SURFACE WATER MANAGEMENT PLAN

CITY OF BLAINE, MN

DRAFT: December 2017

WSB Project No. 02907-020

Title Page

Certification

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ACD – Anoka Conservation District

BMPs – Best Management Practices

BWSR – Board of Water and Soil Resources

CCWD – Coon Creek Watershed District

City – City of Blaine

CIP – Capital Improvement Projects

CWPMP – Comprehensive Wetland Protection and Management Plans

DNR – Minnesota Department of Natural Resources

DWSMA – Drinking Water Supply Management Area

IDDE – Illicit Discharge Detection and Elimination

IESF – Iron-Enhanced Sand Filter

LiDAR – Light Detection and Ranging

LGU – Local Governing Unit

LSWMP – Local Surface Water Management Plan

MCBS – Minnesota Bounty Biological Survey

MDH – Minnesota Department of Health

MIDS – Minimal Impact Design Standards

MLCCS – Minnesota Land Cover Classification System

MnRAM – Minnesota Routine Assessment Method for Evaluating Wetland Functions

MPCA – Minnesota Pollution Control Agency

MS4 – Municipal Separate Storm Sewer System

NPDES – National Pollutant Discharge Elimination System

NOAA – National Oceanic and Atmospheric Administration

NRI – Natural Resources Inventory

NWI – National Wetland Inventory

NWS – National Weather Service

PAHs – Polycyclic Aromatic Hydrocarbons

PPB – Parts Per Billion

RCWD – Rice Creek Watershed District

SNA – Scientific and Natural Area

SOP – Standard Operating Procedure

SSTS – Subsurface Sewage Treatment System

SWAMP – Stormwater Asset Management Program

SWMP – Surface Water Management Plan (also called the plan, City plan and local plan)

SWPPP – Storm Water Pollution Prevention Plan

TMDL – Total Maximum Daily Load

TP – Total Phosphorus

TSS – Total Suspended Solids

WCA – Wetland Conservation Act

WMO – Watershed Management Organizations

1. EXECUTIVE SUMMARY

1.1. Local Surface Water Management Plan Purposes

This Local Surface Water Management Plan (Surface Water Management Plan, LSWMP, SWMP) will serve as a comprehensive planning document to guide the City of Blaine in conserving, protecting, and managing its surface water resources. This plan has been created to meet the requirements detailed in Minnesota Statutes 103B and Minnesota Rules 8410, administered by the Minnesota Board of Water and Soil Resources. This plan is also consistent with the goals and policies of the Metropolitan Council's *Water Resources Policy Plan*, and the two watershed management organizations having jurisdiction within the City: Rice Creek Watershed District (RCWD) and Coon Creek Watershed District (CCWD). This plan may be periodically amended to remain current with local practices and policies. The purposes of the water management programs are to:

- Protect, preserve, and use natural surface and groundwater storage and retention systems;
- Minimize public capital expenditures needed to correct flooding and water quality problems;
- Identify and plan for means to effectively protect and improve surface and groundwater quality;
- Establish more uniform local policies and official controls for surface and groundwater management;
- Prevent erosion of soil into surface water systems;
- Promote groundwater recharge, where beneficial;
- Protect and enhance fish and wildlife habitat and water recreational facilities; and
- Secure the other benefits associated with the proper management of surface and groundwater.

The Blaine Local Surface Water Management Plan addresses these purposes.

1.2. Executive Summary

The Blaine Surface Water Management Plan is organized as follows:

- ***Section 1.0 Executive Summary*** provides background information and summarizes the plan's contents.
- ***Section 2.0 Land and Water Resource Inventory*** describes the physical setting, the history, natural resources, and land uses within the City.
- ***Section 3.0 Agency Cooperation*** outlines other governmental controls and programs that affect stormwater management.
- ***Section 4.0 Assessment of Problems and Issues*** presents the City's water management related problems and issues.
- ***Section 5.0 Goals and Policies*** outlines the City's goals and policies pertaining to water management.
- ***Section 6.0 Implementation Program*** presents the implementation program for the City of Blaine, which includes defining responsibilities, prioritizing, and listing the

program elements.

- ***Section 7.0 Administration*** outlines the continued administration of this plan with respect to plan updates and amendments.

1.3. Requirements

This LSWMP serves multiple purposes including statutory and rule compliance. Minnesota statute 103B.235 defines content for local water management plans. According to the statute's text:

Each local plan, in the degree of detail required in the watershed plan, shall:

(1) describe existing and proposed physical environment and land use;
(2) define drainage areas and the volumes, rates, and paths of stormwater runoff;
(3) identify areas and elevations for stormwater storage adequate to meet performance standards established in the watershed plan;
(4) define water quality and water quality protection methods adequate to meet performance standards established in the watershed plan;
(5) identify regulated areas; and
(6) set forth an implementation program, including a description of official controls and, as appropriate, a capital improvement program.

Minnesota rules 8410, written for the Board of Water and Soil Resources (BWSR), provide more detail on local plan content. Although the BWSR guidance applies specifically to watershed management organizations, this guidance has historically been used to frame expectations for municipal plans. According to rules 8410 local plans must provide or address:

- Executive summary
- Land and water resource inventory
- Impact on other units of government
- Establishment of goals and policies
- Assessment of problems
- Implementation program
- Implementation priorities
- Plan contents; amendments
- Annual reporting requirements

The Blaine LSWMP must satisfy the requirements of the Minnesota Pollution Control Agency's Municipal Separate Storm Sewer System (MS4) program. This program is designed to reduce the sediment and pollution that enters groundwater and surface waters to the maximum extent practicable. The MS4 program is regulated through the use of National Pollutant Discharge Elimination System (NPDES) permits. These NPDES permits require the development of Storm Water Pollution Prevention Programs (SWPPP).

The Blaine LSWMP must also satisfy Metropolitan Council requirements as contained in their 2040 Water Resources Policy Plan. These requirements build on those of Rules 8410.

Beyond state level and Metropolitan Council requirements, this plan must be consistent with those of the watershed organizations with jurisdiction in the City. Very often watershed districts outline specific content for local plans that go beyond that required by statute and rule. In Blaine the following local watershed district plan requirements pertain:

- **Rice Creek Watershed District**

From the RCWD 2010 Watershed Management Plan with a 2016 Amendment:

- Compliance with minimum requirements based on Minnesota State Statute.
- Additional requirements as listed in RCWD's Watershed Management Plan Section 8.3.1.
- If cities choose to take over permitting authority from RCWD, the cities must adopt ordinances and procedures related to implementation and administration necessary to ensure RCWD's regulatory standards are met.

The RCWD completed an update of their management plan in January 2010. Their rules were revised in January 2017. The City has made or is in the process of making the necessary updates to meet compliance with these documents as required by state statute.

- **Coon Creek Watershed District**

From the CCWD 2013 Watershed Management Plan:

- Compliance with minimum requirements based on Minnesota Statute.

CCWD completed a rule revision in 2009 and completed an update of their management plan in 2013. The City has made or is in the process of making the necessary updates to meet compliance with these documents as required by state statute.

1.4. Info on MS4 and Asset Management

2. LAND AND WATER RESOURCE INVENTORY

2.1. Location and History

The City of Blaine is located in the northern portion of the Twin Cities metropolitan area, primarily within southern Anoka County as shown on **Figure 1, Appendix A**. There are several major transportation corridors within Blaine – Highway 65, Interstate 35W, and State Highway 10.

Significant housing growth has occurred in the City within the last decade. Over the next 25 years, continued growth is expected to occur in the remaining portions of Blaine's northeastern and northwestern areas. Commercial development and redevelopment is focused along Highway 65 and around the intersection of Interstate 35W and County Highway 17. Considered a developing community within the Twin Cities metropolitan area, Blaine's population is anticipated to grow through 2040, as shown in **Table 2.1**.

Table 2.1 Blaine Population

Year	Population	Households
2010	57,186	21,077
2016	64,188	23,586
2020	66,300	25,100
2030	76,700	29,200
2040	87,300	33,300

Sources: Metropolitan Council Population/Household Estimates

2.2. Physical Setting

2.2.1. Topography and Geology

The topography is generally characterized as gently undulated with little relief. This topography was shaped by the advance and retreat of glaciers, most recently the Grantsburg Lobe. These glaciers left behind the Anoka Sandplain. The sand and gravel till of the moraine has been reworked over the centuries by weather and vegetation to form principally fine sand. Large blocks of ice remained within the moraine as the glaciers retreated, melting to form wetlands and lakes.

The City is topographically divided into three major drainage districts which generally follow the watershed district jurisdictional boundaries, shown in **Figure 2, Appendix A**. The primary conveyance for all drainage districts is an extensive system of ditches. **Figure 3, Appendix A** shows the City's subwatershed drainage areas and ditch system. The ditch systems are largely intact, although some have been replaced with storm sewer and interconnected chains of ponds.

Runoff from the northwestern and central portion of the City drains to the west via County Ditches 39, 41, 17, and 60 along with Pleasure Creek within the CCWD. Parts of Northern Blaine also drains viz Ditch 50 and 44.This district covers over half of the total City area. Ditch 60 drains into Ditch 41 which continues on into the City of Coon Rapids. Each of these ditch systems continue into the City of Coon Rapids, leaving the City of Blaine at University Avenue.

County Ditch 17 (Springbrook Creek) and Pleasure Creek carry the runoff from the southwest portion of Blaine. Springbrook Creek continues into the City of Fridley near 85th Avenue and County Road 10. Pleasure Creek continues into Coon Rapids near County Road 10 and University Avenue. This drainage district is within CCWD and forms the smallest drainage district in the City of Blaine, covering roughly 12 percent.

There are three major ditch systems in the eastern and southern portion of the City, County Ditch 53-62, Rice Creek, and Judicial Ditch 1. These systems are within RCWD and cover approximately 35 percent of the total land area. County Ditch 53-62 is tributary to Circle Pines and carries the majority of the runoff in the City north of Interstate 35W. Judicial Ditch 1 carries the runoff from the southeast corner continuing into the City of Mounds View near Interstate 35W and 85th Avenue. A portion of Rice Creek meanders through the southeast corner of Blaine near 85th Avenue.

Additional geological information can be found in the *Anoka County Geologic Atlas* website.

2.2.2. Soils

The NRCS published the *Soil Survey of Anoka County Minnesota (Soil Survey)* in 1980. The *Soil Survey* provides mapping and physical properties for soil types found in Blaine. The *Soil Survey* was added to the Soil Survey Geographic (SSURGO) Database in 2005, providing digital access to the information.

The *Soil Survey* assigns each soil type to a hydrologic soil group, according to the soil's ability to infiltrate water during long-duration storms. The four hydrologic soil groups are: Group A – high infiltration, Group B – moderate infiltration, Group C – slow infiltration, and Group D – very slow infiltration. Most of the soil types in Blaine are classified in hydrologic soil Group A. **Figure 4, Appendix A** provides hydrologic soil groupings for Blaine.

These specific groups include the Zimmerman, Lino, Isanti, and Rifle soil series. All except the Rifle soil series are classified as having low runoff potential as they are excessively drained sands with high infiltration rates. Though Blaine's soils indicate a high infiltration potential, infiltration is precluded as a Best Management Practice (BMP) where depth to groundwater is less than three feet. The NPDES stormwater construction permit and the Minnesota Stormwater Manual call for three feet of vertical separation from an infiltration practice and underlying water table. Generally, the three-foot separation is understood as applying to the seasonal high water table, if this can be determined. The purpose of the separation is not so much protection of the underlying water table, but to maintain an aerobic zone between the infiltration practice and the anaerobic zone within the water table. This aerobic environment allows for the biological treatment of pollutants. Other volume management methods are available where depth to groundwater is less than three feet including decreasing impervious surfaces, disconnecting impervious, using green roofs, tree planting, and preserving vegetation through easements.

2.2.3. Climate and Precipitation

The climate within the Twin Cities Metropolitan Area is typical of a continental climate. Without the buffering influence of large bodies of water, cold winters and hot summers predominate. It is generally understood that global climate change has an effect on the Twin Cities Metropolitan Area's local climate. One area where climate change manifests itself is in rainfall intensities and rainfall depths. The Twin Cities Metropolitan Area has seen more intense rainfalls the last two decades and even the average rainfalls seem more intense. The implications are clear:

- Flood control facilities, if designed for the 100-year rainfall, may get larger as the statistical 100-year rainfall gets larger.
- Facilities designed for smaller events, such as infiltration areas and small storm sewer, may also get larger as rainfall depths increase for the 1-year to 5-year rainfall events.

Climate data for Blaine (Station 211785) is published by the National Weather Service (NWS) station at Chanhassen, MN. The NWS is a branch of the National Oceanic and Atmospheric

Administration (NOAA). **Table 2.2** provides a summary of average temperature, precipitation, and snowfall data for Blaine. The total average annual precipitation in the Twin Cities Metropolitan Area is approximately 30.6 inches. The total average annual snowfall is approximately 54.4 inches.

Rainfall frequency estimates are used as design tools in water resource projects. Rainfall frequencies are summarized in *Technical Paper No. 40, Rainfall Frequency Atlas of the United States*, published by the U.S. Weather Bureau in 1961. This document was updated in 2013. Atlas 14 is the new document used as reference for rainfall frequencies. It has been adopted by both the RCWD and CCWD in their respective stormwater management rules. The U.S. Weather Bureau was combined with other agencies in 1970 to form NOAA. **Table 2.3** lists rainfall frequencies for Blaine.

Table 2.2 Average Monthly Climate Data 1981-2010

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Daily Temperature (°F)	15.6	20.8	32.8	47.5	59.1	68.8	73.8	71.2	62.0	48.9	33.7	19.7
Average Precipitation (in.)	0.90	0.77	1.89	2.66	3.36	4.25	4.04	4.30	3.08	2.43	1.77	1.16
Average Snowfall (in.)	12.2	7.7	10.3	2.4	0.1	0.0	0.0	0.0	0.0	0.6	9.3	11.9

Source: Minnesota Climatology Working Group

Additional climatological information for the area can be obtained from the Minnesota State Climatology Office website.

Table 2.3 Atlas 14 Rainfall Depths and Frequency

Recurrence Interval (yrs)	24-hr Rainfall Depth (in)
1	2.46
2	2.84
5	3.56
10	4.24
25	5.31
50	6.23
100	7.25

The City of Blaine uses the 5-year storm event for storm sewer design and the 100-year storm event for evaluating freeboard.

Additional precipitation information for the area can be obtained from the NOAA website.

2.2.4. Land Use

In Blaine, the use of land is controlled and guided by policies, plans, and ordinances put in place by the Blaine City Council. The City's authority in land use matters and other areas is provided in state law and refined through court decisions at both the state and federal level. The Land Use chapter of the City's Comprehensive Plan generally outlines the City's future land use vision and existing land use.

The City's existing land use practices include agricultural, residential, commercial, industrial, and private and public open spaces. Most of the City is single family residential with areas of commercial development along the Highway 65 corridor. **Figure 5** shows the existing land use

for Blaine.

Blaine's 2040 land use plan shows single-family uses covering a majority of the City. Multi-family residential, commercial, and business uses are concentrated along Highway 65, County Road 10, Interstate 35 and University Avenue (from 109th Street to County Road 10). A large amount of land near the northeast area of the City is designated as open space primarily due to wetlands. The Land Use Plan is central to the Comprehensive Plan and it guides how specific properties might develop. **Figure 6** shows the guided Land Use Plan for the current Comprehensive Plan Update, which projects land use to the year 2040. It becomes the basis of important local and regional planning decisions made by the City and outside agencies such as Metropolitan Council. According to state law, development proposals must conform to the land use plan or an amendment to the land use plan must be sought.

Land use data is an important factor for estimating surface water runoff. The hard or impervious surface areas associated with each land use greatly affect the amount of runoff generated from an area. Future land use projections indicate those areas that may be available for water resource enhancement and where improvements should be a priority. Significant changes in land use can increase runoff due to added impervious surfaces. However, changes in land use also allow for the construction of stormwater BMPs.

2.3. Water Resources Data

2.3.1. Wetlands

Blaine possesses a variety of wetland types. When Minnesota's Wetland Conservation Act became law in 1991, Blaine was still a rural community. Consequently, Blaine's urban development has occurred under the protections offered by this state law, which calls for no loss of wetland area.

Wetlands provide several valuable functions. Wetlands are a critical part of the natural storm drainage system, help maintain water quality, reduce flooding and erosion, provide food and habitat for wildlife, and provide open spaces and natural landscapes for residents. Thus, wetlands are important physical, educational, ecological, aesthetic, recreational, and economic assets to the City. **Figure 7** presents the National Wetland Inventory (NWI) for Blaine. The NWI map provides guidance on where wetlands occur in the City, though the NWI wetland boundaries cannot replace wetland delineations for determining legal wetland boundaries. The CCWD and RCWD serve as Local Government Unit (LGU) for the Wetland Conservation Act within their respective jurisdictions. Regardless the LGU, Minnesota's statutory wetland protection standards provide uniform wetland protection throughout the City. Wetlands and lakes under Minnesota Department of Natural Resources (DNR) jurisdiction have an added level of protection.

Blaine seeks to use its abundant wetlands as part of a natural stormwater drainage system while preserving the function and values of these wetlands. Using wetlands as part of the storm drainage system improves water quality, reduces flooding and erosion, and may involve the restoration of previously drained wetland basins. This involves balancing function and values against the City's need for economical implementation of its flood control system. Increases in water level, water level fluctuations, or inundation times can change wetland characteristics. Though the Wetland Conservation Act (WCA) does not preclude these changes, the Minnesota Pollution Control Agency (MPCA) does not allow for inundation of wetlands or discharges to wetlands that causes an adverse impact. When considering wetland impacts, the watersheds use a function and values approach, which means the type of wetland mitigation, not just the mitigation area, becomes important.

There are currently three different wetland management strategies for the City of Blaine.

- Wetlands within CCWD: From their proposed draft rules, any person proposing to impact a wetland in the District is subject to, and must establish compliance with, the WCA standards and criteria including but not limited to sequencing and replacement. In addition to the WCA standards, CCWD has separate buffer requirements that can be found on their website.
- Wetlands within the generalized RCWD ACD 53-62 drainage boundary are subject to one of two Comprehensive Wetland Protection and Management Plans (CWPMP) under the WCA. The two CWPMPs and their components are named Village Meadows and Resource Management Plan (RMP-1). The requirements are contained in RCWD Rule F. This rule regulates both upland and wetland management. The plans and rules can be found on the RCWD website.
- Wetlands within RCWD (outside the generalized ACD 53-62 drainage area) are subject to and must establish compliance with the WCA standards and criteria including, but not limited to, sequencing and replacement. RCWD Rule F: Wetland Alteration includes additional requirements and is found on the RCWD website.

The City will enforce wetland requirements based on the respective Watershed District that the project falls under.

2.3.2. Drainage Systems

Early on, Blaine's landscape was primarily agricultural and remained so until the late 1980s. The county ditch system was created as a way of increasing the amount of land available for production. As a result, long before urban development came to Blaine, the City had an extensive conveyance system.

Initial development in Blaine occurred when flood control was the primary priority for controlling stormwater runoff. In the early 1990s, it became clear that urban drainage had cumulative impacts within wetlands and lakes and that the accumulation of nutrients within wetlands and lakes was beginning to affect their recreational, aesthetic, and biological values. In consideration of this and the Clean Water Act, the 1990s saw an increase in the use of water quality ponds. This generally coincided with a marked increase in urban development in Blaine. Today it is widely understood that water quality ponds alone are not enough to protect water resources, hence the recent emphasis on volume management through diverse decentralized best management practices for development sites. Although decentralized stormwater techniques such as rain gardens and pervious pavement are gaining wider adoption, there are still those that are not fully aware of the variety or treatment and aesthetic benefits these features provide.

A schematic plan of the drainage system is shown on **Figure 3** attached to this report. The runoff generated in the City is routed to three primary watersheds which all ultimately discharge to the Mississippi River.

The southern and eastern portions are tributary to Rice Creek in RCWD. The northern, western, and central portions are tributary to Coon Creek in the CCWD and the small southwestern portion of the City is tributary to Pleasure Creek and Springbrook Creek (Ditch 17), also in CCWD. RCWD modeling has identified three intercommunity flow points in Blaine that could become an issue as development occurs.

2.3.3. Lakes

There are two lakes within Blaine; Laddie and Lochness as shown on **Figure 7**. Both lakes are groundwater fed. Laddie Lake is located on the southern border of the City with Spring Lake Park and is the largest lake in the City. It is located in the CCWD and is the only natural lake within the City of Blaine. The majority of the land area tributary to Laddie Lake is fully developed. The

Department of Natural Resources (DNR) places the lake in the North Central Hardwood Forest ecoregion. It has a surface area of 77 acres and a maximum depth of about six feet. Fish kills occur in the winter due to its shallow depth. The lake can be accessed from Laddie Lake Park to the north.

Lochness Lake is a dredged wetland; groundwater fed and has a surface area of 14 acres and a maximum depth of 15 feet. It is located on the eastern edge of Blaine within the RCWD. The majority of the land area surrounding the lake is park land. There is limited monitoring data available for this lake from the DNR and RCWD, although the City has been monitoring the lake for eight years. Monitoring shows a secchi disk average of 6.05 feet and average total phosphorus reading of 34 parts per billion (ppb).

2.3.4. Water Courses

The majority of Blaine's surface water system is connected via the county ditch system as shown on **Figure 3.** The southwest corner of Blaine discharges to Pleasure Creek and County Ditch 17, which is within the CCWD. County Ditch 53-62 drains most of the east side of Blaine, which is within the RCWD. This ditch leaves Blaine and enters Circle Pines near Lexington Avenue and North Road. A small portion of Rice Creek is located in Blaine in the southeast corner of the City in watershed HD-03, within the RCWD. Rice Creek enters Blaine along 85th Avenue. County Ditch 41 runs through the northwest portion of Blaine in CCWD and leaves Blaine and enters Coon Rapids at University Avenue between 118th and 117th Avenues. County Ditch 44 and 49 run through the northern section of the City. RCWD and CCWD serve as the public ditch authority for the portion of Blaine within their jurisdiction.

2.3.5. Man-Made Water Features

There are several large man-made water features within the central portion of Blaine. These features generally lie south of 125th Avenue NE on both the east and west sides of County Road 52. The water features are connected by County Ditch 41, which is managed by the CCWD. The water features themselves are managed by their respective homeowners' associations. These man-made water features are not protected under state or federal law as they are not considered wetlands or waters of the state. The deepest water feature is approximately 65 feet deep. The other water features average 15-20 feet deep.

Because of a public swimming beach having been constructed on the north side of one of these man-made water features, the City of Blaine has monitored water quality at several locations on the northern edge of the Sunrise Lake. The purpose of Blaine's monitoring is to ensure water quality is within the state standards. The basins are part of the City's stormwater conveyance system and recreation is only allowed in designated areas. The City currently has nine seasons of monitoring, which shows that the water features are not impaired based on the MPCA guidelines for lakes. The monitoring data shows an average total phosphorus reading of 22 ppb, secchi disk reading of 6.55 feet, chlorophyll average of 8.74 ppm, and average cumulative geometric mean for E coli of 5.98 parts per 100 ml.

2.3.6. Monitored Water Quality and Quantity Data

The City will continue to support monitoring of surface waters within its jurisdictional boundaries and for waters to which the City discharges that are outside these boundaries. Data will be obtained through cooperation and coordination with other various agencies, including the MPCA, cities adjacent to Blaine, the Metropolitan Council, the DNR, the RCWD, the CCWD, the Anoka Conservation District (ACD), and Three Rivers Park District.

Figure 8 shows monitoring stations located within the City. Other water quality information can be found from the watershed management organizations having jurisdiction within the City,

Metropolitan Council, and the MPCA as follows:

- Rice Creek Watershed District monitoring information can be found at their Water Quality 101 webpage.
- Coon Creek Watershed District monitoring and water quality information can be found on the Managing Water Resources webpage.
- Metropolitan Council monitoring information, including the Citizen-Assisted Monitoring Program (CAMP), can be found on the Water Quality Management webpage.
- MPCA information can be found on the Citizen Lake Monitoring Program webpage.

2.3.7. Impaired Waters

The MPCA is required to publish a list of impaired waters, which are lakes and streams in the state that are not meeting federal water quality standards. For each water body on the list, the MPCA is required to conduct a study to determine the allowable Total Maximum Daily Load (TMDL) for each pollutant that exceeds the standards. Impaired waters in Blaine, or those receiving discharge from Blaine, are summarized in **Table 2.4**.

Table 2.4 – Impaired Waters

Impaired Water	Affected U se	Pollutant	Year Added	Completio
Pleasure Creek (07010206-594)	Aquatic Life, Aquatic Recreation	Invertebrate Index of Biotic Integrity, Fecal Coliform	2014	2016
Coon Creek (07010206-530)	Aquatic Life, Aquatic Recreation	Invertebrate Index of Biotic Integrity, Fecal Coliform	2014	2016
Sand Creek (07010206-558)	Aquatic Life, Aquatic Recreation	Invertebrate Index of Biotic Integrity, Fecal Coliform	2016	2016
Springbrook Creek (County Ditch 17) (07010206-557)	Aquatic Life, Aquatic Recreation	Invertebrate Index of Biotic Integrity, Fecal Coliform	2014	2016
Rice Creek (07010206-512)	Aquatic Life, Aquatic Recreation	Dissolved oxygen and turbidity, Fecal Coliform	2014	2016, 2024
Golden Lake (02-0045-00)	Aquatic Recreation	Nutrient eutrophication biological indicators	2004	2009
Upper Mississippi River (07010206)	Aquatic Recreation	Fecal Coliform	2011	2016
Marshan Lake** (02-0007)	Aquatic Recreation	Excess Nutrients	2002	2013
Reshanau Lake** (02-0009)	Aquatic Recreation	Excess Nutrients	2006	2013
Rice Lake** (02-0008)	Aquatic Recreation	Excess Nutrients	2010	2013
Baldwin Lake** (02-0013)	Aquatic Recreation	Excess Nutrients	2010	2013

**Part of the Lino Lakes Chain of Lakes Nutrient TMDL. Blaine was assigned a categorical wasteload allocation for each of the four lakes.

The City will be required to update this LSWMP to incorporate the findings of each completed

TMDL study and will also be required to amend their MS4 permit and SWPPP. This must be done within 18 months of the approved TMDL date.

For more information on impaired waters and TMDL Plans visit the MPCA website. **Appendix B** includes the approved TMDL plans affecting Blaine.

2.3.8. Groundwater

The City of Blaine, along with the Minnesota Department of Health (MDH) and Anoka County Environmental Services, developed a Wellhead Protection Plan that delineates drinking water supply management areas and wellhead protection areas. The Wellhead Protection Plan was approved by the MDH in April of 2008. Blaine is currently amending its Wellhead Protection Plan for its drinking water supply wells. **Figure 9** shows the drinking water supply management areas for the City, a few of which are generally described below.

Most of Blaine is considered to have very high geologic sensitivity based on the Anoka Sandplain Regional Hydrogeologic Assessment. In particular, the Drinking Water Supply Management Area (DWSMA) around Well 12 is considered vulnerable due to tritium results and Wells 3, 4, and 16 are considered vulnerable due to their status as multi-aquifer wells with volatile organic compounds. The Well 12 DWSMA is generally located west of Highway 65 in the northwest portion of the City in the CCWD. The Wells 3, 4, and 16 DWSMA is generally located north of Highway 10 along Central Avenue, within the CCWD.

Blaine's subsurface hydrogeology is generally distinguished by unconsolidated deposits above bedrock. Typically, there is a 10 to 30-foot layer of clay and sandy clay 40-50 feet below the surface. The depth and composition of these layers affect groundwater availability and the potential for contamination. The major bedrock units used for groundwater resources are the Tunnel City - Wonewoc and Mount Simon Sandstone system.

The City will be required to incorporate the requirements of the Wellhead Protection Plan into their SWPPP for areas located within vulnerable source water protection areas (NPDES MS4 General Permit). Vulnerable Source Water Protection areas are those areas susceptible to water supply contaomination from activities at the land surface and are based on the following three components: geologic sensitivity, well construction maintenance and use, and water chemistry and isotopic composition. **Figure 9** shows the DWSMA vulnerability locations within the City. The DWSMA vulnerability is determined using geologic, soils and groundwater chemistry information. The designation indicates that the aquifer is covered by at least 50 feet of clay material.

For areas of vulnerability, the City will incorporate the guidance developed by the MDH on evaluating proposed stormwater infiltration projects in vulnerable source water protection areas and the guidance located within the Minnesota Stormwater Manual on designing infiltration BMPs while protecting groundwater. This will be of a particular concern in areas where infiltration is being considered in soils suitable for rapid infiltration adjacent to municipal and private wells.

Protection of the aquifers described above is crucial in maintaining Blaine's long-term water supply. Proecting the supply will require cooperating with the MDH when developing the City's Wellhead Protection Plan. The objectives of protecting Blaine's water supply wells are to:

- Reduce the use of costly treatment facilities
- Avoid the drilling of new wells
- Avoid the need to clean up contaminated groundwater
- Protect public water supply wells by preventing contaminants from entering the area that contributes water to the well or well field over a period of time.

2.4. Natural Resources Data

The natural communities remaining in the City have been fragmented and altered by agriculture, altered hydrology, and urbanization. Many of these communities have been invaded by non-native and naturalized plant species. However, the Natural Resources Inventory (NRI) completed in 2000 notes that there are opportunities for restoration of these natural areas and identified many high-quality natural resource areas remaining in the City, including the dry prairie at Laddie Lake Park and woodlands and wetlands at Pioneer Park. While natural areas are found throughout the City, they are concentrated on the northeast and east side. **Figure 3** presents the NRI for the City. Note that the data shown on the figure is from the 2000 NRI and some features have changed since this inventory.

In 2007, the City completed an Open Space Management Plan. This included an inventory and assessment of the open space sites, selection of target plant communities for restoration, and management recommendations. The 2030 Comprehensive Plan designates these areas as Park and Open Space to protect them from future development.

The 2030 Comprehensive Plan lists three natural resource goals including development of a plan for the wetland/natural area north of 109th Avenue and west of Lexington Avenue, promoting preservation of natural areas, and development of best management practices to address environmental concerns.

Also, the protection of wetlands through state statute and the preservation of wetland function and values through watershed and city controls is integral to the preservation of Blaine's natural resources and the preservation of connectivity among these resources.

Additional natural resources information for Blaine is available in the watershed management plans adopted by the RCWD and CCWD and from the ACD.

2.4.1. MLCCS and MCBS

The Minnesota Land Cover Classification System, or MLCCS, categorizes urban and built up areas in terms of land cover rather than land use. MLCCS serves as a tool for City staff to integrate natural area preservation into land planning, land use, and zoning decisions. The City is dominated primarily by developed area with planted or cultivated vegetation areas as the next majority land classification. The remaining areas are herbaceous areas and wetland throughout the center of the City. **Figure 10** provides MLCCS coverage for Blaine.

According to the MnDNR, the Minnesota County Biological Survey (MCBS) began in 1987 as a systematic survey of rare biological features on a county-by-county basis. Blaine has several areas identified as outstanding and high biological significance. These are generally near Blaine's open space and park land. The DNR has jurisdiction over these areas. Based on state statute any work within these areas is required to meet DNR permit requirements. **Figure 11** provides the locations of rare and biological features in the City of Blaine.

The conservation corridor shown in **Figure 11** represents area designated by the DNR to be protected and to provide restoration of key natural habitats. These corridors are to be used by local agencies to prioritize areas for conservation.

2.4.2. Unique Features and Scenic Areas

The Blaine Preserve Scientific and Natural Area (SNA) lies in the southeast area of the City. The DNR manages the Preserve SNA and all other SNAs in Minnesota. Minnesota statute stipulates that any water within an SNA is an Outstanding Resource Value Water. Specifically, Minnesota Rule 7050.0180 on Nondegradation for Outstanding Resource Value Waters prohibits discharge

from the City's storm water system to waters within Blaine Preserve. An area of the Blaine Airport is also designated as a SNA. Both designated SNAs are located within the DNR conservation corridor.

2.5. Water Resources Related Agreements

This section summarizes those water resources related agreements the City of Blaine has established with other entities.

2.5.1. Agreement with the City of Coon Rapids for Improvements to County Ditch 17

The agreement grants approval for work in County Ditch 17 from Evergreen Boulevard to 85th Avenue. A copy of the agreement can be found in **Appendix C** of this SWMP.

2.5.2. Agreement with the City of Coon Rapids to Accept Pleasure Creek Drainage Study

The agreement describes the acceptance of the City of Blaine for the Pleasure Creek Drainage Study. A copy of the agreement can be found in **Appendix C** of this SWMP.

2.5.3. Bilateral Compliance Agreement with Minnesota Department of Health for Well No. 7

The agreement describes the bi-annual monitoring of Well 7 for measurement of arsenic levels. A copy of the agreement can be found in **Appendix C** of this SWMP.

2.5.4. Agreement with Coon Creek Watershed District to Inspect and Assess Select Ditches

The agreement describes work performed by CCWD on behalf of the City to inspect and assess ditches lateral to Public Ditches and considered to be private drainage ditches.

2.5.5. Agreement with Rice Creek Watershed District to Inspect and Assess Select Ditches

The agreement describes work performed by RCWD on behalf of the City to inspect and assess ditches lateral to Public Ditches and considered to be private drainage ditches.

3. AGENCY COOPERATION

There are a number of local, State, and Federal agencies that have rules and regulations related to local water management. The City recognizes the roles of these other agencies and will cooperate, coordinate, and partner when possible with these agencies. This section describes the City's current surface water management program and practices, and identifies the agencies and organizations having roles in the City's management of these resources. **Table 3.1** summarizes the City's and other agencies' regulatory controls related to water resources management and protection.

3.1. City Ordinance, Policy, and Procedures

Blaine supports its comprehensive plan with infrastructure plans. These infrastructure plans detail future sanitary sewer, water, transportation, and surface water systems that must be built to fulfill the land use plan. This LSWMP serves as the infrastructure plan for surface water systems. Beyond its role in the comprehensive plan update, the LSWMP has a broader regulatory context that includes meeting statutory, rule, and watershed requirements.

The Engineering Division of Public Services is responsible for the planning, administration, design and inspection of infrastructure improvements. This division coordinates with watershed districts and other outside agencies regarding water resource management and conservation. They also provide monitoring and maintenance of storm sewers, ponding areas, and water quality devices. The Blaine Planning Department manages comprehensive planning and administers the zoning code within the City, which includes land use, zoning, transportation, sewer extension, and community facility improvements.

Current regulations and policies governing surface water management within Blaine include the engineering design standards and previous surface water management plans. **Table 3.1** summarizes the City's regulatory controls regarding surface water.

Table 3.1 – Regulatory Control

Official Control	Responsibility	Mechanism
Stormwater Management	City, WD	City Ordinance Part II, Chapter 34, Article XI
Erosion and Sediment Control	City, WD, PCA	Zoning Ordinance Chapter 33, Section 33.16
Shoreland	City, WD, DNR	DNR Requirements The City currently does not have a shoreland ordinance since the shoreland surrounding Laddie Lake is either fully developed or City Park and surrounding Lochness Lake is City Park. Department of Natural Resources shoreland restrictions would apply.
Floodplain	City, WD, MnDNR	Zoning Ordinance, Chapter 32
Wetlands	WDs as LGU, City DNR, USACE, and TEP Members, BWSR	Public Waters Rules (MnDNR). Section 404 of the Clean Water Act (USACE). WCA (TEP Members). Chapter 8, Section 828.43 of City Ordinance
Illicit Discharge	City, WD	City Ordinance Chapter 34, Article XI, Division 5
Grading and Drainage	City, WD	City Ordinance Chapter 34, Division 2

City staff is supported by several commissions and committees. These include:

- Natural Resource Conservation Board functions as an advisory board to the City Council regarding preservation of natural resources. They also developed the Natural Resource Plan which guides present and future acquisition of natural areas.
- Park Advisory Board works to protect natural resources, studies park site planning, and evaluates and recommends capital improvements to park plans.
- Planning Commission reviews all applications for development and recommends approval or denial based on conformance with the comprehensive plan and zoning regulations.

3.2. Support Agencies

This plan is in conformance with, but does not restate, all other agency rules that are applicable to water resource management. The following agencies deal with or regulate water resources throughout the City.

- Anoka County
- Anoka Conservation District (ACD)
- Rice Creek Watershed District (RCWD)
- Coon Creek Watershed District (CCWD)
- Minnesota Department of Health (MDH)
- Minnesota Pollution Control Agency (MPCA)
- Board of Water and Soil Resources (BWSR) and the Wetland Conservation Act (WCA)
- Minnesota Department of Natural Resources (MnDNR)
- US Army Corps of Engineers (USACE)
- Minnesota Department of Agriculture (MDA)
- US Fish and Wildlife Service
- Minnesota Environmental Quality Board
- Metropolitan Council
- Minnesota Department of Transportation (MnDOT)
- US Environmental Protection Agency (EPA)
- Federal Emergency Management Agency (FEMA)
- Natural Resources Conservation Service (NRCS)
- U.S. Geological Survey

While these other agencies' rules, policies, and guidelines are not all restated in this Plan, they are applicable to projects, programs, and planning within the City. The MPCA Minnesota Stormwater Manual, which is a document intended to be frequently updated, is also incorporated by reference into this Plan and can be found at MPCA website.

3.3. NPDES Permitting Process

The MPCA has designated the City of Blaine as an NPDES Phase II MS4 community (MN Rules Chapter 7090). Blaine's application for permit coverage was extended in 2014. The permit outlines Blaine's SWPPP to address six minimum control measures:

- Public education
- Construction site runoff control
- Public involvement
- Post-construction runoff control
- Illicit discharge detection and elimination
- Pollution prevention in municipal operations

The City's SWPPP contains several best management practices within each of the listed control measures. These were identified using a self-evaluation and input process with City staff. The City's permit application was submitted to the MPCA in 2006, with permit coverage extended in 2007. The most recent 5-year permit cycle required cities to reapply for coverage in the Fall of 2013, permit coverage was extended to Blaine in 2014 for the subsequent 5-year permit cycle.

Many of the goals and policies discussed in this LSWMP are directly related to requirements listed in the NPDES program. As a result, the implementation section of this plan repeatedly references items listed in the City's SWPPP.

3.4. Comparison of Regulatory Standards

Developing property within Blaine is subject to review and approval from the two Watershed Management Organizations (WMO) covering the City (**Figure 2)**. Each WMO has established rules or standards governing stormwater management and protection of natural resources. Currently, these rules vary in content between agencies, and may be more restrictive than City standards.

3.4.1.Rice Creek Watershed District Rules

RCWD updated their Water Management Plan in 2010. RCWD is planning on updating it by 2020. The most recent RCWD rules were adopted December 2016 and implemented January 2017. A significant revision to the rules added limits on the volume of runoff leaving development sites. This is consistent with regional trends discussed in The *Minnesota Stormwater Manual*. Specifically, low-impact development, better site design, and on-site infiltration of runoff are recommended to offset the adverse impacts created by additional impervious surfaces. The City will continue to defer to RCWD for review and permitting of the stormwater management, erosion control, floodplains, and wetland aspects of developments in the part of the city within the RCWD boundary. Another major change to the rules was the consolidation of the individual Resource Management Plan (RMPs) into the Comprehensive Wetland Protection and Management Plan (CWPMP) in Rule F for consistency. Specific stormwater requirements of the RMPs were modified and independently reflected in the Stormwater Rule C. The 2014 rule revision included the addition of a defined floodplain management zone which includes portions of southern Blaine. This addition requires reducing peak runoff rates to less than 80 percent of the existing condition.

3.4.2. Coon Creek Watershed District Rules

CCWD Rules and Regulations were last updated in 2009 and their plan was last updated in 2013. The City will continue to defer to CCWD for review and permitting of the stormwater management and wetland aspect of developments in the part of the city within the CCWD boundary. A

significant change was the adaptation of Atlas 14, providing the most recent data on rainfall depths and frequencies.

3.4.3. Wetland Management

CCWD and RCWD are the LGU for the WCA, and they will continue to administer WCA permits. WCA regulations generally focus on the prevention or mitigation of wetland fill, while watershed standards focus on wetland buffers and stormwater impacts. As discussed previously, wetland classification systems and management standards vary among the watersheds. CCWD and RCWD enforce their rules through approval of watershed permits.

3.4.4. Consistency

The City is committed to working with RCWD and CCWD in facilitating their land disturbance permits. The City is also committed to working with the two watersheds in administering WCA permits.

3.4.5. Summary of Findings

In the months and years ahead, the City will face multiple challenges in surface water management. The governing WMOs within the City will continue to implement surface water standards that impact City reconstruction and development projects. Completion of local TMDL studies will lead to challenging implementation projects throughout the City. Growth in and around the City will put additional pressure on local surface water resources. Using the Stormwater Utility Fund will provide revenue to fund a maintenance program to rehabilitate and rebuild thesections of the infrastructure which are aging and to maintain all other areas.

4. ASSESSMENT OF ISSUES

Previous sections of this LSWMP provide background on the physical and regulatory forces shaping surface water management in Blaine. This section describes problems and challenges of specific waters, neighborhoods or programs identified by the City, watershed districts and others. Minnesota Statutes and Metropolitan Council guidance documents require "issues and corrective actions" or "problems and corrective actions" as elements of LSWMP. The assessment includes stormwater management issues—current and future—identified by the City, the two watersheds with jurisdiction within the City, and other state and federal agencies. Blaine emphasizes the surface water management challenges ahead and that these challenges will test the City's financial and technical resources.

4.1. Water Quality

Issue 4.1.1: Golden Lake was placed on the MPCA's impaired waters list in 2002 for nutrient/eutrophication biological indicators and in 2010 for mercury in fish tissue.

> **Corrective Action:** A TMDL was completed in 2009 for Golden Lake. While the lake is in Circle Pines, a majority of the drainage area comes from Blaine. The City will consider partnering with Circle Pines to address this issue.

Issue 4.1.2: Two streams within the City were placed on the MPCA's impaired waters list in 2006 for aquatic macroinvertebrate bioassessments and in 2014 for E. coli: Unnamed Ditch (Pleasure Creek) and County Ditch 17 (Springbrook Creek)

> **Corrective Action:** A TMDL was completed in 2016 for the CCWD, which includes these streams. The City will look into options to implement BMPs throughout the City. As development occurs, BMPs will be installed which will address this TMDL in addition to meeting total suspended solids (TSS) and total phosphorus (TP) goals.

Issue 4.1.3: Rice Creek was placed on the MPCA's impaired waters list in 2014 for E. Coli.

> **Corrective Action:** The Upper Mississippi River Bacteria TMDL Study and Protection Plan was completed in 2014. The City will consider implementing a Pet Waste Ordinance and providing resident education on the topic.

Issue 4.1.4: Marshan Lake, Reshanau Lake, Rice Lake, and Baldwin Lake were placed on the MPCA's impaired waters list between 2002 and 2010 for excess nutrients.

> **Corrective Action:** A TMDL was completed in 2013 for these four lakes. Although all four lakes are outside of the City of Blaine, the City was assigned a categorical wasteload allocation for each lake. As development occurs, BMPs will be installed which will address this TMDL.

Issue 4.1.5: The City desires to be proactive in protecting and improving water quality.

> **Corrective Action:** CCWD and RCWD monitor water quality in several the lakes and streams (**Figure 8**).

Issue 4.1.6: Concerns for carp, vegetative management, and aquatic invasive species (AIS).

Commented [LR1]: For the City: Are there any existing problem areas with these issues?

> **Corrective Action:** The City will monitor for carp, excessive vegetation, and AIS then address issues as necessary.

Issue 4.1.7: Concerns for the water quality of Lochness Lake.

Corrective action: The City implemented a water quality monitoring program for Lochness Lake and the man-made water feature in The Lake development. The intent is to establish base line data for Lochness Lake in light of the potential impact from future development or a possible TMDL. With respect to the man-made water features, base line data was needed prior to establishing a public beach. Data will be made available to the homeowners' associations as they manage their surface waters. The City will continue to delegate or defer the lead in monitoring of Laddie Lake to the MPCA and DNR as they are better set up to conduct monitoring projects. CCWD plans to continue to contract ACD to monitor water quality of Laddie Lake two out of every three years.

Issue 4.1.8: In 2007, the City was required by the MPCA to complete a loading assessment and a nondegradation report. The report estimates change in TSS and TP from development since 1988 and future loading with development that could occur by 2020.

Corrective Action: The report concluded that there was no significant increase in TSS and TP loadings between 1988 and 2005 due to the stormwater treatment ponds that accompanied development and redevelopment in that time. Further, it predicts a reduction in TSS and TP loadings between 2005 and 2020. No changes were proposed to the City's SWPPP.

As TMDLs are developed, loading reductions will be prioritized through any wasteload allocations assigned. The City will continue to use this Nondegradation Report (**Appendix D**) as a reference.

Issue 4.1.9: Algae can be an issue in storm ponds and lakes and prompt resident complaints.

Corrective Action: The City will implement resident education on lawn fertilization and its contribution to phosphorus loading and algae growth in water bodies.

Issue 4.1.10: Some land within the City is designated as Drainage Sensitive Uses Areas. Per the CCWD, "Drainage Sensitive Uses are those land uses that require less than saturated conditions to grow or for the land to be used and therefore are dependent upon the subsurface, lateral effect of drainage ditches to remove water." In the City of Blaine, these areas are concentrated around TPC Twin Cities, Victory Links Golf Course, and the Sanctuary neighborhood (**Appendix E**).

Corrective Action: The City will collaborate with CCWD to ensure that stormwater requirements are met within Drainage Sensitive Uses Areas:

- Projects that impact Drainage Sensitive Uses Areas must account for their ability to discharge in a timely manner.
- In Drainage Sensitive Uses Areas, the post-development 100-year peak flow rate shall not exceed the predevelopment 25-year peak flow rate (by subwatershed).

Issue 4.1.11: The possibility of contamination exists when there are connections between groundwater and surface water.

Corrective Action: The City has developed a Wellhead Protection Plan which identifies DWSMAs and their vulnerability. The City will continue to follow the requirements of its Wellhead Protection Plan to protect groundwater. Guidance from the MPCA and MDH will be followed to determine the applicability of infiltration in the DWSMAs.

4.2. Flooding and Stormwater Rate Control

Issue 4.2.1: There is localized flooding within the Laddie Lake drainage area.

Corrective Action: The City will conduct a study to identify areas of flooding, address known storm sewer issues, and pursue available options to improve water quality.

Issue 4.2.2: The outlet pipe leading to Laddie Lake can get plugged with debris.

Corrective Action: The City will consider outlet improvements as a part of the Laddie Lake subwatershed assessment and improvements.

Issue 4.2.3: There is flooding at East Pond, west of Xebec Street and south of Flowerfield Road.

Corrective Action: In accordance with the Cooperative Agreement dated July 19, 2012, RCWD is responsible to provide inspection services for the ditch surrounding this pond. The City will prioritize ditch maintenance and outlet improvements based on inspection reports from RCWD.

Issue 4.2.4: There is localized flooding due to maintenance issues in Judicial Ditch 1 south of the City.

Corrective Action: The City will coordinate with Mounds View to perform maintenance and clear out vegetation on a regular basis.

Issue 4.2.5: There are instances of buffer encroachments.

Corrective Action: The City will implement an education program to inform the public about the benefits of buffers and buffer requirements.

Issue 4.2.6: There is encroachment of stormwater ponds into the rear yards of private property.

Corrective Action: The City will investigate and address any issues as they arise.

Issue 4.2.7: Localized flooding may occur throughout the City.

Corrective Action: The City will meet with residents and conduct education programs on this topic. When specific issues are identified, the City will investigate the causes and address the issues as possible. The City will incorporate a policy that provides guidance on addressing these issues as they arise. The City will consult CCWD and RCWD watershed models for potential flooding issues and work with the watershed districts to take appropriate corrective action for future flooding problems.

4.3. Impacts of Stormwater Quality on Fish and Wildlife Resources

Issue 4.3.1: There is a need for shoreline vegetation management.

Corrective Action: The City will address excessive vegetation as needed.

Issue 4.3.2: There is a need for increased buffers along waterbodies.

Corrective Action: The City will update its buffer ordinance to be consistent with CCWD and RCWD.

Issue 4.3.3: Development can alter in-stream habitats and existing hydrology.

Corrective Action: The City will investigate issues as they arise and consider restoration projects.

Commented [LR2]: For the City: Are there any existing problem areas that you are aware of?

4.4. Adequacy of Existing Regulations and Programs to Address Adverse Impacts on Local Water Resources

Issue 4.4.1: The City has adopted ordinances related to floodplain regulation, stormwater management (including illicit discharge and wetland management) and erosion control. These ordinances need to be kept up to date as requirements change. A copy of the ordinances can be found in **Appendix F**.

Corrective Action: The City will continually evaluate these ordinances and will update them as needed. The City will continue to enforce all ordinances as necessary.

Issue 4.4.2: The City currently has limited funding sources available to complete projects related to water resources.

Corrective Action: Stormwater funds and special assessment funding are not adequate to implement the studies, programs, and capital improvements outlined in this plan. The City must apply for grants to fund the implementation of capital improvements identified in this management plan. The City may establish a fund for stormwater system maintenance.

Issue 4.4.3: There is a need to verify that wetland mitigation is being carried out as required.

Corrective Action: The City will coordinate with RCWD and CCWD on enforcement.

4.5. Erosion and Sediment Control

Issue 4.5.1: There are instances of erosion and sedimentation of drainage channels.

Corrective Action: The City will investigate and address erosion and sedimentation issues as they arise.

Issue 4.5.2: The City desires to preserve the existing ditch system.

Corrective Action: The City will work with the RCWD and CCWD to maintain ongoing inspections, repair of erosion, monitoring, and routine maintenance.

4.6. Impact on Water Resources from Land Use Practices and Development

Commented [SH3]: For the City: Are there any stormwater reuse opportunities for regional treatment?

Issue 4.6.1: The City of Blaine is nearing full development. This can make it difficult for the City to implement stormwater management BMPs to efficiently meet watershed requirements on a site by site basis.

Corrective Action: In areas where project specific BMPs will be unfeasible, the City will look into completing regional water quality improvement projects, such as water reuse BMPs, to help meet future stormwater management requirements. The City would be interested in collaborating with the RCWD and CCWD to help identify opportunities for stormwater reuse and other regional BMPs.

Issue 4.6.2: Problems may arise with subsurface sewage treatment systems (SSTSs).

Corrective Action: The City will investigate and address issues as they arise.

Issue 4.6.3: Wetland degradation caused by agriculture or urbanization. When the quality of the incoming stormwater declines, the wetland's plant community may become less diverse, leaving only those species that are tolerant of high nutrient and sediment loads. Once a wetland's plant community is changed, the wetland's character and ecosystem will change often to a less valuable system in terms of diversity, wildlife habitat, and aesthetic qualities.

Corrective Action: As of December 2017, 55 wetland restoration projects have been completed and 76 are in progress. Moving forward, degraded wetlands will be identified and potential restoration sites will be prioritized. Wetlands can be improved by stabilizing water levels, reducing sediment load, and vegetative management. Storage can be restored by breaking tile lines, berming across ditches, and other methods. Metropolitan Council, in its 2040 Water Resources Management Policy Plan, requires cities to create a function and values based wetland management plan or identify a timeframe and process for completing one. In Blaine, the CCWD, and RCWD act as the LGU in charge of administering the WCA in their respective jurisdictions. RCWD has completed wetland assessments in recent years and have management plans that the City follows. Although the City does not currently intend to complete wetland management plans for any portions of the City, it recommends the use of the Minnesota Routine Assessment Method (MnRAM) for wetland evaluation.

4.7. Education Program

Issue 4.7.1: The City of Blaine recognizes the need for local water education programs to increase public awareness of local water management and improve the quality of stormwater runoff.

Corrective Action: The City will continue to provide education content and opportunities to residents, businesses, developers, and others. These efforts may include regular notices in the City's monthly newsletter, articles in the local paper, postings on the City website, and flyers in the utility bill. The City will coordinate with the RCWD, CCWD, and ACD to improve the efficiency of educational efforts and reduce duplication. Educational topics may include but are not limited to:

- Stormwater pond function and maintenance
- Wetland buffers
- Water quality
- Use of fertilizer
- Yard/pet waste management
- Illicit discharge to stormwater
- Controlling invasive species

4.8. Identification of Potential Problems to Occur in the Next 20 Years

Issue 4.8.1: Inspecting and maintaining existing stormwater infrastructure throughout the City.

Corrective Action: The City of Blaine is responsible for maintenance of its stormwater system in conformance with the MCPA's MS4 Program. This includes maintenance of pipes, outlets, constructed ponds, lakes, wetlands, ditches, swales, and other drainage ways. Proper maintenance will ensure that the stormwater system continues to provide the necessary flood control and water quality treatment. Refer to **Appendix G** for a copy of the City SWPPP. Other units of government are responsible for maintaining the stormwater systems under their control.

Issue 4.8.2: Increasing prevalence of polycyclic aromatic hydrocarbons (PAHs) in stormwater ponds from runoff of roadways and other surfaces.

> **Corrective Action:** As stormwater ponds are inspected and maintained, the City will identify any ponds that are contaminated and follow protocol for disposal of dredged material. The City also bans the use of materials for paved surfaces that contain PAHs for future development and redevelopment.

Issue 4.8.3: Accumulation of debris and material on City streets.

> **Corrective Action:** The City will continue to sweep debris and salt from streets twice annually and more frequently for those areas along lakes and streams. More information regarding street sweeping activities can be found in the SWPPP (**Appendix G).**

Issue 4.8.4: Elevated levels of chloride concentrations have been found in stormwater ponds, surface water bodies, and groundwater throughout the Twin Cities Metropolitan Area. At levels exceeding the water quality standards, chloride can be toxic to aquatic life and can make drinking water sources not economically feasible to treat.

> **Corrective Action:** The City will continue to implement chloride best management practices such as reducing salt use on roadways, education to private business owners about correct salt application, and improve policies designating salt usage.

Issue 4.8.5: Prioritizing inspection and maintenance of stormwater ponds as well as determining the performance of existing stormwater ponds throughout the City.

> **Corrective Action:** The City will implement a pond program that identifies and prioritizes pond maintenance activities. This program will need to be updated regularly to result in an updated prioritization of pond inspection and maintenance activities. In addition, the program will estimate the current treatment provided by each pond to determine if the desired amount of treatment is being achieved. This program will help meet the new MS4 permit requirements related to the management of stormwater ponds. The City will consider using the Stormwater Asset Management Program (SWAMP) to address this issue.

4.9. Availability and Adequacy of Existing Technical Information to Manage Local Water Resources

Issue 4.9.1: Atlas 14 (updated precipitation probability information) was recently released by NOAA.

> **Corrective Action:** The City will adopt Atlas 14 to replace TP-40 (existing precipitation probability information). Based on this decision, the City will update its policies, codes, ordinances, and other appropriate documents. New development, redevelopment, and areas where problems may exist will be evaluated (as needed) by completing a risk assessment using Atlas 14.

Issue 4.9.2: The City has mapped the majority of its storm sewer system. As new and redevelopment projects are completed, the storm sewer GIS database needs to continually be updated.

> **Corrective Action:** The City will annually update its storm sewer GIS database to incorporate recent projects, BMPs, and associated storm sewer improvements.

5. GOALS AND POLICIES

5.1. Summary

The City has a strong interest in protecting and managing its valuable water and natural resources, recognizing the relationships between resource protection, land use management, development, redevelopment and fiscal responsibility. This section outlines the goals and policies specific to surface water management in Blaine. Goals and policies are grouped by their relationship to the key issues:

- Section 5.2 – Volume and Rate Management
- Section 5.3 – Water Quality
- Section 5.4 – Nondegradation
- Section 5.5 - Lake and Wetland Management
- Section 5.6 – Erosion and Sediment Control
- Section 5.7 – Education and Public Participation
- Section 5.8 – Groundwater Protection
- Section 5.9 – Recreation, Fish and Wildlife
- Section 5.10 – Maintenance
- Section 5.11 – Public Ditch System
- Section 5.12 – Financial Management
- Section 5.13 – TMDL Implementation – Impaired Waters

5.2. Volume and Rate Management

5.2.1. Overall Goal

The City of Blaine will increase the use of BMPs to achieve the infiltration of storm water runoff to reduce the loading of phosphorus, TSS, and water volume to lakes, wetlands, and streams.

As one of the 30 designated cities, nondegradation requirements are part of Blaine's NPDES permit and SWPPP. The City's Loading Assessment quantifies how pollutant loadings changed in the period from 1988 to 2005 while its Nondegradation Report presents feasible options to reduce pollutant loadings where they have increased. The Loading Assessment is periodically referenced in this LSWMP.

The expectation would be that any site that requires an NPDES construction site permit would also be required to implement permanent volume management. Any site not requiring a construction site permit would implement volume management to the extent practical and, if necessary, employing the alternative means as outlined in the Minimal Impact Design Standards (MIDS) and prescribed in the Minnesota Stormwater Manual.

5.2.2. Overall Policies

1. The City adopted MIDS, requiring that the first 1.1 inches of runoff from impervious surfaces created by new projects be infiltrated.

2. The City will promote the BMPs as a way of achieving volume reduction including, but not limited to, the following:

    a. Limit impervious areas
    b. Rainwater gardens
    c. Infiltration trenches

d. Green roofs
e. Vegetation preservation through conservation easements
f. Low impact development
g. Tree planting
h. Pervious pavement
i. Stormwater ponds

3. Update Chapter 34, Division 2 Stormwater Management Plan to include a section on the installation of BMPs and low impact development. Construct stormwater management facilities to reduce runoff volume in the post development condition. The MPCA and MIDS are the models for these practices.

4. The Subdivision Design Standards will be reviewed and updated as necessary to ensure that stormwater management standards, including volume control standards, are consistent with current engineering practices and current regulations of local and state agencies having jurisdiction within the City.

5. Any development or redevelopment will be required to include in its SWPPP measures to manage stormwater, including volume management, in conformance with the policies and content of the LSWMP and the Watershed Districts with jurisdiction over the project, as well as according to the requirements of the NPDES construction stormwater permit.

6. The City will use natural ponding areas such as wetlands for the impoundment and treatment of surface water runoff including the infiltration, evaporation, and transpiration of runoff volume in accordance with state and local law only if it can be shown that the functions and values of the wetland will not be adversely affected by this activity. Pretreatment practices in conformance with RCWD, CCWD, NPDES and City requirements will be required prior to discharging to natural ponds/wetlands. Pretreatment practices shall be sized and designed per the recommendations set in the Minnesota Stormwater Manual and the MPCA's Protecting Water Quality in Urban Areas guidance.

7. Areas within the CCWD shall comply with their updated Water Management Plan volume management policies and stormwater management rules including those areas designated as Drainage Sensitive Uses.

8. Areas within the RCWD will be required to comply with their Water Management Plan policies and RCWD Rules towards maximizing infiltration through stormwater management to control runoff volume increases. Areas within the Anoka County Ditch 53-62 Resource Management Plan and Village Meadows CWPMP will be required to comply with Rule F.

9. Construction sites required to obtain NPDES Construction Permit coverage must be in compliance with the terms of that permit.

10. The Minnesota Stormwater Manual will be the guide for design and implementation of stormwater best management practices.

5.3. Water Quality

5.3.1. Overall Goal

The City of Blaine strives to maintain or improve the water quality of wetlands, lakes and streams. Current water quality monitoring efforts are led by the City, CCWD, RCWD, MPCA, and the Met Council.

The desired outcome of Blaine's water quality goal is a net improvement in the quality of water discharged to the City's lakes, wetlands and streams and ultimately the Mississippi River. It is important to choose desired outcomes that are attainable. So, although it is desirable to improve the quality of water within the City's wetlands and lakes, it is sometimes difficult to measure whether this is actually occurring. The City can control and measure improvements to the discharge and assume that, long term, these will also lead to improvements in the surface water itself. The strategy is to implement the SWPPP to reduce pollution and improve water quality. Volume management is another means for improving water quality.

5.3.2. Overall Policies

1. The City will require that new developments provide no net increase of TP, TSS, and volume of runoff; redevelopment projects will implement BMPs to provide a net reduction on TP, TSS, and volume of runoff in compliance with water quality and non-degradation guidelines.

2. The City will require that all development projects provide the water quality treatment required by the MPCA NPDES General Stormwater Permit for Construction Activity or the watershed district, whichever is more stringent.

3. The City will require that redevelopments within the RCWD and CCWD comply with watershed district policies regarding water quality treatment and with the MPCA NPDES General Stormwater Permit for Construction Activity.

4. BMPs will be required to help minimize pollutants in stormwater runoff per the recommendations set in the Minnesota Stormwater Manual, MPCA Protecting Water Quality in Urban Areas, and the MPCA MIDS.

    a. Stormwater ponds
    b. Infiltration basins
    c. Filtration basins
    d. Underground systems

5. The City will actively implement the SWPPP as stated in the MS4 permit.

6. The Stormwater Ordinance and Policies will be reviewed and updated as necessary to ensure that the water quality requirements are consistent with current engineering practices and regulations of local and state agencies having jurisdiction within the City.

7. Construction sites required to obtain NPDES Construction Permit coverage must be in compliance with the terms of that permit.

5.4. Nondegradation

5.4.1. Overall Goal

The City of Blaine shall improve the quality of the City's surface water resources by decreasing phosphorous, total suspended solids, and water volume discharge whenever possible. At a minimum, the City's nondegradation goal will pursue no increase over current conditions in phosphorus, total suspended solids, and water volume discharge.

5.4.2. Overall Policies

1. The City will review development and redevelopment in the context of nondegradation

and will require such BMPs as necessary to maintain or reduce current phosphorous, total suspended solids loads, and water volume loads. (See 5.3.2, Policy 1)

2. The City will retrofit stormwater treatment when opportunities present themselves in public and redevelopment projects.

3. The City of Blaine will incorporate nondegradation mitigation projects as needed in its annual Capital Improvement Plans, based on the City's financial plan.

5.5. Lake and Wetland Management

5.5.1. Overall Goal

The City of Blaine will protect wetlands in conformance with the requirements of the Wetland Conservation Act to seek no net loss of wetlands and their functions. The City of Blaine will protect Laddie Lake.

Discussion: Minnesota regulates wetlands through the WCA. The following is excerpted from the BWSR websiteand provides a synopsis of the WCA.

> *In 1991, reacting to public concern about Minnesota's disappearing wetlands, the Minnesota Legislature approved and Governor Arne Carlson signed the Wetland Conservation Act, one of the most sweeping wetlands protection laws in the county.*
>
> *Local government units—cities, counties, watershed management organizations, soil and water conservation districts, and townships—implement the act locally. The Minnesota Board of Water and Soil Resources administers the act statewide, and the Department of Natural Resources enforces it.*
>
> *To retain the benefits of wetlands and reach the legislation's goal of no-net-loss of wetlands, the Wetland Conservation Act requires anyone proposing to drain, fill, or excavate a wetland first to try to avoid disturbing the wetland; second, to try to minimize any impact on the wetland; and, finally, to replace any lost wetland acres, functions, and values. Certain wetland activities are exempt from the act, allowing projects with minimal impact or projects located on land where certain pre-established land uses are present to proceed without regulation.*

To attain its lake and wetland management goal, the City of Blaine will augment its development review and approval process city-wide to include consideration of lake and wetland functions and values and the impact development may have on these. The CCWD and RCWD will continue in their role as LGU for wetlands within their jurisdiction.

5.5.2. Overall Policies

1. The City of Blaine discourages wetland disturbance. Wetlands must not be drained or filled—wholly or partially—unless replaced by restoring, enhancing, or creating wetland areas of an equal public value, as permitted by the WCA. Wetland sequencing will be strictly followed:

    a. First priority is to avoid the impact
    b. Where the impact cannot be avoided, the impact must be minimized
    c. Where the impact cannot be avoided, the impact must be mitigated

2. The City of Blaine prohibits clearing and grading within designated wetland buffers.

3. The City of Blaine has developed a plan for the Preservation of Natural Drainage Ways that is included in the City Zoning Ordinance Section 33.17.

4. The City of Blaine will continue to work with the CCWS and RCWD as LGUs for wetlands within their respective jurisdictions.

5. The City of Blaine set management goals for Laddie and Lochness Lake. Laddie Lake goals are based on the ecoregion goals described in **Section 6**. These goals will be deferred until the shallow lake goals are set by the MPCA. Lochness Lake goals are to maintain existing water quality, consistent with nondegradation.

5.6. Erosion and Sediment Control

5.6.1. Overall Goal

The City of Blaine will require preventing sediment from leaving construction sites or established areas including agricultural areas from entering the City's surface water resources and storm sewer system. The City will repair erosion problems on City-owned property and issue orders for private landowners to do the same when erosion problems transport sediment from their property.

The City of Blaine desires to control temporary sources of sediment such as construction sites and identify, minimize, and correct sediment sources that are not directly related to land disturbing activities. The following publications should be utilized as guides: *Protecting Water Quality in Urban Areas*, MPCA and *Stormwater Management for Construction Activities: Developing Pollution Prevention Plans and BMPs*, EPA.

5.6.2. Overall Policies

1. Blaine will regulate new development, redevelopment, and other land disturbing activities through its Land Disturbance and Erosion and Sediment Control Ordinance.

2. The City will periodically review its Erosion and Sediment Control ordinance and revise it as necessary.

3. All construction sites required to obtain a NPDES permit must comply with the erosion and sediment control conditions of that permit. Erosion and sediment control BMPs are to be installed before land disturbing activities begin and shall be maintained until the site is re-stabilized.

4. The City will cooperate with RCWD and CCWD to maintain drainage ditched and prevent stream bank erosion.

5.7. Education and Public Participation

5.7.1. Overall Goal

The City of Blaine will inform and educate the public concerning urban stormwater management and the problems pollutants cause if they are allowed to enter Blaine's water resources. The public will be provided opportunities to comment on surface water management activities and become directly involved in these activities.

To obtain the necessary political and economic support for successful LSWMP implementation, it is vital to inform city residents, business owners, and property managers about the basic stormwater management and water quality concepts, policies, and recommendations in the

LSWMP and the progress of stormwater management efforts.

5.7.2. Overall Policies

1. Enact a public education program based on the following objectives to reduce stormwater pollution:
    a. Raise awareness of the problem and solutions
    b. Promote community ownership of Laddie and Lochness Lake and other surface waters
    c. Recognize responsible parties and actions to date
    d. Merge public feedback into program execution

2. Enact a public education and outreach program to satisfy the minimum control measures identified in the City's NPDES MS4 permit.

3. The public education program will include close coordination with outside entities like the watershed districts, Anoka County, DNR, MPCA, and others.

5.8. Groundwater Protection

5.8.1. Overall Goal

The City of Blaine will promote recharge of groundwater by requiring infiltration where appropriate to mitigate for the increased impervious surfaces from development. The City will protect drinking water and wells by restricting infiltration where underlying geologic formations might convey surface water directly into groundwater aquifers, such as DWSMAs, as found in the Wellhead Protection Plan.

The City's groundwater protection policies are intended to preserve groundwater levels and flow and to protect drinking water supplies.

5.8.2. Overall Policies

1. The City will implement its approved wellhead protection plan.

2. The City will continue to coordinate with other agencies to continue existing groundwater monitoring and permitting programs.

3. The City will explore opportunities to reduce groundwater use through the development of an irrigation ordinance. The City will also promote stormwater reuse opportunities in new and redeveloping projects.

5.9. Recreation, Fish, and Wildlife

5.9.1. Overall Goal

The City of Blaine will protect recreational opportunities and fish and wildlife habitat for the benefit of its residents.

The City's recreation and fish/wildlife policies focus on access, connectivity, preservation, and control of exotic and invasive species.

5.9.2. Overall Policies

1. Work with appropriate agencies to control exotic/invasive species.
2. Preserve wetlands that provide habitat for wildlife and spawning of fish.
3. Work to create wildlife corridors throughout the city.
4. Plan trails and parks to provide controlled access to water resources and encourage recreational opportunities.
5. Create native buffers around lakes and wetlands whenever possible to increase wildlife habitat and pollinators.
6. Continue to work with the watershed districts to implement their fish and wildlife policies.
7. Coordinate with local and state agencies to protect threatened and endangered plant and animal species.

5.10. Maintenance and Inspection

5.10.1. Overall Goal

The City of Blaine will continue an active storm sewer system maintenance and inspection program.

5.10.2. Overall Policies

1. Continue to implement an annual inspection and maintenance program as required by the city's NPDES MS4 permit.
2. Require and enforce adequate access to ponding facilities including outlots and easements.

5.11. Public Ditch System

5.11.1. Overall Goal

The City of Blaine will provide a mechanism for management of the public ditch system.

5.11.2. Overall Policies

1. The City will continue to work with RCWD and CCWD to provide inspection, maintenance, and repair of all ditches in the City's jurisdiction.
2. The City will maintain the ditches in their jurisdiction in conformance with the City ordinances.

5.12. Financial Management

5.12.1. Overall Goal

The City of Blaine will use available funding mechanisms to construct and maintain a sustainable stormwater management system.

5.12.2. Overall Policies

1. The City will utilize various funding sources including, but not limited to area charges, stormwater utility and grants to accomplish improvements listed in this surface water management plan and other surface water documents including the Nondegradation Study.

2. The City will pursue grants, donations, and in-kind contributions to help fund stormwater projects.

3. The City will encourage the watershed districts to finance intercommunity and regional issues and projects.

5.13. TMDL Implementation – Impaired Waters

5.13.1. Overall Goal

The City of Blaine will address target pollutants identified in TMDL studies to improve the quality of impaired waters.

5.13.2. Overall Policies

1. The City of Blaine will follow the steps described in BMP Summary Sheet 6c-2 (refer to Appendix G) to achieve reductions in assigned waste load allocations (WLA).

6. IMPLEMENTATION PROGRAM

6.1. Overview

Blaine has developed its implementation program to address issues identified earlier in this LSWMP. This program reflects the needs and concerns of many stakeholders including the City Council, City staff, citizens, and watershed districts. The program also considers Blaine's ability to fund these items through its stormwater utility. The implementation program consists of the following components:

- Capital Improvement Projects (CIP)
- Operation and Maintenance
- Official Controls
- Monitor and Study

Capital Improvements consist of on-the-ground projects intended to remedy issues identified as current problems. The capital projects focus on phosphorus, TSS, and E. coli reduction within the TMDL subwatersheds and areas identified in the City's Nondegradation Report.

Operation and Maintenance items consist primarily of the general maintenance of Blaine's drainage system including ponds, storm sewer, and culverts. Operation and maintenance also includes activities related to NPDES MS4 Permit compliance such as annual meetings, SWPPP updates, and SWPPP implementation.

Official Controls include ordinance and policy revisions intended to achieve water quality benefits. Each proposed implementation item has a specific driver, which are identified **Table 6.1**. The overarching goal of Blaine's implementation program is to improve the quality of its surface waters, improve its surface water discharge, and achieve sustainable site development practices. Over time, codes must be updated to remain consistent with goals, policies, and practices. City ordinances are revised as needed to stay current with the MS4 permit requirements and revisions to the two watershed district rules.

Monitor and Study items consist primarily of projects designed to collect water resource data such as water quality monitoring projects, and projects to evaluate cost benefits for various stormwater treatments or planning opportunities.

6.2. 10-Year Implementation Plan Priorities

Table 6.1 presents Blaine's Implementation Program. More importantly, the Implementation Program aligns with the City's goals and policies presented in this SWMP. **Table 6.1** presents implementation items in each of the four functional areas of CIP, Operation and Maintenance, Official Controls and Monitor and Study. The implementation program incorporates Blaine's SWPPP through direct reference of items that have a financial impact. The City will update the implementation program in conjunction with its annual NPDES MS4 public meeting. The City's CIP is reevaluated yearly and therefore this table may change, which does not require an amendment to this LSWMP.

6.3. Financial Considerations

In 2008, the City of Blaine instituted a Stormwater Utility Fee. This fee is applied to all properties and low and medium density residential properties pay the same fee. Other land use types with larger amounts of impervious surfaces pay fees based on the size of the property and an equivalency calculation that factors in impervious area. The City will use funds generated from

its Stormwater Utility Fee as the primary funding mechanism for its implementation program including maintenance, repairs, capital projects, and studies. If funds from this fee do not cover necessary costs, the City will consider adjusting the Stormwater Utility Fee to cover the costs associated with the implementation program. The City will continue to review the fee annually and adjust based on the stormwater related needs of the City and other available funding mechanisms. The City will also take advantage of grant or loan programs to offset project costs where appropriate and cost-effective. Below is a list of various sources of revenue that the City will attempt to use:

- Grant monies possibly secured from various agencies. This could include the RCWD, CCWD, Anoka County, DOT, MPCA, DNR, Legislative-Citizen Commission on Minnesota Resources, BWSR, and others.
- Special assessments for local improvements performed under authority of Minnesota Statutes Chapter 429.
- Revenue generated by Watershed Management Special Tax Districts provided for under Minnesota Statutes Chapter 473.882.
- Project funds could be obtained from watershed district levies as provided for in Minnesota Statutes Chapter 103D.905 for those projects being completed by or in cooperation with RCWD and CCWD.
- Other sources potentially including tax increment financing, tax abatement, state aid, and others.

TABLE 6.1

SURFACE WATER MANAGEMENT IMPLEMENTATION PLAN

No.	Project Description	10 Year Total Cost Estimate [1,3]	Watershed District[4]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
					2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Capital Improvement Projects (CIP)															
1	Mary Elizabeth Addition	$300,000			$300,000										
2	Donnay's Oak Park	$300,000			$300,000										
3	7th Street Box Culvert Replacement	$250,000			$250,000										
4	Laddie Lake Regional Stormwater Treatment	$0													
5	Toys R Us	$0													
6	Olympia Park Infiltration Basin	$26,200								$25,000	$300	$300	$300	$300	Project 3-B from Springbrook Stormwater Retrofit Analysis
7	Aurelia Park Infiltration Basin	$28,700								$27,500	$300	$300	$300	$300	Project 5-C from Springbrook Stormwater Retrofit Analysis
8	3rd St and 90th Ave Infiltration Basin	$66,800						$65,000	$300	$300	$300	$300	$300	$300	Project 5-D from Springbrook Stormwater Retrofit Analysis
9	Little Bit Park Infiltration Basin	$36,800						$35,000	$300	$300	$300	$300	$300	$300	Project 7-B from Springbrook Stormwater Retrofit Analysis
10	Curb Cut Rain Gardens - The City will assist homeowners in funding private rain gardens to improve water quality throughout the City	$10,000		Homeowners with assistance from WDs, Anoka Conserv. District, City	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	Multiple projects from Springbrook and Pleasure Creek Stormwater Retrofit Analysis
11	Pond 303 IESF Bench	$217,000							$210,000	$1,400	$1,400	$1,400	$1,400	$1,400	Project 1-C from Pleasure Creek Stormwater Retrofit Analysis
12	Pond 310 IESF Bench	$172,000					$165,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	Project 1-D from Pleasure Creek Stormwater Retrofit Analysis
13	Swan Park Infiltration Basin North	$35,900									$35,000	$300	$300	$300	Project 2-B from Pleasure Creek Stormwater Retrofit Analysis
14	Swan Park Infiltration Basin South	$44,900				$42,500	$300	$300	$300	$300	$300	$300	$300	$300	Project 2-C from Pleasure Creek Stormwater Retrofit Analysis
15	Van Buren Park Infiltration Basin South	$95,300											$95,000	$300	Project 3-B from Pleasure Creek Stormwater Retrofit Analysis
16	Van Buren Park Infiltration Basin North	$95,600										$95,000	$300	$300	Project 3-C from Pleasure Creek Stormwater Retrofit Analysis
17	Cloverleaf Park Infiltration Basin	$205,000												$205,000	Project 3-D from Pleasure Creek Stormwater Retrofit Analysis

SECTION VI

No.	Project Description	10 Year Total Cost Estimate [1,3]	Watershed District[4]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
					2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
18	Centennial Green Park IESF	$81,800				$65,000	$2,100	$2,100	$2,100	$2,100	$2,100	$2,100	$2,100	$2,100	Project 1 from Golden Lake Stormwater Retrofit Assessment

No.	Project Description	10 Year Total Cost Estimate [1,3]	Watershed District[4]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
					2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
MS4 Permit and Additional Operations and Maintenance Activities															
19	Craig's Addition Ditch Improvements	$56,000			$56,000										
20	Ditch Inspections - watershed contracts	$16,000			$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	
21	General Ditch Maintenance	$500,000			$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	Includes Issues 4.2.3 and 4.5.2
22	Pond Inspections - contract	$220,000			$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	Includes Issues 4.8.1 and 4.8.2
23	Pond Maintenance - contract	$1,500,000			$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	Includes Issues 4.8.1 and 4.8.2
24	Raingarden Maintenance	$22,000			$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	$2,200	
25	General Maintenance Placeholder	$400,000			$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000	
26	Street Sweeping - Sweep City maintained streets 2 times per year.	$250,000		Stormwater Utility	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	Issue 4.8.3
27	Education Activity Implementation Plan and Program - The City will provide stormwater education and outreach programs for residents within the City. The Education Program should include: -Distribution of educational materials including through City newsletter, website, and public service announcements (local paper and TV) -Coordination with RCWD and ACD -Presence at environmental fairs, home and garden shows, etc. -Volunteer opportunities -Annual builders meeting and trainings	$15,000		Stormwater Utility	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	Includes Issues 4.2.5, 4.7.1 and 4.8.4
28	Annual Meeting - Hold annual public meeting to provide information on the NPDES program and allow residents an opportunity to review and provide input on the SWPPP. Provide public notice of the meeting 30 days in advance. All input will be documented as part of the public record and addressed as appropriate. Revisions will be made to the SWPPP as necessary and submitted to the MPCA.	$8,000		Stormwater Utility	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	
29	Online Availability of Stormwater Pollution Prevention Program Document - Provide an electronic version of the SWPPP on the City website to solicit public opinion and provide easy access.	$500		Stormwater Utility		$250					$250				
30	Storm Sewer System Map - Update storm sewer map upon receipt of as builts for new infrastructure. Identify outfalls, including unique identification (ID) number assigned by the permittee, and an associated geographic coordinate and other discharge points from the City.	$4,000		Stormwater Utility		$2,000					$2,000				Issue 4.9.2

No.	Project Description	10 Year Total Cost Estimate [1,3]	Watershed District[4]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
					2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
31	Illicit Discharge Detection and Elimination (IDDE) Regulatory Control Program - Review ordinance to ensure that ordinance continues to meet the needs of the City and legal requirements. Review ordinances of adjacent communities with regularity.	$3,000		Stormwater Utility	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	
32	Illicit Discharge Inspections - The City continue to inspect septic systems upon property transfer and completion of construction. The City will track reporting of resident pumping and cleaning of septic systems to ensure compliance (required every 3 years).	$25,000		Stormwater Utility	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	
33	IDDE Information Program - The City will develop a strategy to inform City employees, local businesses, property owners, and the public about the hazards associated with illegal discharges and improper disposal of waste. The City will cooperate with the watershed districts to develop educational opportunities.	$5,000		Stormwater Utility	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500	
34	Identification of Non-Stormwater Discharge and Flows - Continue to evaluate non-stormwater discharges identified in permit as significant contributors of pollutants to MS4. Develop and implement action plans to address these flows.	$8,000		Stormwater Utility	$800	$800	$800	$800	$800	$800	$800	$800	$800	$800	
35	Standard Operating Procedures (SOPs) - Update SOPs for IDDE, including emergency response, within 12 months of the date of MS4 permit coverage.	$500		Stormwater Utility		$250					$250				
36	Source Water Protection Areas - Identify potential sources of pollution in the vulnerable well areas. Develop a plan to clean up existing pollutants and prevent introduction of future pollutants. Develop and implement an education plan.	$3,000		Stormwater Utility	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	
37	Construction Site Inspections - Continue to inspect construction sites for compliance with erosion and sediment control plans and waste management. Distribute priority BMP sheets to builders/developers and track their use. Continue to utilize the City's Building Inspection log for issues and complaints received on construction sites and address site runoff issues.	$25,000		Stormwater Utility	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	
38	Site Plan Review - The City will continue to review site plans for development and redevelopment and require the use of structural and non-structural BMPs. The City will track the number of BMPs incorporated in site plans and assess changes due to increases in impervious area.	$40,000		Developers & Stormwater Utility	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	
39	Update Ordinance to Meet New Permit Requirements - Complete Ordinance updates for post-construction runoff from new development and redevelopment within 12 months of extension of permit coverage.	$3,000		Stormwater Utility		$1,500					$1,500				

No.	Project Description	10 Year Total Cost Estimate [1,3]	Watershed District[4]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
					2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
40	Structural Stormwater BMP Maintenance Program - Inspect 20% of known public outfalls, sediment basins and ponds each year on a rotating basis. Inspect 100% of structural pollution control devices each year. Retain records of inspection, maintenance, and corrective actions for 3 years past the expiration of the MS4 permit.	$80,000		Stormwater Utility	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	Issue 4.8.1
41	Municipal Operations and Maintenance Program - The City will implement an inspection, operation, and maintenance program with a training component for City Public Works employees.	$0		Stormwater Utility											
42	Stockpiles, Storage, and Material Handling Area Inspections - Conduct written inspections of all stockpile, storage, and material handling areas.	$10,000		Stormwater Utility	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	
Official Controls															
43	Ordinance Updates - Blaine, in cooperation with watershed districts, will ensure that adequate regulatory controls are in place to manage and mitigate adverse impacts on public waters and wetlands. This implementation item is programmed in the CIP under Operations Projects and in the Budget under Expenditures - Operating to address sedimentation and siltation in the lakes, streams and wetlands through maintenance of the storm sewer pipes, ponds and ditches. This item is also covered by the Erosion and Sediment Control Ordinance and NPDES and MS4 permits.	$0													Issue 4.4.1
44	Subdivision Design Standards - The Subdivision Design Standards will be reviewed and updated as necessary to ensure that stormwater management standards, including volume control standards and erosion and sediment control standards are consistent with current engineering practices and current regulations of local and state agencies having jurisdiction within the City.	$0													

No.	Project Description	10 Year Total Cost Estimate [1,3]	Watershed District[4]	Possible Funding Sources [2]	Proposed Cost By Year[1]										Comments
					2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Monitor and Study															
45	Laddie Lake Regional Stormwater Study	$0													Issue 4.2.1
46	Man-made water feature monitoring program	$0													Issue 4.1.7
47	Street sweeping study	$0													
48	Neighborhood Drainage Study - South of 88th Lane and West of Lexington Ave NE	$0													
	TOTAL	**$5,160,000**			**$1,220,000**	**$425,500**	**$481,400**	**$417,400**	**$528,000**	**$371,900**	**$359,000**	**$415,300**	**$415,600**	**$525,900**	

[1] Cost estimates are preliminary and subject to review and revision as engineer's reports are completed and more information becomes available. Table reflects 2018 costs and does not account for inflation. Costs generally include labor, equipment, materials, and all other costs necessary to complete each activity. Some of the costs outlined above may be included in other operational costs budgeted by the City.

[2] Funding for stormwater program activities projected to come from following sources - Stormwater Utility, Developers Agreements, Grant Funds, General Operating Fund, or Special Assessments.

[3] Staff time is not included in the cost shown.

7. ADMINISTRATION

7.1. Review and Adoption Process

Review and adoption of this Surface Water Management Plan will follow the procedure outlined in Minnesota Statutes 103B.235:

> After consideration but before adoption by the governing body, each local government unit shall submit its water management plan to the watershed management organization[s] for review for consistency with the watershed plan. The organization[s] shall have 60 days to complete its review.
>
> Concurrently with its submission of its local water management plan to the watershed management organization, each local government unit shall submit its water management plan to the Metropolitan Council for review and comment. The council shall have 45 days to review and comment upon the local plan. The council's 45-day review period shall run concurrently with the 60-day review period by the watershed management organization. The Metropolitan Council shall submit its comments to the watershed management organization and shall send a copy of its comments to the local government unit.
>
> 'After approval of the local plan by the watershed management organization[s], the local government unit shall adopt and implement its plan within 120 days, and shall amend its official controls accordingly within 180 days.

7.2. Plan Amendments and Future Updates

This Local Surface Water Management Plan will be incorporated into the City's 2040 Comprehensive Plan currently being updated and planned for approval in 2018. The Plan is intended to be in effect for 10 years, at which time an updated plan will be required. Following review by the WMO's and the formal adoption process outlined above, the Blaine LSWMP will be current. The City of Blaine my revise/amend the plan in response to City-identified needs.