have been focused on reducing TP loading from the watershed to the lakes, and since that time three lakes have been delisted due to improved water quality. Internal load management activities have been completed or are in progress on five of the remaining ten lakes. The City of New Hope and the Meadow Lake Watershed Association (MLWA) have been active in reducing watershed load and are ready to start addressing internal load.

The Commission's Third Generation Watershed Management Plan in its Executive Summary and Implementation Plan established as its number one priority for the period 2013-2022: "Work aggressively toward achieving TMDL lake and stream goals (p. 4-4)." Furthermore, in addition to establishing a stretch goal to achieve delisting of four additional lakes (Goal B.2.), Goal B.3. of the Plan is to "Improve water clarity in the balance of the lakes by 10% over the average of the previous ten years (p. 4-6)." As a shallow lake currently in a turbid state, significant internal load control is necessary to flip Meadow Lake to a clear water state to achieve the clarity goal. The Meadow Lake Drawdown Project was identified as a potential project in the Implementation Plan (p. 4-21) but was not specifically programmed at that time pending additional study, monitoring, and stakeholder work. That work has now been completed and the project has been added to the current CIP via a 2019 minor plan amendment.

(B) In addition to the plan citation, provide a brief narrative description that explains whether this application fully or partially accomplishes the referenced activity.

This is the first phase of what will likely be a series of actions over six or more years. This phase will focus on improving the biology of this very shallow lake by significantly reducing aquatic invasive fish and vegetative species, preparing the lake to flip to a clear-water state. This will take three to four years. The second phase will address internal phosphorus load through a chemical treatment of the high-release-rate sediments. That phase will take an additional three or more years. Future maintenance actions may be necessary to keep invasive vegetation and fish in check.

(C) Provide weblinks to all referenced plans.

Shingle Creek Watershed Management Plan: <u>http://www.shinglecreek.org/management-plan.html</u> Meadow Lake TMDL and Implementation Plan: <u>https://www.pca.state.mn.us/water/tmdl/meadow-lake-excess-nutrients-tmdl-project</u>

Meadow Lake TMDL 5 Year Review: <u>http://www.shinglecreek.org/tmdls.html</u>

Question 2. (3 points):

(A) Describe how the resource of concern aligns with at least one of the statewide priorities referenced in the Nonpoint Priority Funding Plan (also referenced in the "Projects and Practices" section of the RFP).

The project aligns with the statewide priority "Restore and protect water resources for public use and public health, including drinking water." Phase one of the Meadow Lake Management Plan is the restoration of a balanced lake ecology. Water quality in shallow lakes is as dependent on a balanced fish/invertebrate/vegetation community as on the phosphorus load to the lake. Reducing the watershed load to zero would still result in a hypereutrophic lake with excessive algae blooms simply due to the presence of an unchecked minnow population and excessive curly-leaf pondweed infestation.

(B) Describe the public benefits resulting from this proposal from both a local and state perspective.

In its current condition the public cannot recreate in the lake and its aesthetics are unpleasing. It is not capable of sustaining a balanced ecology. The Meadow Lake Management Plan would restore the lake's Aquatic Recreation beneficial use.

Targeting

Question 3. (15 points): Describe the methods used to identify, inventory, and target the root cause (most critical pollution source(s) or threat(s)). Describe any related additional targeting efforts that will be completed prior to installing the projects or practices identified in this proposal.

Periodic water quality monitoring has been conducted on Meadow Lake since the original TMDL study. Much of the data was collected by volunteers through the Met Council's CAMP and the MPCA's CLMP. The Commission monitored water quality on Meadow Lake in 2016 through its Intensive Lake Monitoring Program in preparation for completing a TMDL Five Year Review of progress. The Commission systematically reviews every TMDL in the watershed every 5-7 years to update data, assess progress, and update implementation priorities. In addition to water quality monitoring, the Commission also collected sediment cores, undertook fish and aquatic vegetation surveys, and assembled information about BMPs completed in the lakeshed. This data was used to update HydroCAD, P8, and lake response modeling, and review and revise implementation priorities.

The 2016 fish survey as well as previous surveys completed by academic researchers documented the fathead minnow population and its potential role in degrading water quality. The fish and curly-leaf pondweed surveys and sediment core results as well as the lack of any improvement in the lake even with reducing the watershed load by nearly half suggested that internal load control would be necessary to make any water quality gains.

Prior to undertaking a winter drawdown, the Commission would monitor water quality and repeat the fish and aquatic vegetation surveys. Another set of sediment cores would be taken to document bulk density and organic content as well as to refine the phosphorus fractionation data. That monitoring would be repeated after the lake refills to assess progress. The Meadow Lake Feasibility Report includes a decision tree that will guide how the Commission and City would proceed in years two and three based on the monitoring results. Only when monitoring indicates the fish and CLP populations have ben controlled would the Commission proceed to phase 2, an alum treatment.

Question 4. (10 points): How does this proposal fit with complementary work that you and your partners are implementing to achieve the goal(s) for the priority water resource(s) of concern? Describe the comprehensive management approach to this water resource(s) with examples such as: other financial assistance or incentive programs, easements, regulatory enforcement, or community engagement activities that are directly or indirectly related to this proposal.

<u>The Meadow Lake Watershed Association</u> (MLWA) in partnership with the City of New Hope and the Commission recently updated its <u>Lake Management Plan</u>. This Plan includes both short- and long-term goals and strategies that have been in active implementation since its inception in 2009. The Commission awarded MLWA three education grants to support community education including the publication of a series of newsletters and the <u>Meadow Lake Watershed Guide</u>. MLWA designed and purchased "Welcome to the Meadow Lake Watershed" street signs, worked with the City to place them throughout the watershed, and routinely displays yard signs informing residents that "Every curb is a

shoreline" and "Our street connects to Meadow Lake." The Association received a grant from the MN DNR to sponsor a series of three educational workshops on shoreline restoration, and several lakeshore property owners restored their shorelines with native plant buffers. The Association partnered with Meadow Lake Elementary School to plant a 10,000 square foot rain garden, and the Association and City have collaborated with volunteers to adopt and restore over 200 feet of shoreline in Meadow Lake Park. The City also maintains grit chambers and provides enhanced street sweeping in the lakeshed throughout the growing season.

Concurrent with this project, the City, Association, and Commission will develop a written maintenance plan that will include schedules for street sweeping, grit chamber and outlet cleaning; best practices for road salt usage and golf course turf management to limit impacts to the lake; and plans for ongoing management of stormwater in the lakeshed.

Measurable Outcomes and Project Impact

Question 5. (10 points): (A) What is the primary pollutant(s) this application specifically addresses? (B) Has a pollutant reduction goal been set (via TMDL or other study) in relation to the pollutant(s) or the water resource that is the subject of this application? If so, please state that goal (as both an annual pollution reduction AND overall percentage reduction, not as an in-stream or in-lake concentration number). (C) If no pollutant reduction goal has been set, describe the water quality trends or risks associated with the water resource or other management goals that have been established. (D) For protection projects, indicate measurable outputs such as acres of protected land, number of potential contaminant sources removed or managed, etc.

A) The primary pollutant addressed is nutrients, specifically total phosphorus. B) The Meadow Lake Nutrient TMDL requires an 83%, 96 lb/yr reduction from the watershed and 85%, 62 pound reduction from internal load. Lake response modeling completed for the TMDL 5 Year Review using a longer and more recent data set and measured release rates from sediment cores suggests a 71%, 62 pound reduction from the watershed and a 93%, 110 pound reduction from internal load. An analysis conducted for the TMDL 5 Year Review estimates that about 42 pounds of TP are removed annually by BMPs installed since the TMDL and by annual enhanced street sweeping.

Question 6. (10 points): (A) What portion of the water quality goal will be achieved through this application? Where applicable, identify the annual reduction in pollutant(s) that will be achieved or avoided for the water resource if this project is completed.

The proposed project is focused on restoring the biology of the lake to improve water clarity and chlorophyll-a concentrations, and thus the metrics that will be used to evaluate success will be Floristic Quality Index (FQI), Secchi depth, chl-a concentration, presence/absence of fathead minnows or rough fish, extent of sediment consolidation as measured by bulk density, and CLP abundance. While it is difficult to say with certainty what the numeric TP benefit would be, lake response modeling using Walker's BATHTUB estimates a residual annual load of 20-25 pounds TP that cannot be accounted for from watershed load or from sediment release based on the measured release rate. This may be the load attributable to resuspension from minnows foraging in the sediments, and from wind resuspension of the unconsolidated sediments. That residual is based on use of Nurnberg's shallow lakes equation for the anoxic factor, which may be conservative and attribute too much load to sediment release and not to residual. Based on experience gained from other shallow lake drawdowns (see for example Cleary Lake in Carver County), the initial lake response is likely a dramatic decrease in chl-a concentration and improvement in transparency. Phase Two of the

Management Plan, to be completed in year 4-5, would focus on reducing phosphorus from sediment release though an alum application.

(B) Describe the effects this application will have on the root cause of the issue it will address (most critical pollution source(s) or threat(s)).

Shallow lakes occur in one of two phases: a clearwater state or a turbid water state. Clear water states are sustained by a balanced biology. A healthy predator fish population keeps bottom feeders such as carp, bullheads and fathead minnows in check. Minnows prey on zooplankton such as Daphnia, which graze on phytoplankton. A healthy zooplankton community keeps algae from spreading unchecked, which enhances transparency of the water column. This transparency allows light to filter to the bottom and supports the growth of submersed and emergent aquatic vegetation. The root systems of these plants stabilize the lakebed, reducing resuspension due to wind and waves. When one of those factors becomes unbalanced, a cascade of effects occurs. Meadow Lake is too shallow to support predator fish, so the introduction of fathead minnows allows them to reproduce unchecked. The fish suspend sediments as they feed along the lake bottom, and also prey on zooplankton. Without a healthy invertebrate population, algae grows unchecked, fueled by phosphorus released from the sediments. The turbid water suppresses the growth of native aquatic vegetation and allows for invasive curly-leaf pondweed to thrive. Phase one of the management plan would re-set the biology of the lake by eliminating the fathead minnows and allowing beneficial zooplankton to thrive and keep algal growth in check. The drawdown would also significantly reduce curly-leaf pondweed and provide an opportunity for native vegetation to re-establish from the seedbank in the sediments. The drawdown would also consolidate sediments, reducing wind and wave resuspension. The goal is to significantly improve water clarity and minimize or at least reduce nuisance algal blooms.

Question 7. (5 points): If the project will have secondary benefits, specifically describe, (quantify if possible), those benefits. Examples: hydrologic benefits, enhancement of aquatic and terrestrial wildlife species, groundwater protection, enhancement of pollinator populations, or protection of rare and/or native species.

The City and Association will be conducting education and outreach activities throughout the project and will work with the local newspaper, Sun Post, and the cable access provider CCX Media to publicize the project on its daily newscast. Ongoing publicity about the project will create the opportunity to increase community awareness about Meadow Lake and other waterbodies. The City and Association will leverage this publicity as a vehicle to educate the community on how individual practices can make a difference in protecting and improving water quality and ecological integrity.

Cost Effectiveness and Feasibility

Question 8. (15 points): (A) Describe why the proposed project(s) in this application are considered to be the most cost effective and feasible means to attain water quality improvement or protection benefits to achieve or maintain water quality goals. Has any analysis been conducted to help substantiate this determination? Discuss why alternative practices were not selected. Factors to consider include, but are not limited to: BMP effectiveness, timing, site feasibility, practicality, and public acceptance.

Meadow Lake has a small (88 acres), fully developed watershed. A City improvement project several years ago installed grit chambers and a large boulevard rain garden to provide treatment of runoff prior to discharge into the lake. The City also undertakes enhanced street sweeping in the lakeshed. These actions have achieved about 2/3 the required watershed load reduction. Several homeowners have planted native buffers on their shoreline, and the MLWA sponsors shoreline buffer plots at Meadow Lake Park. There are few opportunities left in the small lakeshed to make additional watershed load reductions. Shallow lakes are different than deep lakes, in that achieving a biotic balance is as crucial to achieving a clear water state as is managing nutrients. Even if the watershed load was reduced to zero, the lake would not significantly improve because it does not currently have a balanced biology. The fish community is almost exclusively fathead minnows, and the aquatic vegetation community is dominated by curly-leaf pondweed. Fathead minnows are opportunistic feeders, rooting in the bottom sediments as well as consuming zooplankton that would ordinarily keep algae growth in check. The proposed drawdown would target eliminating as many of the minnows as possible, and barriers installed on outfalls and the lake outlet should prevent colonization from nearby ponds and from Bass Creek. The drawdown would also help control the curly-leaf pondweed, allowing native vegetation an opportunity to establish. The City of New Hope had previously undertaken a partial drawdown to excavate sediment accumulated at outfalls, and the following year water clarity was good and native vegetation did grow, confirming that the seedbank is still present and viable. This first phase of the Meadow Lake Management Plan would focus on reestablishing biology in the lake. At the same time, sediment cores reveal a very high phosphorus release rate. Once the biology is restored, which will take 3-5 years Phase 2 of the project will be chemical control of sediment release, such as an alum treatment.

(B) If your application is proposing to use incentives above and beyond payments for practice costs, please describe rates, duration of payments and the rationale for the incentives' cost effectiveness. **Note**: For in-lake projects such as alum treatments or carp management, please refer to the feasibility study or series of studies that accompanies the grant application to assess alternatives and relative cost effectiveness. Please attach feasibility study to your application in eLINK.

A Feasibility Study is attached.

Project Readiness

Question 9. (8 points): What steps have been taken or are expected to ensure that project implementation can begin soon after the grant award? Describe general environmental review and permitting needs required by the project (list if needed). Also, describe any discussions with landowners, status of agreements/contracts, contingency plans, and other elements essential to project implementation.

The Commission has completed water quality monitoring and aquatic vegetation and fish surveys as well as taken a sediment core to measure the phosphorus release rate. The City of New Hope and Meadow Lake Watershed Association have been partners in developing the proposed Meadow Lake Management Plan₇ and have held public meetings to discuss the proposed improvements, including an Open House to which all residents in the lakeshed were invited. A DNR Work in Public Waters permit will be required to conduct temporary drawdowns, and the Commission has been in contact with the Area Hydrologist to be sure all permit procedures are followed. MLWA will assist in obtaining the required riparian property owner approvals.

Question 10. (2 points): What activities, if any proposed, will accompany your project(s) that will communicate the need, benefits, and long term impacts to your local community? This should go above and beyond the standard newsletters, signs and press releases.

The City of New Hope and the MLWA are partners in this project. This project will be publicized on the Commission and City website, and we will also work with CCX Media to provide ongoing , local cableaccess TV coverage over the life of the project.

Question 11. (O points). All project applications for **feedlots** much include a work sheet with supplemental questions being answered. This worksheet is found on the BWSR webpage "Apply for Grants." Have you attached this worksheet?

N/A

The Constitutional Amendment requires that Amendment funding must not substitute traditional state funding. Briefly describe how this project will provide water quality benefits to the State of Minnesota without substituting existing funding.

The grant funds will allow the Commission to undertake a suite of activities that together will restore Meadow Lake to a clear-water state.

				Const.				
Task #	Task	Tot Hrs	Staff Costs	Costs		Lab Costs	Expense	TOTAL Cost
1	Project Coordination	32	\$6,088					\$6,088
2	Construction							
	Drawdown	40	\$8,160	\$	50,000			\$58,160
	SAV Treatment	24	\$4,896	\$	6,000		\$500	\$11,396
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	Fish Treatment	24	\$3,076	\$	5,000		\$500	\$8,576
3	Monitoring							
	Water Quality	129	\$15,252			\$8,370	\$3,150	\$26,772
	Fish Surveys and Permits	86	\$10,274				\$750	\$11,024
	SAV Surveys and Permits	108	\$6,660				\$2,850	\$9,510
	Sediment Coring	31	\$3,555			\$4,000	\$600	\$8,155
4	Report	36	\$4,004					\$4,004
5	Meetings	48	\$8,220					\$8,220
6	Grant Reporting	6	\$852					\$852
							Subtotal	\$170,205
						Contingency 10%		\$17,020
						TOTAL		\$187,225
							SAY	

 Grant
 \$152,000

 Commission
 38,000

 TOTAL
 \$190,000

Project Summary

Project Abstract (5 points): Succinctly describe what you are trying to achieve and how you intend to achieve those results, including the type and quantity of projects and/or practices included in the application budget and anticipated outcomes.

The purpose of the Shingle Creek Connections II stream restoration project is to improve water quality and biotic integrity in Shingle Creek in the cities of Brooklyn Park and Brooklyn Center. Shingle Creek is an Impaired Water for low dissolved oxygen, excess E. coli, and an impaired macroinvertebrate community. Approximately 1,750 linear feet will be improved by thinning trees, establishing native vegetation in the buffer and on the banks, enhancing habitat, and introducing low-flow sinuosity and reaeration opportunities with rock vanes and root wads. This is a "missing link" segment that will result a continuous 2.5 mile corridor of urban stream restoration in the Shingle Creek watershed.

Does your organization have any active CWF competitive grants? If so, specify FY and percentage spent. Also, explain your organization's capacity (including available FTEs or contracted resources) to effectively implement additional Clean Water Fund grant dollars.

Yes, the Crystal Becker Park Infiltration Project. Commission as grantee has expended 52%, but the City of Crystal as project lead has expended 100% and is awaiting reimbursement from the Commission, which will be complete by December 31, 2019.

Water Resource: Identify the water resource the application is targeting for water quality protection or restoration.

Shingle Creek, 07010206-506, from Regent/73rd Avenues N to Brooklyn Boulevard in the cities of Brooklyn Park and Brooklyn Center in Hennepin County.

Proposed Measurable Outcomes: Succinctly describe the proposed measurable outcomes of this grant application.

- 1) Stabilize and restore areas with severe to moderate erosion to reduce the estimated annual soil loss mass from 26.8 tons per year to 6.3 tons per year and TP from 5.4 to 1.3 pounds per year.
- 2) Increase reaeration potential to minimize time that streamflow dissolved oxygen (DO) concentration falls below 5 mg/L.
- 3) Improve Minnesota Stream Health Assessment (MSHA) score from 39.7 (Poor) to at least 50 points (Fair).

Prioritization (Relationship to Plan) Question 1. (17 points):

(A) Describe why the water resource was identified in the plan as a priority resource. For the proposed project, identify the specific water management plan reference by plan organization (if different from the applicant), plan title, section, and page number.

The Commission's Third Generation Watershed Management Plan in its Executive Summary and Implementation Plan established as its number one priority for the period 2013-2022: "Work aggressively toward achieving TMDL lake and stream goals (p. 4-4)." Furthermore, Goal B.4. of the

Plan is to "Improve at least 30% of the length of Shingle Creek to meet Corridor Study and TMDL design standards (p. 4-6)." As of 2019, 3.09 miles, or 27% of the 11.15 miles have been restored. Initial assessment of stream physical and biotic conditions was completed in 2005 for the Shingle Creek Corridor Study, and included a physical inventory and Rapid Bioassessment Protocol condition assessment as well as a macroinvertebrate collection and assessment. Work completed in 2009 and 2010 for the Shingle and Bass Creeks Biota and DO TMDL included a Rosgen Level III and BEHI assessment of stream morphology. Additional monitoring for the TMDL included 72-hour diurnal DO measurements, two synoptic surveys of water quality and flow, two dye studies under high and low flow, and QUAL2K modeling of water quality and DO dynamics. The QUAL2K models were used to test various improvement scenarios to determine which combination of improvements should be located.

(B) In addition to the plan citation, provide a brief narrative description that explains whether this application fully or partially accomplishes the referenced activity.

This application will fully accomplish the proposed restoration. Shingle Creek upstream and downstream of the site has already been restored. Completing this reach will create a continuous 13,000 feet (almost 2.5 miles) of restored urban stream corridor.

(C) Provide weblinks to all referenced plans.

Shingle Creek Watershed Management Plan: <u>http://www.shinglecreek.org/management-plan.html</u> Shingle Creek Biota and Dissolved Oxygen TMDL and Implementation Plan: <u>https://www.pca.state.mn.us/sites/default/files/wq-iw11-11e.pdf</u>, <u>https://www.pca.state.mn.us/sites/default/files/wq-iw11-11c.pdf</u> Shingle Creek Corridor Study: <u>http://weebly-</u> file/5/7/7/6/57762663/final 2005 shingle creek corridor report.pdf

Question 2. (3 points):

(A) Describe how the resource of concern aligns with at least one of the statewide priorities referenced in the Nonpoint Priority Funding Plan (also referenced in the "Projects and Practices" section of the RFP).

The project aligns with the statewide priority "Restore and protect water resources for public use and public health, including drinking water." Shingle Creek is a wadable stream, and there are public parks upstream and downstream of this segment. Just downstream is Park Center High School, which has an outdoor classroom directly adjacent to the stream. The classroom is used for, among other things, hands-on aquatic ecology and water quality education. Restoring and enhancing the Connections II segment will improve water quality and enhance habitat, improving the learning experience for the students and the general public.

(B) Describe the public benefits resulting from this proposal from both a local and state perspective.

The public benefit is stabilized streambanks, a native vegetation buffer, enhanced habitat, improvements in reaeration to reduce periods of low dissolved oxygen, reduced sedimentation and nutrients to improve water quality, and an improved fish and macroinvertebrate community.

Targeting

Question 3. (15 points): Describe the methods used to identify, inventory, and target the root cause (most critical pollution source(s) or threat(s)). Describe any related additional targeting efforts that will be completed prior to installing the projects or practices identified in this proposal.

The 2005 Shingle Creek Corridor Study was a thorough assessment of physical and biological conditions in Shingle Creek. The findings were used to inform the 2011 Bass and Shingle Creeks Biota and DO TMDL and the associated Stressor ID and Implementation Plan. The Connections II project (and upstream segments that have been previously restored) are located in the stream segment known as Reach 6 of those studies. This Corridor Study used the Rapid Bioassessment Protocol and the Steam Visual Assessment Protocol to assess stream conditions and the macroinvertebrate IBI to assess biotic conditions. The three segments of Reach 6 scored the worst of all reaches of Shingle Creek on the SVAP (score of 4.09 of 10, or poor) and M-IBI (score of 13.5, impairment threshold=54) and the second worst on the SVAP (score of 83 of 200, or marginal). The SVAP is weighted more towards the riparian and streambank conditions and habitat quality while the RBP more heavily weights stream channel physical conditions.

The Stream Stressor ID repeated the RBP assessment with similar findings, and completed Rosgen Level II and Pfankuch Stability Analyses, which can identify stream reaches that are at higher potential for instability and thus more susceptible to habitat impacts such as sediment deposition, loss of streambank vegetation, and increased turbidity. Reach 6 was assessed as poor, at a higher risk of instability. The Stressor ID evaluated numerous probable causes for the biotic impairment and concluded that the evidence for altered hydrology was strongest followed closely by dissolved oxygen and lack of habitat. The DO TMDL concluded that the primary cause of low DO in the stream was excess sediment oxygen demand caused by an overwidened stream, and the legacy impacts of nutrient and sediment loading from the watershed and streambank erosion.

This stream segment was surveyed in 2018 and existing conditions evaluated prior to preparing potential restoration concepts. The MPCA's Minnesota Stream Health Assessment (MSHA) tool was used to evaluate stream conditions, scoring 39.7 or poor. The survey found that about 14% of the bank linear footage was experiencing severe erosion; 68% moderate erosion; and 18% slight erosion. This erosion is contributing an estimated 20.5 tons of sediment and 4.1 pounds of total phosphorus to the stream each year.

The degree of streambank degradation, altered channels, sediment deposition and aggradation, lack of quality habitat, and the lack of streambank vegetative protection led to Reach 6 being designated as a high priority for restoration. Just prior to restoration the Connections II segment will be reassessed using the MSHA to establish baseline conditions for comparison post restoration.

Question 4. (10 points): How does this proposal fit with complementary work that you and your partners are implementing to achieve the goal(s) for the priority water resource(s) of concern? Describe the comprehensive management approach to this water resource(s) with examples such as: other financial assistance or incentive programs, easements, regulatory enforcement, or community engagement activities that are directly or indirectly related to this proposal.

The Commission's Third Generation Plan includes a goal to "Improve at least 30% of the length of Shingle Creek to meet Corridor Study and TMDL design standards." (p. 4-6) To date 3.09 miles, or 27% of the 11.15 miles have been restored. This project would complete another 0.33 miles, increasing the

Shingle Creek Connections II DRAFT #1 9/4/19

total to 3.42 miles, or 31%. More importantly, completing this segment will create a continuous 13,000 feet (almost 2.5 miles) of restored stream corridor. The stakeholders in the watershed have also focused on reducing pollutant loading to Shingle Creek, through installation of Best Management Practices (BMPs) as part of street, highway, and park projects; strengthened standards for development and redevelopment projects that require enhanced stormwater management; strict enforcement of erosion control standards; and enhanced street sweeping. The Commission has identified "directly connected untreated areas" throughout the watershed where stormwater is discharged into lakes and streams with no interim treatment from ponds, wetlands, or BMPs. These are areas of focus for enhanced sweeping and for siting new BMPs. The Commission's annual monitoring program has detected a statistically significant reduction in TP and TSS concentrations in streamflow.

Measurable Outcomes and Project Impact

Question 5. (10 points): (A) What is the primary pollutant(s) this application specifically addresses? (B) Has a pollutant reduction goal been set (via TMDL or other study) in relation to the pollutant(s) or the water resource that is the subject of this application? If so, please state that goal (as both an annual pollution reduction AND overall percentage reduction, not as an in-stream or in-lake concentration number). (C) If no pollutant reduction goal has been set, describe the water quality trends or risks associated with the water resource or other management goals that have been established. (D) For protection projects, indicate measurable outputs such as acres of protected land, number of potential contaminant sources removed or managed, etc.

A) The primary pollutants addressed are DO and sediment, as well as the non-numerical TMDL parameter of habitat. B) The Shingle Creek DO TMDL requires a 99.3% reduction in sediment oxygen demand in this segment, primarily through stream restoration to create a low-flow channel to reduce exposure to sediments and oxygen demand during periods of low-velocity, low-reaeration flow. C) Although not considered a pollutant, the biotic TMDL established restoration strategies to improve habitat, including rock vanes to provide aeration and varied substrate and to encourage the formation of deeper pools; root wads to introduce woody substrate, provide cover and refuge, and provide lurking areas for aquatic organisms; native streambank vegetation and installation of live stakes to stabilize streambanks and provide opportunities for overhanging vegetation; low-flow channels meandering through a planted point bar; native buffers to reduce runoff and provide upland habitat; and introduction of cobble and boulders to provide additional varied substrate. Most of these design elements are incorporated into the Connections II design.

Question 6. (10 points): (A) What portion of the water quality goal will be achieved through this application? Where applicable, identify the annual reduction in pollutant(s) that will be achieved or avoided for the water resource if this project is completed.

It is difficult to quantify a specific reduction. The project is intended to create the conditions in which improvements will occur. In other words, increasing habitat complexity should result in the stream being more able to support a wider variety of aquatic life; "If you build it they will come." Because this is the "missing link" of restored stream segments, the proposed improvements will create a continuous corridor that will promote recolonization. Sediment oxygen demand is not measured directly, but creating a low-flow channel within the wider channel will reduce the wetted width during those critical low-flow periods and thus reduce streamflow exposure to oxygen demand. Again, because the project is the last segment to be restored, the design elements that are intended to enhance reaeration will help maintain or even increase dissolved oxygen levels rather than sag as it does now, as the creek flows through this reach.

(B) Describe the effects this application will have on the root cause of the issue it will address (most critical pollution source(s) or threat(s)).

Stabilizing and restoring the streambanks and enhancing stream buffers will reduce sediment and nutrients delivered to the stream, which will improve water quality, reduce embeddedness, and improve clarity, allowing beneficial aquatic vegetation to thrive. Increased habitat complexity will support a wider variety of organisms. Design elements that promote reaeration will help to sustain dissolved oxygen concentrations and reduce sediment oxygen demand. Finally, completing this segment will result in an almost 2.5 miles corridor of restored urban stream.

Question 7. (5 points): If the project will have secondary benefits, specifically describe, (quantify if possible), those benefits. Examples: hydrologic benefits, enhancement of aquatic and terrestrial wildlife species, groundwater protection, enhancement of pollinator populations, or protection of rare and/or native species.

The project will include enhancements to the stream buffer, which currently is comprised of unmowed turf and field grass, invasive undergrowth, and excessive tree canopy. Thinning the trees to remove leaners and undercut trees and open up the canopy will allow a wider variety of slope stabilizing understory and pollinator-friendly forbs and grasses to thrive and will create a more varied terrestrial habitat. Completion of the continuous 2.5 mile restored corridor will provide a protected natural passage for wildlife and organisms to move through the urban landscape. Finally, opening up the stream, restoring it and planting the buffer and banks with native vegetation creates a more aesthetically pleasing public space.

Cost Effectiveness and Feasibility

Question 8. (15 points): (A) Describe why the proposed project(s) in this application are considered to be the most cost effective and feasible means to attain water quality improvement or protection benefits to achieve or maintain water quality goals. Has any analysis been conducted to help substantiate this determination? Discuss why alternative practices were not selected. Factors to consider include, but are not limited to: BMP effectiveness, timing, site feasibility, practicality, and public acceptance.

Previous restoration projects completed by the Commission have shown the proposed work to be cost effective in bringing measurable water quality benefits while also obtaining acceptance from residents for the stream appearance. Most of the stream segments along Shingle Creek that have been restored have been located in public parks or residential back or side yards. Based on 20 years of restoration experience we have identified the design elements that are the most acceptable and the most successful for achieving our water quality and habitat enhancement goals, and we have incorporated those into this proposed project.

(B) If your application is proposing to use incentives above and beyond payments for practice costs, please describe rates, duration of payments and the rationale for the incentives' cost effectiveness. **Note**: For in-lake projects such as alum treatments or carp management, please refer to the feasibility study or series of studies that accompanies the grant application to assess alternatives and relative cost effectiveness. Please attach feasibility study to your application in eLINK.

Project Readiness

Question 9. (8 points): What steps have been taken or are expected to ensure that project implementation can begin soon after the grant award? Describe general environmental review and permitting needs required by the project (list if needed). Also, describe any discussions with landowners, status of agreements/contracts, contingency plans, and other elements essential to project implementation.

Survey work has been completed, and three design concepts have been developed to the 30% level. The Commission and cities have selected their preferred option, so final design work can proceed as soon the grant is awarded. The project will require a DNR Work in Public Waters permit and a FEMA No Rise Certificate assessment, both of which the Commission has successfully obtained on other stream restoration projects. The Commission will hold a public Open House for residents and property owners riparian to the stream prior to finalization of the plans.

Question 10. (2 points): What activities, if any proposed, will accompany your project(s) that will communicate the need, benefits, and long term impacts to your local community? This should go above and beyond the standard newsletters, signs and press releases.

The cities of Brooklyn Park and Brooklyn Center are partners in this project. This project will be publicized on the Commission and cities' websites, and we will also work with CCX Media to provide ongoing , local cable-access TV coverage over the life of the project.

Question 11. (O points). All project applications for **feedlots** much include a work sheet with supplemental questions being answered. This worksheet is found on the BWSR webpage "Apply for Grants." Have you attached this worksheet?

N/A

The Constitutional Amendment requires that Amendment funding must not substitute traditional state funding. Briefly describe how this project will provide water quality benefits to the State of Minnesota without substituting existing funding.

The grant funds will allow the Commission to increase the number of habitat features to create better habitat complexity.

Project Cost and Funding

Construction (incl 15% contingency)	\$360,000
Design & construction services	\$40,000
Public outreach, admin & coord	\$10,000
TOTAL	\$410,000
Grant	\$328,000
Commission	\$72,000
TOTAL	\$410,000

Shingle Creek Connections II DRAFT #1 9/4/19

SHINGLE CREEK / WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSION MONTHLY COMMUNICATION LOG August 2019



Date	From	То	SC	WM	Description
7-31-19	Jeremy Nielsen @ SRF	Sarah Nalven, Wenck		x	Jeremy is working on proposal for storm sewer rehab project in Brooklyn Center (the pipe that outfalls to 70 th). Was wondering about project review requirements.
8-1-19	Ken Yellen	Ed Matthiesen, Wenck	Х		Fisherman asking about Twin Lake
8-1-19	Dave Ahrens @ Stantec	Ed Matthiesen, Wenck	Х		Use of tire shreds at New Hope City Hall in place of aggregate
8-2-19	Max Haynes @ Maple Grove	Ed Matthiesen, Wenck	х		Cedar Island Lake water elevation concern
8-6-19	DNR MPARS	WM WMC		х	Work in Public Waters permit application for proposed wetland fill/mitigation at TH169/109 th Ave N. Commission is LGU for WCA in Brooklyn Park.
8-7-19	Resident, Upper Twin Lake Assn	Diane Spector	х		Request for carp project update for upcoming assn annual meeting
8-12-19	Tim Schwartz, MPCA	Diane Spector	х		Notice that the EPA has officially accepted the Crystal Lake Management Plan proposal for the 319 program
8 14 10	Duen Welter OWeeleart	Carab Maksan M(anak	x		Construction of Waterwalk (SC 2018-010) is happening now. Contractor ordered regular catch basins instead of slotted catch basins (which allow infiltration) and R. Walter asked permission to use these regular catch basins instead. We recommended that the City say no because slotted catch basins were a large party of applicant meeting watershed volume management requirements. Trevor
8-14-19	Ryan waiter @wooipert	Saran Naiven, Wenck			Quast at the City of Plymouth said no.
8-21-19	Environmental	Diane Spector	Х		equal to a SAFL Baffle
8-28-19	Bob Leba @ SRF	Sarah Nalven, Wenck		х	Asking about WM monitoring data so they can use it to calibrate models for Hwy 252
8-28-19	Todd Shoemaker, Wenck	Drew McGovern, Hennepin County	x		After reviewing test performance data we have concluded that The Preserver as specified on the project SC2019-004 CSAH 81 is equal to the SAFL baffle and is acceptable to the Commission

Send Log to:



3235 Fernbrook Lane N • Plymouth, MN 55447 Phone (763) 553-1144 • Fax (763) 553-9326

www.shinglecreek.org

September 3, 2019

Mr. Jesse Struve, City Engineer City of Brooklyn Park 5200 85th Ave. N. Brooklyn Park, MN 55443

Dear Mr. Struve:

The West Mississippi Watershed Management Commission wholeheartedly supports the City of Brooklyn Park's proposed stormwater improvements at River Park. These improvements will provide water quality treatment to 250 acres of fully developed mixed use land that is currently discharged into the Mississippi River with no treatment. The project will prevent over 15 tons of sediment and 50 pounds of total phosphorus per year from reaching the Mississippi.

The Shingle Creek and West Mississippi Third Generation Watershed Management Plan established priorities for its ten year plan duration, and goals and actions to help achieve those priorities. Two of the five top priorities are:

- 1. Work aggressively toward achieving TMDL lake and stream goals; and
- 2. Retrofit BMPs in developed areas in the most cost-effective way.

The proposed pond retrofit in River Park is consistent with those priorities as well as the South Metro Mississippi TSS TMDL and the draft Lake Pepin Watershed Phosphorus TMDL. One of the Third Generation Plan strategies is to share in the cost of TMDL and other water quality projects. The West Mississippi Commission will commit to funding 25% of the cost of the "above and beyond" portion of this proposed project.

We are also pleased that the City of Brooklyn Park intends this project to provide an opportunity for public education and outreach about water quality and aquatic habitat. It will nicely complement the prairie restoration that is another of River Park's features.

Sincerely,

Cerald E. Butcher /ja

Gerry Butcher, Chair West Mississippi Watershed Management Commission Z:\WestMiss\River Park\L-letter of support re river park.doc