



April 28, 2010

Mr. Brad Wozney
MN Board of Water and Soil Resources
520 Lafayette Road N.
St. Paul, MN 55155

**Re: Major Plan Amendment—Bassett Creek Watershed Management Commission's
September 2004 "Watershed Management Plan"**

Dear Mr. Wozney:

In an April 5, 2010 letter to you, the Bassett Creek Watershed Management Commission (BCWMC) proposed a minor plan amendment to the September 2004 BCWMC *Watershed Management Plan* (BCWMC Plan). The proposed minor plan amendment involved two additions to Table 12-2, Water Quality Management and Flood Control 10-Year Capital Improvements Program (CIP):

- One project is proposed to restore the Main Stem of Bassett Creek from Highway 169 in the City of Golden Valley to the City of Crystal boundary; construction is to begin in 2011
- One project is proposed to restore the channel of the North Branch of Bassett Creek from 36th Avenue to Bassett Creek Park in the City of Crystal; construction is to begin in 2011

In an April 22, 2010 letter from MN Board of Water and Soil Resources (BWSR) staff, the BCWMC learned that BWSR would require a major plan amendment for the BCWMC to add these projects to their CIP. *Therefore, please disregard/discard our previous letter and replace it with this letter. With this letter, the BCWMC proposes a major plan amendment to add the above two projects to its CIP.*

The remainder of this letter describes the proposed BCWMC Plan modifications in more detail and the major plan amendment process.

Additions to the CIP— Main Stem of Bassett Creek, North Branch of Bassett Creek

The BCWMC Plan recognized the need to restore stream reaches (e.g., the Main Stem of Bassett Creek and the North Branch of Bassett Creek) damaged by erosion or affected by sedimentation. Section 7.0 of the BCWMC Plan describes the issue, the Commission's policies relating to channel restoration and the benefit of stream restoration in preserving fisheries habitat and minimizing nutrient and sediment loads to the creek and downstream waters. The Commission established the Creek and Streambank Trunk System Maintenance, Repair and Sediment Removal Fund (the Restoration Fund) to address the issue. The Commission decided to assess the cities in the watershed \$25,000 annually to fund channel restoration projects (Restoration Fund). The cities conducted inventories of the channel reaches and the BCWMC Plan identified specific problem areas.

As part of the Commission's 2007 annual review of the CIP, the Commission noted that money was accumulating in the Restoration Fund, but there were no restoration projects scheduled for construction. The cities indicated that to repair the identified channel erosion and sedimentation problems efficiently and cost effectively, reaches with several problem areas needed to be completed

as one project. It was further noted that if the restoration was completed by reach, sufficient money in the Restoration Fund was not available to complete any of the projects.

The Commission decided to identify channel restoration projects by stream reach, prepare cost estimates for the restoration of the reach, prioritize the restoration projects and add the larger projects to the CIP. A reach of the Sweeney Lake Branch of Bassett Creek was restored in 2008-2009 and reaches of Plymouth Creek and the Main Stem of Bassett Creek are being restored in 2010-2011. The principal difference between completing the restoration projects as part of the CIP rather than completing them using the Restoration Fund is the source of the funds. The CIP is funded by ad valorem taxes and the Restoration Fund receives funds from the cities, which could come from a variety of sources.

The Bassett Creek Main Stem and North Branch of Bassett Creek channel restoration projects proposed to be added to the CIP will consist of a variety of erosion control measures including:

- Rock vanes to direct flow away from eroding stream banks
- Check dams to prevent erosion of the stream bottom
- Realigning portions of the stream
- Armoring the banks
- Removing accumulated sediment
- Redirecting runoff that is contributing to slope failures
- Regrading, stabilizing and revegetating slopes and shoreline

The total estimated cost of the two restoration projects is \$1,440,000; \$780,000 for the Bassett Creek Main Stem project and \$660,000 for the North Branch Bassett Creek project.

Attached is an excerpt from the July 2009 draft *Resource Management Plan for the Bassett Creek Watershed Management Commission, Proposed Water Quality Improvement Projects, 2010-2016* (prepared for the BCWMC). The excerpt provides background information on the proposed channel restoration projects.

Also attached is the revised CIP (Table 12-2 in the BCWMC Plan). The revised table shows the two additional projects, along with the completed and future CIP projects. The CIP shows the projects proposed to be completed from 2010 through 2018 and their estimated costs. The CIP also lists the completed CIP projects and the actual project costs; the year of completion is shown in the notes at the bottom of the table.

Major Plan Amendment Process

In accordance with MN Statute 103B.231, copies of this proposed plan amendment are being sent to the member cities, Hennepin County, Hennepin Conservation District, the Metropolitan Council, the state review agencies, and BWSR for their review and comment. Copies of the major plan amendment will also be made available on the BCWMC's website (www.bassettcreekwmo.org). Written comments should be sent to the Commission at the address shown below. We are extending the 60-day review period to August 1, 2010 to allow sufficient time for Hennepin County to review and act on this amendment request. Extending the 60-day review period to August 1 also allows the BCWMC to follow the new streamlined review process, which will take effect on August 1, 2010. The new process for major plan amendment (and plan) review no longer includes the second (45-day) review by the state agencies. Upon completion of the first review, the BCWMC will respond to

comments, hold a public hearing on the plan amendment, and then submit the plan amendment to BWSR for Board approval.

These two projects are proposed to be constructed in 2011. For this to happen, the BCWMC must order the project and submit its tax levy request to Hennepin County by the end of September 2010. Therefore, it is very important that the BCWMC's major plan amendment request be acted on at the September 22 BWSR Board meeting.

Thank you for your review of this proposed amendment. We look forward to working with the BWSR staff to gain the BWSR Board's timely approval of this major plan amendment. After approval of the major plan amendment, but prior to ordering the channel restoration projects in the amendment, the BCWMC will hold another public hearing to receive comments on the proposed projects.

Please call either Charlie LeFevere, Esq., the BCWMC's legal representative, at (612) 337-9215, or Len Kremer, P.E., the BCWMC's engineer, at (952) 832-2781 if you have any questions.

Sincerely,



Linda R. Loomis
Chair, Bassett Creek Watershed Management Commission

Note: please send written comments to:

Ms. Linda Loomis
Bassett Creek Watershed Management Commission, Chairperson
c/o Barr Engineering Co.
4700 West 77th Street
Minneapolis, MN 55435

Enclosure(s)

c: Hennepin County – Mr. Joel Settles
Hennepin Conservation District – Ms. Stacey Lijewski
City of Crystal – Ms. Janet Lewis, City Clerk
City of Golden Valley – Ms. Sue Virnig, City Clerk
City of Medicine Lake – Ms. Nancy Pauly, City Clerk
City of Minneapolis – Mr. Steven Ristuben, City Clerk
City of Minnetonka – Mr. David Maeda, City Clerk
City of New Hope – Ms. Valerie Leone, City Clerk
City of Plymouth – Ms. Sandra Engdahl, City Clerk
City of Robbinsdale – Mr. Tom Marshall, City Clerk
City of St. Louis Park – Ms. Nancy Stroth, City Clerk
Minnesota Department of Natural Resources – Ms. Charlotte Cohn
Minnesota Pollution Control Agency – Mr. David L. Johnson
Minnesota Department of Health – Mr. Art Persons
Minnesota Department of Agriculture – Ms. Becky Balk
Metropolitan Council – Ms. Judy Sventek
Bassett Creek Watershed Management Commission

**Resource Management Plan
for
Bassett Creek Watershed Management Commission
Proposed Water Quality Improvement Projects
2010 – 2016**

**Prepared for
Bassett Creek Watershed Management Commission**

July 2009

I hereby certify that this plan was prepared by me or under by
direct supervision.



Leonard J. Kremer
Engineer for the
Bassett Creek Watershed
Management Commission

10170

Minnesota Registration No.

3.2 Creek Stabilization Projects

A total of five creek reaches will be stabilized (Table 2) as part of the BCWMC CIP. The goals for each of the creek stabilization projects include:

- Repairing bank erosion sites to reduce the sediment and phosphorus load into the stream system;
- Prevent future erosion through grade control and adjustment of channel dimensions to achieve equilibrium with the watershed hydrology;
- Re-establish native, robust riparian vegetation communities that have been disturbed through development.

3.2.1 Stabilization Measures

The concept plans developed for the Bassett Creek watershed streams call for a variety of streambank stabilization measures to be used. These measures are summarized below.

3.2.1.1 Vegetation Management

Vegetation management involves the selection of an optimal species mix to contribute to a healthy and stable stream. Typically an optimal species mix will provide good root structure to help stabilize streambanks and provide good habitat for riparian birds and animals. Obtaining this mix often requires planting new species, removing unwanted or exotic species, and/or thinning existing vegetation to provide enough sunlight to allow new ground vegetation to become established. Vegetation management is recommended for most of the restoration sites along the five stream restoration reaches. It is recommended that invasive species of vegetation and less desirable tree species be removed, leaving the more valuable trees and vegetation in place. Supplemental planting of ground vegetation is also desirable.

3.2.1.2 Channel Grade Control

Grade control measures are used where channel downcutting has occurred or has the potential to occur. High flow velocities during flood conditions increase the sediment-carrying capacity of the stream. This can result in channel downcutting and subsequent widening as the banks become oversteepened and slump into the channel. Channel downcutting has not occurred to any significant degree in any of the reaches to be stabilized, however, installing grade control is an excellent way to prevent downcutting and its devastating consequences.

The grade control measures would be constructed with boulders and coarse gravel. A V-shaped rock weir is constructed so that the flow is concentrated toward the center of the channel and away from the banks. Multiple weirs can be constructed to stabilize a longer reach.

3.2.1.3 Rock Vanes

Rock vanes are constructed from boulders on the creek bottom. They function by diverting channel flow toward the center and away from the bank. They are typically oriented in the upstream direction and occupy no more than one third of the channel width. Vanes are largely submerged and inconspicuous. The rocks are chosen such that they will be large enough to not move during flood flows or by vandalism, with additional smaller rock material used to add stability. Rock vanes function in much the same way as root wads in that they push the stream centerline away from the outside bend. They also promote sedimentation behind the vane, which adds to the toe protection.

3.2.1.4 Root Wads

Root wads consist of logs with the root ball attached and anchored into the bank, so that only the root ball is exposed. Typically placed about half below and half above the normal water line, they are well suited to deeper locations such as outside bends. The trunk portion is placed in the bank by either placing it in a trench or by pushing the trunk into the bank. The root wad absorbs energy and diverts flows away from the bank. Root wads are generally cost effective and provide excellent fish habitat.

3.2.1.5 Riprap

Stone toe protection employs stones to armor the toe of the bank. It is often used on sites that are too shaded to support good ground vegetation, and where rock vanes or root wads are not necessary. Stones are selected to be large enough so that they would not be moved by flood flows, but small enough to be of similar size as other stones found in and near the stream and thus appear natural.

3.2.1.6 Grading and Revegetation

Grading and revegetation of the eroded bank is the most common method for stabilization. With this method, the upper bank is graded at a 2:1 (2 foot horizontal to 1 foot vertical) or flatter slope to allow for replanting. The slope is typically seeded with a cover crop and covered with erosion control fabric. Plant plugs and shrubs such as willows or dogwood can then be installed through the erosion control fabric. The stabilized slope and vegetation work together to prevent erosion from stream flows, wind, and raindrop impact.

3.2.1.7 Vegetated Reinforced Soil Slope

Vegetated reinforced soil slope (VRSS) is typically used on steep slopes where grading the bank to a more stable slope is not an option due to site restrictions. VRSS typically involves protecting layers of soils with a blanket or geotextile material (e.g. erosion control blanket) and vegetating the slope by either planting selected species (often willow or dogwood species) between the soil layers or by seeding the soil with desired species before it is covered by the protective material. In either case, if given enough light and moisture, the vegetation grows quickly and provides significant root structure to strengthen the bank. This method tends to be labor intensive and, therefore, somewhat expensive.

3.2.1.8 Live Stakes

Live stakes are live, rootable vegetative cuttings, typically from willow and dogwood species. Cuttings can be taken when the plants are dormant. The cuttings are placed into the ground during the late fall or early spring, and the cuttings will develop new roots and shoots. Live stakes represent a means to quickly establish new vegetation on an exposed bank.

3.2.1.9 Live Fascines

Live fascines are similar to live stakes in that they use dormant cuttings from the same species. However, instead of the cuttings being pounded into the ground, the cuttings are bundled and placed into a shallow trench. Fascines also quickly establish vegetation on an exposed bank, and they also aid in halting sheet flow down the bank.

3.2.1.10 Biologs

Biologs are coir fabric rolls that are used to provide toe protection on banks of streams and lakes. They can be used where protection requirements do not require something as strong as riprap, and they provide a “softer” look than riprap. They gradually biodegrade over time, so they are typically used with other stabilization measures that will be able to continue to provide bank stability after the biologs lose some of their integrity.

3.2.1.11 Channel Relocation

In some cases, it is necessary or advantageous to relocate a stream channel. This is done in cases where the stream channel had previously been altered, where the existing alignment is not a feasible long-term option, or as a means to mitigate severe erosion problems.

3.2.2 Creek Concept Restoration Plans

3.2.2.1 Bassett Creek Main Stem Reach 1

Reach 1 of the Main Stem of Bassett Creek (Figure 12) extends for 17,400 feet through 12 sub-reaches from Wisconsin Avenue to Highway 100 in the City of Golden Valley. Land use immediately adjacent to the creek is predominantly single family residential homes. There is also some institutional and commercial land use, along with a golf course. There are at least 30 distinct sites along this reach that need some form of stabilization. There are also a total of 33 obstructions within this reach. Most of the obstructions are in the form of culverts and bridges, but some of them are fallen trees or other debris within the stream channel. The causes for bank erosion are not the same for each site within this reach, however, the causes include: poor vegetation management, natural causes, changing watershed hydrology, and concentrated runoff from adjacent land uses.

During the feasibility study for this reach, several items will need to be completed before completing preliminary designs. First, the causes of the erosion will require additional investigation. Second, all obstructions should be evaluated to determine if they are causing detrimental effects to the stream and if corrective measures are necessary. Last, it will also be necessary to re-inventory the erosion sites to determine if any of the previously documented sites have changed and to determine if new sites have developed. Previously documented problems along the 12 sub-reaches for this project site include failing retaining walls, failing banks, poor riparian vegetation, and bed scour. Conceptual bank stabilization measures for the erosion sites are presented in Figure 12. The bank stabilization measures are chosen to (a) provide a combination of hard armoring where necessary and softer bioengineering methods that are aesthetically pleasing, (b) provide a means for the sites to be somewhat flexible to natural changes to the stream, and (c) provide a means for natural self repair. The methods include toe protection (stone toe protection, biologs, and root wads), grade control (constructed riffles and cross vanes), bank protection (VRSS and fascines), and vegetation (live stakes, native seeding, and vegetation management).

Implementation of the project will ultimately require close coordination between the BCWMC and land owners to ensure the long term project health. Landowners will need to be supportive of the feasibility level plans for stabilizing stream banks on their properties. Most importantly, the landowners will need to understand the importance of maintaining the designed measures, particularly the vegetation component since poor vegetation management is a common cause of the bank failures. Natural resources for this reach are shown on Figures 13a and 13b.

Table 14 Natural Resource Involvement and Impacts for CIP Project Bassett Creek Main Stem Reach 1

Natural Resource	Involvement and Impact
Wetlands or other Surface Waters	Virtually no wetlands were identified by NWI within this stretch of Bassett Creek; however, most of this stretch is mapped as containing hydric soils. In 1947 aerial photography, this stretch of creek was fully channelized and the area surrounding it had been cleared. The present-day golf course had already been built by 1947. No distinct indicators of wetlands intersecting this stretch of Bassett Creek were detected in the historic photo.
DNR Public Waters	None in this area.
NHIS Threatened or Endangered Species	None anticipated due to lack of available habitat.
Regional Significance	Much of this section of Bassett Creek is considered a “Regional Ecological Corridor” and the entire stretch is included in the “Central Region Green Infrastructure.” Both of these were drawn for the inclusion of Bassett Creek. The Regional Ecological Corridor maps a connection between Medicine Lake and Bassett Creek by following a railroad corridor.

3.2.2.2 Bassett Creek Main Stem Reach 2

The second reach of the Bassett Creek Main Stem to be stabilized flows for approximately 3,500 feet from Highway 100 to Regent Avenue in Golden Valley (Figure 12). There are four distinct sites of moderate bank erosion, scour, and bank failure. The total length of bank erosion is approximately 600 feet. There are also four obstructions on this reach that will need to be investigated during the feasibility study. The causes of bank failure along this reach appear to be a combination of poor vegetation management and natural causes associated with changing watershed hydrology.

Stabilization along this reach will be relatively easy to complete because much of the land adjacent to the stream is publicly owned. The remaining land is owned by only a couple of private owners, and development has not occurred immediately adjacent to the channel as it has on most other reaches. The concept stream bank stabilization measures are summarized in Figure 12 and include stone toe protection, rock vanes, root wads, live stakes, biologs, native plantings and vegetation management. Natural resources for this reach are shown in Figures 13a and 13b.

Table 15 Natural Resource Involvement and Impacts for CIP Project Bassett Creek Main Stem Reach 2

Natural Resource	Involvement and Impact
Wetlands or other Surface Waters	Most of this stretch of Bassett Creek is identified as containing wetlands. Only the easternmost end of this stretch is identified as containing hydric soils. This section of creek appears to have been channelized according to a 1947 historic aerial photo. The area was cleared and intensely farmed, but some indicators of wetland hydrology were visible.
DNR Public Waters	None in this area.
NHIS Threatened or Endangered Species	None anticipated due to lack of available habitat.
Regional Significance	This stretch is included in the “Central Region Green Infrastructure”, which roughly follows the alignment of Bassett Creek.”

3.2.2.3 Bassett Creek North Branch

Upstream of Bassett Creek Park Pond and the confluence with the main stem of Bassett Creek, seven sub-reaches of the North Branch of Bassett Creek to be stabilized flows for approximately one mile through residential areas in the City of Crystal (Figure 15). Like many urban streams, the section of the North Branch from 36th Avenue to Bassett Creek Park suffers from stream bank and streambed erosion. Erosion problems have developed because flows in the creek have increased due to urbanization and the creek is working to increase its cross-sectional area accordingly. Stream channel evolution occurs in much of this reach of the North Branch through stream bank slumping and channel widening. In addition to contributing sediment and other pollutants to the creek, this erosion has the potential to endanger property, including private buildings and public infrastructure (especially sanitary sewers). Moderate erosion problems are common in segments 4 through 7 of this reach, from upstream of Douglas Drive through 32nd Avenue.

In the lower portions of this reach a ditched segment of the North Branch flows through Bassett Creek Park. In this segment the channel is artificially straight and wide, and low flows in the creek are very shallow and slow. Because of this slow flow, a large amount of sediment has been deposited along the ditch bottom. In this area, the creek is working to decrease its cross-sectional area, especially during low flows.

Restoration of this reach of the North Branch of Bassett Creek will include a variety of measures designed to stabilize the creek and reduce both erosion and deposition. Creek banks will be regraded to stable slopes, sanitary sewer manholes will be protected, sediment will be excavated from portions

of the channel, the creek channel will be relocated in some places, and a low-flow channel will be created within the ditched segment in Bassett Creek Park. Structural creek stabilization measures will include riprap, rock vanes, root wads, biologs, fascines, and vegetated reinforced slope stabilization (VRSS). Live willow stakes will be used to further stabilize creek banks, where appropriate, and native vegetation will be established on areas disturbed by construction.

Natural resources for this reach are shown in Figure 15.

Table 16 Natural Resource Involvement and Impacts for CIP Project North Branch Bassett Creek

Natural Resource	Involvement and Impact
Wetlands or other Surface Waters	The southern end of this stretch of North Branch Bassett Creek contains forested and shallow marsh NWI wetlands; however no hydric soils are mapped within this stretch of creek. According to a 1947 historic aerial photo, this stretch of creek was channelized into a perfectly straight channel, but has since regained some sinuosity. The northern end of this stretch of creek was already developed in residential housing. The remainder of this section of creek was cleared for agriculture with very little indicator of historic wetlands. The surface waters at the southern end of this stretch appear to have been man-made.
DNR Public Waters	An unnamed Public Water “27-646 P” occurs at the southern end of this stretch of creek.
NHIS Threatened or Endangered Species	None listed in this area by NHIS, though there is a small chance of Blanding’s turtle within the Public Water mentioned above, along with surrounding shoreline. Generally the aquatic habitat does not appear to be suitably vegetated for Blanding’s turtle.
Regional Significance	None in this area.

3.2.2.4 Plymouth Creek, Reach 1

Reach 1 of Plymouth Creek (Figure 16) flows for approximately 7,000 feet between 26th Avenue North and West Medicine Lake Road through the City of Plymouth. Unlike the other stream projects to be completed, a feasibility study has already been completed for this reach (Barr, 2008) to stabilize 17 documented erosion sites. This reach suffers from stream bank and streambed erosion, which is caused by increased urban runoff. A portion of the stream channel was also historically relocated in the lower portion of this reach. Erosion issues develop because the creek is attempting to return to a stable condition with the increased flow that the channel carries. This evolution occurs through stream bank slumping, formation of sediment bars in the channel, which direct flow from one bank to

the other, and channel widening. Storm sewers which carry flow from adjacent development also have caused some of the bank and channel erosion.

The project along this reach of Plymouth Creek consists of removal of some trees and vegetation, regrading some reaches of stream bank, installation of a variety of stream stabilization measures to address erosion and sedimentation problems, excavation of sediment from portions of the channel, relocation of a portion of the stream channel to a location closer to its historic location, modification of some of the storm sewers tributary to the channel and establishing new vegetation on areas disturbed by construction. Proposed stream stabilization measures to be installed include riprap, root wads, biologs, cross vanes, and VRSS.

Natural resources along this reach are shown in Figure 17.

Table 17 Natural Resource Involvement and Impacts for CIP Project Plymouth Creek Reach 1 (PC-1)

Natural Resource	Involvement and Impact
Wetlands or other Surface Waters	Numerous forested, shrubby, and open water wetlands surround this stretch of Plymouth Creek, along with associated hydric soils. An examination of 1947 historic aerial photography reveals that much of the present-day wetland areas were extensive undeveloped and unfarmed diverse forested, shrubby, and herbaceous wetlands in 1947 which were interspersed with areas of cleared, grassy uplands. About half of this stretch of creek (the half nearer to Medicine Lake) had been channelized by this time.
DNR Public Waters	None in this area, though Medicine Lake is a Public Water.
NHIS Threatened or Endangered Species	None listed by NHIS in this area, but in reality, Blanding’s turtle should be anticipated in this stretch of creek. A bald eagle nest is located to the north along the shore of Medicine Lake, but restoration projects in Plymouth Creek should have no effect on this pair. Due to the proximity of surrounding development, there is little chance that enough suitable habitat is present for hooded warbler or peregrine falcon. The available habitat is not of the type utilized by trumpeter swans.
Regional Significance	This stretch of creek is included as “Central Region Green Infrastructure”, which generally follows Plymouth Creek. The creek probably does serve as a movement corridor for local wildlife; however, outside of the wetlands discussed above, the region in general is highly developed and does not provide much opportunity for wildlife use. The southern half of this stretch is also classified as a “Regional Ecological Corridor” which includes much of the wetlands previously discussed as well as much of Medicine Lake.

3.2.2.5 Plymouth Creek, Reach 2

Reach 2 of Plymouth Creek (Figure 18) flows for approximately 9,400 feet in three sub-reaches between Central Park and 26th Avenue North in the City of Plymouth. Similar to Reach 1 of Plymouth Creek, this reach suffers from stream bank and stream bed erosion. Increased urban runoff, natural causes, and poor vegetation are the primary causes for the erosion problems. There are 18 documented erosion sites along this reach.

Figure 18 shows conceptual stabilization measures for the sites along this reach. The potential measures to be used include cross vanes, stone toe protection, VRSS, live stakes, fascines, biologs, and vegetation management. A feasibility study will be completed prior to the design and construction of this project in 2015.

Natural resources along this reach are shown in Figure 19.

Table 18 Natural Resource Involvement and Impacts for CIP Project Plymouth Creek Reach 2 (PC-2)

Natural Resource	Involvement and Impact
Wetlands or other Surface Waters	Numerous forested, shrubby, and open water wetlands surround this stretch of Plymouth Creek, along with associated hydric soils. Historically, according to 1947 aerial photography, this stretch of creek was surrounded by land that had been cleared for agriculture. Much of the creek had already been channelized. Near the southern end of this stretch of creek appear to be the same wetlands that exist today, although appearing more herbaceous than shrubby in 1947. A narrow riparian forest corridor follows the southernmost extent in an area of Plymouth Creek that had not been channelized.
DNR Public Waters	An unnamed Public Wetland “27-617 W” intersects much of this section of Plymouth Creek and generally includes the wetland areas described above.
NHIS Threatened or Endangered Species	None in immediate vicinity. Blanding’s Turtle (a state-threatened species) has been observed to occur nearby to the east, and may also occur within or adjacent to Plymouth Creek in areas of suitable habitat. The area generally appears to be too developed to support any of the other listed species discussed in this report.
Regional Significance	This stretch of creek is included as “Central Region Green Infrastructure” which generally follows Plymouth Creek. The creek probably does serve as a movement corridor for local wildlife; however, outside of the named Public Waters, the region in general is highly developed and does not provide much opportunity for wildlife use.

Table 12-2 Water Quality Management and Flood Control 10-Year Capital Improvements Program

	Water Quality Improvement	Capital Cost ¹		Year								
		A (Actual Project (Cost))	E (Estimated Project Cost)	2010	2011	2012	2013	2014	2015	2016	2017	2018
Medicine Lake												
ML-1 ²	Construct wet detention pond for subwatershed BC94B1 (Option 8 in Medicine Lake Plan)		\$0									
ML-2 ³	Reduce Goose Loadings by 75% (Option 17 in Medicine Lake Plan)											
ML-3, ML-4 ⁴	Reroute flows from subwatershed BC94 to a larger wet detention pond for BC92 (Option 9a in Medicine Lake Plan) & dredging of accumulated sediment Medicine Lake East Beach wet detention pond for subwatershed BC107 (Option 11 in Medicine Lake Plan) & dredging of accumulated sediment	A	\$893,000									
ML-5 ⁵	Construct wet detention pond for subwatersheds BC98, BC98A and BC98B (Option 10a in Medicine Lake Plan) & dredging of accumulated sediment		\$0									
ML-6	Construct wet detention pond for subwatershed BC94B2 (Option 6 in Medicine Lake Plan)	E	\$14,000									\$14,000
ML-7 ⁶	In-Lake Herbicide Treatment (Option 18 in Medicine Lake Plan)	A	\$132,000									
ML-8	Lakeview Park Pond		\$0									
ML-11 ¹⁵	Medicine Lake Park Pond	E	\$1,100,000									
Plymouth Creek												
PC-1 ¹⁹	26th Avenue to Medicine Lake	E	\$965,000	\$902,462								
PC-2 ¹⁹	26th Avenue to 37th Avenue	E	\$559,000							\$105,000	\$454,000	
Parkers Lake												
PL-6 ¹⁴	Improvements to stormwater basin in PL-A13 near Circle Park (from the City of Plymouth's Parkers Lake Implementation Plan)	E	\$73,000									
Wirth Lake												
WTH-1 ⁷	Dredging subwatershed FR-5 detention pond (Option 2 in Wirth Lake Plan)	A	\$69,000									
WTH-2 ⁸	Highway 55 detention pond (option 3 in Wirth Lake Plan)	E	\$215,000									
WTH-3 ⁸	In-lake alum treatment (Option 1 in Wirth Lake Plan)	E	\$59,000									
Sweeney Lake												
Twin Lake												
TW-1 ⁹	Pond expansion (Option 1 in Twin Lake Plan)	E	182,000									
Westwood Lake												
WST-1 ¹⁰	Flag Avenue detention/ skimming facility (Option 1 in Westwood Lake Plan)	A	\$174,000									
Bassett Creek Park Pond												
	None-see Table 2 Potential future water quality projects											
Northwood Lake												
NL-1 ¹¹	Construct ponds NB-35A, B, C and NB-29A, B (Option 4 in Northwood Lake Plan)	E	\$595,000							\$595,000		
NL-2	Dredge pond NB-07 (Option 2 in Northwood Lake Plan)	E	\$943,000				\$943,000					
NL-3	Divert Lancaster Lane storm sewer (Option 3 in Northwood Lake Plan)	E	\$59,000									\$59,000
NL-4 ¹²	Construct ponds NB-36A, NB-37A, NB-38A and NB-28A, B (Option 5 in Northwood Lake Plan)	A	\$153,000									
NL-7 ¹⁶	Construct pond adjacent to creek	E	\$139,000									
Bassett Creek Main Stem												
BC-1 ¹³	Pond BC 10-3 (Option 4 in Bassett Creek Main Stem Plan)		\$0									
Crystal Boundary to Regent Ave ²⁰	Channel restoration	E	\$636,000	\$34,800	\$601,200							
Highway 169 to Crystal Boundary	Channel restoration	E	\$780,000		\$398,800	\$381,200						
BC3, BC5, BC7		E	1,300,000					\$15,800	\$984,200	\$300,000		
BC2, BC4, BC8		E	1,000,000				\$15,800	\$984,200				
Irving Avenue to Golden Valley Road	Channel restoration	E	\$1,000,000								\$546,000	\$454,000
Sweeney Lake Branch												
Courtawn Pond to Turners Crossing ¹⁷	Channel restoration	A	\$386,000									
North Branch												
36th Ave to Bassett Creek Park	Channel restoration	E	\$660,000			\$618,800	\$41,200					
Grimes, North, & South Rice Ponds												
GR-2	Grimes Pond wet detention pond (Option 4 in Rice and Grimes Ponds Plan)	E	\$104,000									\$104,000
Crane Lake												
CL-1	Ramada Inn detention/ skimming facility (Option 1 in Crane Lake Plan)	E	\$116,000									
CL-2 ¹⁸	Joy Lane Wet Detention Pond (Alt. #2)		\$0									
Turtle Lake												
	None Proposed											
Lost Lake												
	None Proposed											
		Capital Cost		2010	2011	2012	2013	2014	2015	2016	2017	2018
	ANNUAL ESTIMATED COST			\$937,262	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$984,200	\$1,000,000	\$1,000,000	\$631,000

Notes:

- Capital Cost does not include land acquisition costs, but does include legal, administration, and 25% additional for contingencies.
- Constructed by City.
- Periodically completed by City.
- This project includes dredging of accumulated sediment and was completed in 2006.
- Mn/DOT sound wall construction in New Hope will require relocation and resizing of storm sewer in this watershed.
- Treatment completed by the City of Plymouth in 2005, 2006, and 2008.
- Completed in 2006.
- Project authorized in 2006. Issues regarding participation by Mn/DOT and future maintenance have delayed construction, no current schedule.
- Project authorized in 2006. Issues regarding site contamination and right-of-way have delayed construction, no current schedule.
- Project completed in 2006.
- The City of New Hope constructed NB-35A, B, C but not to the same degree as proposed in the lake and watershed management plan. NB-29 A and B have not been constructed. These improvements will need to be re-evaluated as part of the feasibility study. Costs shown are for NB-29A and B only. Costs will be added to the CIP to upgrade these ponds if the feasibility study indicates that they should be upgraded.
- The City of New Hope constructed NB-28A and B. NB-36A, NB-37A and NB-38A were completed in 2006.
- This project was completed as part of the Boone Ave and Brookview Golf Course improvement projects in 2004.
- Project approved for construction in 2006, to be completed as part of street repaving project.
- Minor Plan Amendment approved April 2007. Project to be completed in 2010.
- Minor Plan Amendment approved September 2007. Project completed in 2009.
- Minor Plan Amendment approved August 2007. Project completed in 2008.
- Not feasible per city of Minnetonka in 2008.
- Minor Plan Amendment approved June 2009. Project PC-1 to be completed in 2011.
- Minor Plan Amendment approved June 2009.