



Minnesota Pollution Control Agency
 520 Lafayette Road North
 St. Paul, MN 55155-4194

Clean Water Partnership Project Work Plan

Attachment A
 Item 6l.
 BCWMC 8-20-15

Doc Type: Contract

MPCA Use Only	
Swift #:	
CR #:	

Project Title: Northwood Lake Water Quality Improvement Project

1. Project Summary:

Organization: Bassett Creek Watershed Management Commission
Contractor contact name: Laura Jester
Title: Administrator
Address: 16145 Hillcrest Lane
 Eden Prairie MN 55346
Phone: 952-270-1990
Fax: NA
E-mail: Laura.jester@keystonewaters.com

Subcontractor(s)/Partner(s):

Organization: City of New Hope
Type of organization: Municipality
Project manager: Bob Paschke
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 New Hope MN 55428
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Fax: 763-533-7650
E-mail: bpaschke@ci.new-hope.mn.us

Subcontractor(s)/Partner(s):

Organization: Stantec
Type of organization: Consultant
Project manager: Chris Long
Address: 2335 State Hwy 36 Service Rd
 Roseville, MN 55113
Phone: 651-636-4600
Fax:
E-mail: chris.long@stantec.com

MPCA contact(s):

MPCA project manager: Rachel Olmanson
Title: Watershed Project Manager
Address: 520 Lafayette Rd.
 St. Paul MN 55155
Phone: 651-757-2473
Fax: 651-297-8676
E-mail: Rachel.olmanson@state.mn.us

Major watershed(s): Mississippi River – Twin Cities

Major watershed/HUC Code: 07010206
Latitude/Longitude for project: 45°01'31.12" N, 93°23'31.95" W
County: Hennepin

Project start/End dates: June 21, 2015 - June 30, 2018

Project Funding Type (check one):

CWP Resource Investigation

CWP Implementation

Grant Amount: \$300,000

Proposed Cash Match Funds: \$1,052,000

Proposed Inkind Match Funds: \$0

Proposed Loan Funds: \$0

Total project cost: \$1,352,000

2. Statement of Problems, Opportunities, and Existing Conditions

This project will improve the water quality of Northwood Lake by treating storm water runoff from over 110 acres of currently untreated urban land. The project includes the installation of a variety of practices at two different locations adjacent to the lake that will maximize storm water treatment while conserving drinking water and preserving park land.

Northwood Lake is located along the North Branch of Bassett Creek in the City of New Hope. The North Branch of Bassett Creek flows directly into the lake at its northwest corner, and flows out of the lake through a control structure at its southeast corner. Therefore, the lake is directly tributary to the North Branch Bassett Creek which flows into Bassett Creek and into the Mississippi River. Northwood Lake is classified as a shallow lake with a watershed area of approximately 1,341 acres which lies within fully developed areas of the cities of Plymouth and New Hope. Northwood Lake is ringed with single family homes and is used for aesthetic viewing, boating, and fishing. A popular community park, Northwood Park, is located at the eastern end of the lake.

Northwood Lake is included on the State's Impaired Waters List (303(d) list) due to high nutrients. Pollutants enter the lake from the fully developed watershed, much of which has little or no stormwater treatment. In addition to high phosphorus, pollutants entering the lake include bacteria, solids, chlorides, PAHs, and other toxins. The North Branch of Bassett Creek is impaired for bacteria.

A feasibility study for this project was completed in November 2014. The project will reduce total phosphorus loads by an estimated 22 pounds per year and will reduce other pollutants carried in storm water runoff and snowmelt. Water quality in Northwood Lake, the North Branch of Bassett Creek, the main stem of Bassett Creek and the Mississippi River will be improved through the implementation of this project.

The Bassett Creek Watershed Management Commission (BCWMC) is a joint powers watershed management entity comprising all or parts of nine cities in central Hennepin County. This project is part of the BCWMC's capital improvement program which it implements in partnership with its member cities to improve and protect water quality in its priority waterbodies and reduce flooding along Bassett Creek and its tributaries.

3. Goals, Objectives, Tasks, and Subtasks

Goal: Reduce total phosphorus to improve water quality in Northwood Lake by enhancing urban storm water treatment.

Objective 1: Design project components

The BCWMC subcontractor will complete the engineering, surveying, permitting, and administration needed to design and

prepare plans for the various components of this project. The BCWMC will review the plans at the 50% design and the 90% (final) design to ensure that the specifications, modeling, and other design components are appropriate and follow BCWMC goals and policies.

Task A: Design storm water reuse system and raingardens

Complete engineering, surveying, permitting, and administration to design and prepare plans for the following project components: redirection of storm sewer on Boone Ave, installation of a storm water treatment structure, underground storage tank and water reuse for ballfield irrigation, rain gardens, sump structure, curb cut, and emergency overflows.

Task A Responsible Party: City of New Hope staff, Stantec

Task A Timeline: July 2015 - January 2016

Task A Cost: \$222,383

Task B: Design storm water treatment pond west of Northwood Lake

Complete engineering, surveying, permitting, and administration to design and prepare plans for the following project components: wet ponding basin between Trunk Highway 169 and Jordan Avenue; outlet structure from pond to existing storm sewer pipe tributary to Northwood Lake.

Responsible Party: City of New Hope staff, Stantec

Task B Timeline: July 2015 - January 2016

Task B Cost: \$27,862

Objective 1 Timeline: July 2015 - January 2016

Objective 1 Cost: \$250,245

Objective 1 Deliverables: Construction plans for storm water reuse system, raingardens, and storm water treatment pond

Objective 2: Construct storm water reuse system and raingardens (Figure 1)

Task A: Redirect storm sewer and install treatment structure

Approximately 84% of the drainage area flowing from the north of this site will be redirected through a new 36-inch storm sewer along the west side of Boone Ave. The new storm sewer will be routed through a storm water treatment structure which will capture coarse sediment as a means of pre-treatment of runoff prior to discharging to the underground storm water storage system.

Task A Responsible Party: City of New Hope staff, Stantec, and contracted construction crews (TBD)

Task A Timeline: April 2016 - October 2016

Task A Cost: \$194,510

Task B: Install underground storage tank for water reuse

The underground storm water storage system will be installed in the northeast corner of Northwood Park. The concrete vault will hold approximately 160,000 gallons, capturing runoff from 89 acres of residential land.

Task B Responsible Party: City of New Hope staff, Stantec, and contracted construction crews (TBD)

Task B Timeline: April 2016 - October 2016

Task B Cost: \$328,739

Task C: Install water reuse piping and pump house for irrigation

Piping and pumping mechanisms will be installed so that storm water in the storage tank can be used for irrigating adjacent ball fields. Storm water will be pumped from the tank, through a pipe to the irrigation box located on the east side of Boone Avenue and used to irrigate 6.4 acres of baseball and soccer fields.

Task C Responsible Party: City of New Hope staff, Stantec, and contracted construction crews (TBD)

Task C Timeline: April 2016 - October 2016

Task C Cost: \$225,630

Task D: Install overflow raingardens and construct curb cut

A series of raingardens will be constructed along Ensign Avenue at the northern edge of Northwood Park. These raingardens will be constructed to receive overflows from the water reuse system during large events when runoff volumes exceed storage capacity. They will be designed to treat and infiltrate the storm water prior to discharging to Northwood Lake. A curb cut on Ensign Avenue will also direct street drainage into the raingardens. Construction in this task includes installation of drain tile, a sump manhole, pipe, some rip rap, plantings, and trail reconstruction.

Task D Responsible Party: City of New Hope staff, Stantec, and contracted construction crews (TBD)

Task D Timeline: April 2016 - October 2016

Task D Cost: \$220,817

Objective 2 Timeline: April 2016 - October 2016

Objective 2 Cost: \$969,696

Objective 2 Deliverables: Completed constructed storm water reuse system, pumphouse, and raingardens

Objective 3: Construct storm water treatment pond west of Northwood Lake (Figure 2)

A wet ponding basin will be constructed in the open space between Trunk Highway 169 and Jordan Avenue. Storm water runoff from both rear yard areas and Jordan Avenue draining from the south will be directed into the basin for treatment before discharging into an existing storm sewer pipe tributary to Northwood Lake.

Task A: Construct storm water treatment pond west of Northwood Lake

The area will be cleared and grubbed, excavated, and graded. A sump manhole will be installed and a connection will be made to the existing storm sewer pipe leading into Northwood Lake. The area will then be seeded and mulched.

Task A Responsible Party: City of New Hope staff, Stantec, and contracted construction crews (TBD)

Task A Timeline: April 2016 - October 2016

Task A Cost: \$121,479

Objective 3 Timeline: April 2016 - October 2016

Objective 3 Cost: \$121,479

Objective 3 Deliverables: Completed constructed wet ponding basin west of Northwood Lake

Objective 4: Educate the public about raingardens, water conservation and water reuse

One large, permanent educational sign will be designed, constructed, and installed near the raingardens and water reuse system in Northwood Park. The sign will be designed to educate local residents and park users about pollutants in storm water runoff, the use of raingardens and other best management practices around the home, water conservation, and the water reuse system installed in the park.

Task A: Design educational sign

A designer will be hired to develop and layout the text and visual components of a large (approximately 3' x 4') educational sign. This task includes the coordination with sign fabricator.

Task A Responsible Party: BCWMC staff, City of New Hope, sign designer (TBD)

Task A Timeline: June 2016 – August 2016

Task A Cost: \$1,000

Task B: Fabricate educational sign

This task includes the fabrication and the delivery of the sign to the City of New Hope. City crews will install sign once construction in the area is complete.

Task B Responsible Party: Sign fabricator, City of New Hope

Task B Timeline: August 2016 – October 2016

Task B Cost: \$1,000

Objective 4 Timeline: June 2016 – October 2016

Objective 4 Cost: \$2,000

Objective 4 Deliverables: Educational sign installed in Northwood Park

Objective 5: Manage project implementation and provide grant administration

The BCWMC will manage the project including administration of documents and agreements, coordination with subcontractor (City of New Hope), and technical review of project designs. The BCWMC will also perform grant administration including reporting, invoicing, and final report development with input from the City of New Hope.

Task A: Provide project management and administration

The BCWMC Administrator will develop and finalize project work plan, track the project status, implementation, and budget including coordination with the MPCA project manager and the City of New Hope throughout the life of the project. The BCWMC Administrator will report progress to the BCWMC Commissioners regularly.

Task A Responsible Party: BCWMC Administrator

Task A Timeline: July 30, 2015 – December 31, 2016

Task A Cost: \$1,005

Task B: Provide technical review of project

BCWMC engineers will review the project designs at the 50% stage and the 90% stage and will coordinate with the City of New Hope to get questions answered and issues resolved. The BCWMC engineers will draft a memo for

presentation at a BCWMC meeting describing the 50% and 90% designs and presenting comments and recommendations. The Commission must approve the project design at each phase (50% and 90%) before the City of New Hope can proceed. After the 90% plans are complete, the BCWMC engineer will provide a final administrative review and approval of the final plans.

Task B Responsible Party: BCWMC Engineers

Task B Timeline: August 2015 – January 2016

Task B Cost: \$5,230

Task C: Perform grant reporting and invoicing

The BCWMC Administrator will track the grant budget and project implementation, will coordinate with the City of New Hope to learn about progress and status of the project, and will prepare interim and final grant reports and quarterly invoices for submittal to the MPCA project manager. Interim project reports must meet MPCA requirements and are due February 1 and August 1 during the project period. A final project report is due at the end of the project and must meet MPCA requirements. Invoices will be submitted to MPCA at least quarterly.

Task C Responsible Party: BCWMC Administrator

Task C Timeline: July 2015 – January 2017

Task C Cost: \$2,345

Objective 5 Timeline: July 30, 2015 – January 31, 2017

Objective 5 Cost: \$8,580

Objective 5 Deliverables: Review memos for 50% and 90% project designs; quarterly invoices to MPCA; interim grant reports to MPCA; final grant report to MPCA including photos of completed project.

4. Measurable Outcomes

1: Water quality improvement

This project will capture and treat storm water running off 110 acres of developed land and is expected to remove approximately 22 pounds of total phosphorus from the runoff each year. Due to the use of much of the captured storm water for irrigating ball fields, the phosphorus removed includes both particulate and dissolved phosphorus. An improvement in the water quality of Northwood Lake is expected after project implementation. Water quality trends will be measured through the BCWMC's regular water monitoring program (described in Section 7).

2: Conservation of drinking water

This project will install a 160,000 gallon underground storage vault that will capture storm water runoff and reuse it for irrigating adjacent ball fields. It's estimated that the vault will provide storage for approximately 1 – 2 weeks of irrigation during dry periods. Pumping records will measure the amount of storm water used for irrigation.

3: Behavior change by local residents

Although it's difficult to measure, the education of residents and some subsequent behavior change is an expected outcome of the educational sign that will be placed at the site. The sign will describe the project features, inform viewers about typical storm water pollutants, and describe actions they can take to help improve surface water and conserve drinking water in their homes. A large, annual city festival is held at Northwood Park along with many other events each year, which will result in a high number of sign viewers. Further information dissemination and education is expected simply due to the construction activity in the park and news of the project in city newsletters, local newspapers, and through the Friends of Northwood Lake organization.

5. Gantt charts

See attached spreadsheet

6. Project Budget

See attached spreadsheet

7. Monitoring Plan

Although water monitoring is not part of this specific project, the BCWMC implements a robust lake and stream monitoring program in its priority waterbodies each year. The program is designed to track water quality and quantity trends in order to quantify immediate and long term changes in water conditions; provide a basis for water quality improvement projects; evaluate the effectiveness of implemented best management practices; and track progress toward water quality goals.

In 2016, the BCWMC will collect samples from the Northwood Lake sampling station representing the deepest location. Lake monitoring will occur on six occasions from April through September. Monitoring data will be submitted to the State's EQIS by November 1st.

Details follow:

1. One sample shall be collected within two weeks after ice out
2. One sample shall be collected in mid-June
3. One sample shall be collected in mid-July
4. Two samples shall be collected in August, biweekly, during 1st and 3rd weeks
5. One sample shall be collected during the first week of September

Dissolved oxygen, temperature, specific conductance, pH, oxidation reduction potential (ORP), and Secchi disc transparency shall be measured in the field. Water samples will be collected for laboratory analysis for total phosphorus, soluble reactive phosphorus, total nitrogen, chlorophyll a, and chloride at depths.

Zooplankton and phytoplankton monitoring will also occur on Northwood Lake in 2016. The lake will be monitored on six occasions from April through September concurrent with water quality sampling events. Phytoplankton will be sampled as a single 0-2 meter composite sample at the location of water quality sampling. Zooplankton will be sampled using a bottom to surface tow with a zooplankton net at the location of water quality sampling. Phytoplankton analyses shall be completed using the inverted microscope procedure of Utermohl as described by Lund et al. (1958). Zooplankton analyses will be completed using the Sedgwick Rafter procedure described in Standard Methods. Zooplankton shown in Table 4 shall be identified to the species level and other zooplankton shall be identified to the genus level. Results will be expressed as number of zooplankton per square meter.

The BCWMC will perform a qualitative macrophyte survey in 2016 on Northwood Lake. The lake will be surveyed twice, in June and August. Plant surveys will assess the distribution and growth density of all plants. All sampling and data analysis will be conducted according to the methodologies described in the MNDNR protocol for aquatic vegetation surveys. This methodology is based upon the point intercept survey method developed by John Madsen in Aquatic Plant Control Technical Note MI-02, 1999.

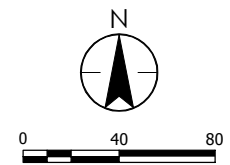
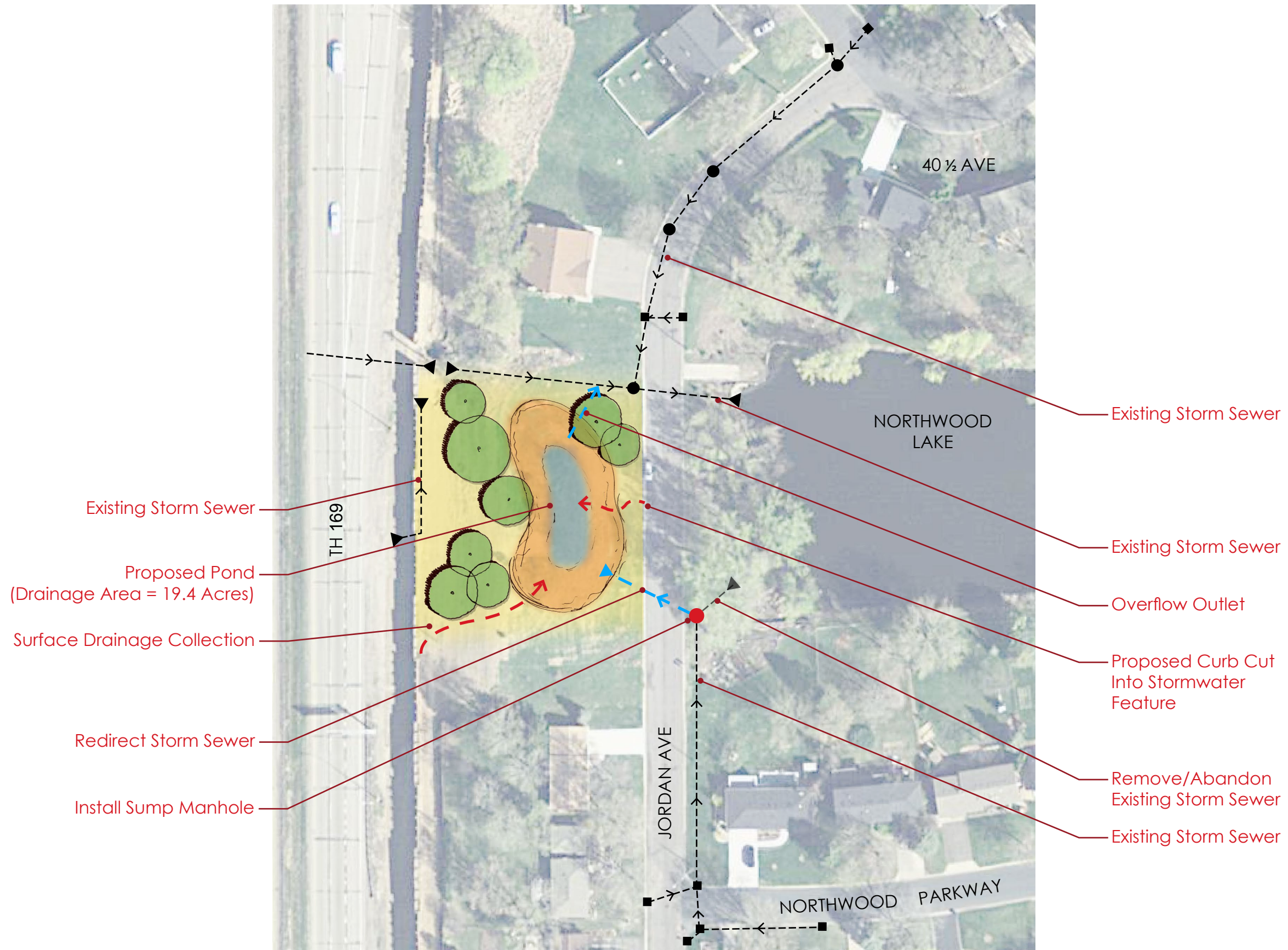
The BCWMC will also fund the Metropolitan Council's Citizen Assisted Monitoring Program (CAMP) during years when detailed water quality monitoring is not planned. On a bi weekly basis (April - October), citizen volunteers will collect a surface water sample for laboratory analysis of total phosphorus, total Kjeldahl-nitrogen, and chlorophyll-a, obtain a Secchi transparency measurement, and provide some user perception information about each lake's physical and recreational condition. Laboratory analysis of collected samples will be performed consistent with CAMP protocols, as determined by the Metropolitan Council Environmental Services.



NORTHWOOD PARK - CONCEPT A

CITY OF NEW HOPE, MINNESOTA
 2016 NORTHWOOD LAKE IMPROVEMENTS

Figure 1



JORDAN AVENUE - CONCEPT C

CITY OF NEW HOPE, MINNESOTA
 2016 NORTHWOOD LAKE IMPROVEMENTS

Figure 2

Cost Category	Estimated cost	Unit Cost	Quantity	Subtotals In-Kind	Match Cash	Loan Funds	Grant Cash	Total Budget
OBJECTIVE 1 - DESIGN PROJECT COMPONENTS								
A) Design storm water reuse system and raingardens - Subcontractor cost ¹	222,383.00				222,383.00			222,383.00
B) Design storm water treatment pond west of Northwood Lake - Subcontractor cost ²	27,862.00				27,862.00			27,862.00
OBJECTIVE 1 - TOTAL				0.00	250,245.00	0.00	0.00	250,245.00
OBJECTIVE 2 - CONSTRUCT STORM WATER REUSE SYSTEM & RAINGARDENS								
A) Construction costs - storm sewer redirect, treatment structure install ³	194,510.00				194,510.00			194,510.00
B) Construction costs - underground storage tank ⁴	328,739.00				328,739.00			328,739.00
C) Construction costs - water re-use piping and pumphouse ⁵	225,630.00				225,630.00			225,630.00
D) Construction costs - raingardens & curbcut ⁶	220,817.00						220,817.00	220,817.00
OBJECTIVE 2 - TOTAL				0.00	748,879.00	0.00	220,817.00	969,696.00
OBJECTIVE 3 - CONSTRUCT POND WEST OF LAKE								
A) Construction costs - pond construction ⁷	121,479.00				52,876.00		68,603.00	121,479.00
OBJECTIVE 3 - TOTAL				0.00	52,876.00	0.00	68,603.00	121,479.00
OBJECTIVE 4 - EDUCATE PUBLIC								
A) Educational sign design	1,000.00						1,000.00	1,000.00
B) Educational sign fabrication	1,000.00						1,000.00	1,000.00
OBJECTIVE 4 - TOTAL				0.00	0.00	0.00	2,000.00	2,000.00
OBJECTIVE 5 -MANAGE PROJECT & GRANT ADMIN								
A) BCWMC Administrator		67.00	/hr.	15.00	hrs		1,005.00	1,005.00
B) BCWMC Engineers								
Principal Engineer		165.00	/hr.	6.00	hrs		990.00	990.00
Consultant/Advisor		155.00	/hr.	14.00	hrs		2,170.00	2,170.00
Engineer/Specialist II		115.00	/hr.	18.00	hrs		2,070.00	2,070.00
C) BCWMC Administrator		67.00	/hr.	35.00	hrs		2,345.00	2,345.00
OBJECTIVE 5 - TOTAL				0.00	0.00	0.00	8,580.00	8,580.00
ITEMIZED BUDGET								
OBJECTIVE 1 - TOTAL					0.00	250,245.00	0.00	250,245.00
OBJECTIVE 2 - TOTAL					0.00	748,879.00	0.00	969,696.00
OBJECTIVE 3 - TOTAL					0.00	52,876.00	0.00	121,479.00
OBJECTIVE 4 - TOTAL					0.00	0.00	0.00	2,000.00
OBJECTIVE 5 - TOTAL					0.00	0.00	0.00	8,580.00
GRAND TOTAL					0.00	1,052,000.00	0.00	1,352,000.00

¹ Includes engineering, surveying, permitting, and administration to design and prepare plans for the stormwater reuse system and raingardens

² Includes engineering, surveying, permitting, and administration to design and prepare plans for the stormwater treatment pond

³ Includes removing existing storm sewer; installing storm sewer pipe; removing existing curb, sidewalk, and driveway pavement; salvaging and reinstalling sign; installing new curb, gutter, sidewalk, driveway

⁴ Includes reservoir excavation; installing storage tank concrete

⁵ Includes installing water main from pump house to irrigation system; building pump house and related plumbing

⁶ Includes clearing and grubbing; excavating raingarden trenches; installing sump manholes, emergency overflow, and outlet control structure; connecting to storm sewer; installing plantings, mulch; creating curb cut; removing and reinstalling pavement; salvaging and reinstalling street sign; removing and repairing bituminous trail; placing topsoil and mulch.

⁷ Includes tree removal; clearing and grubbing; pond excavation; removing existing storm sewer pipe, pavement, and curb; grading pond; installing sump manhole, storm sewer pipe, riprap; connecting to existing storm sewer; installing plantings and mulch.