Local Surface Water Management Plan

City of Crystal

December 2018

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Executive Summary

Background

This Local Surface Water Management Plan (LSWMP) will serve as a comprehensive planning document to guide the City of Crystal 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 Management Policy Plan, and the two watershed management commissions having jurisdiction within the City: Shingle Creek Watershed Management Commission (SCWMC) and Bassett Creek Watershed Management Commission (BCWMC).

This LSWMP is organized into sections that generally follow guidance provided by State statute, rules, and the Metropolitan Council. These sections are described as follows:

- Section 1 identifies the purpose and scope of the LSWMP.
- Section 2 describes the physical setting; the history, natural resources, and land uses within the City.
- Sections 3 through 5 describe the regulatory agencies having jurisdiction in Crystal, and past studies and agreements related to surface water resources.
- Section 6 presents a collection of the storm water management related assessments within the City, identifies recently completed and future storm water management projects as well as assessments completed by others that affect Crystal.
- Section 7 lists the goals and policies identified to address surface water management needs in the City.
- Section 8 summarizes implementation items from the storm water management related assessment (Section 6) and the goals and policies listed in Section 7.
- Section 9 outlines the continued administration of this plan.

Regulatory Setting

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. Sections 3-5 of this Plan identify the context in which the Crystal LSWMP is fashioned. This context includes the multitude of Federal, State, and local governmental agencies that have some authority over water resources and storm water management. Section 3 provides a synopsis of certain agencies and their specific authority. Section 4 references past studies, plans, and reports guide Crystal's storm water management program and this LSMWP. Some among these, such as the Twin and Ryan Lakes TMDL and the individual watershed plans, become another source of regulatory authority as they are adopted and approved. The third leg of this existing regulatory component are the agreements to which Crystal is a party. The agreements that established the watershed management commissions and Bassett Creek Flood Control Project agreement represent a commitment to joint implementation among Crystal and its neighboring communities.

System Assessment

Section 6 assesses the current state of surface waters to which Crystal discharges and evaluates the City's current storm water management program. The assessment provides management issues identified by the City, the two watersheds with jurisdiction within the City, and other state and federal agencies. Possible corrective actions have been associated with each of the issues identified. Embedded within the assessment are a list of issues and corrective actions. This statutorily required component of Crystal's plan represents a comprehensive list of problems and potential solutions. Crystal cannot immediately afford solutions to all these problems, so the list is prioritized based on the City's goals and policies and its financial resources. The implementation plan represents this prioritized list of solutions.

Goals and Policies

Following the assessment, Section 7 identifies the City's storm water management goals and policies. The goals identified in this section fall into broad categories aimed at addressing the purposes of storm water management planning identified in Minnesota State Statute 103B.201:

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

Crystal's goals, and the policy statements that support these goals, fall into 11 categories. The general trend among these goals and policies is to continue Crystal's commitment to retrofitting water quality improvements to areas without water quality treatment and doing this in a way that is both technically feasible and fiscally prudent.

Storm water Management Implementation

The implementation section (Section 8) of the LSWMP describes the specific activities proposed by the City to address the storm water management issues presented in Section 6 and implement the policies identified in Section 7. Section 8 provides recommended actions related to the City's official storm water management controls and a list of system improvement projects and activities, as well as other implementation priorities.

Plan Administration

This LSWMP will be incorporated into the City's current Comprehensive Plan Update. Periodic amendments may be required to incorporate changes in local practices or governing regulations.

Section 1 – Purpose and Scope

1.1 PURPOSE

The Crystal Local Surface Water Management Plan (LSWMP) serves as a comprehensive planning document to guide the City of Crystal 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 Management Policy Plan, and the two watershed management commissions having jurisdiction within the City: Shingle Creek Watershed Management Commission (SCWMC) and Bassett Creek Watershed Management Commission (BCWMC). Crystal may periodically update this plan to remain current with evolving regulation and to remain current with projected and completed implementation items.

1.2 SCOPE

This plan serves multiple purposes including statutory and rule compliance. Minnesota Statute 103B.235 defines content for Local Surface Water Management Plans.

Minnesota Rules 8410, written by the Board of Water and Soil Resources to administer statutes 103B and others, provide more detail on local plan content. Though the BWSR guidance applies specifically to watershed management organizations, this guidance has historically been used to frame expectations for municipal plans. According to Minnesota Rules 8410.0160, local plans must include sections containing:

1. Table of Contents
2. Purpose
3. Executive Summary
4. Land and Water Resource Inventory
5. Water Resource Management Related Agreements
6. Assessment of Problems
7. Corrective Actions
8. Establishment of Goals and Policies
9. Relation of Goals and Policies to Local, Regional, State, and Federal Plans, Goals, and Programs
10. Implementation Priorities
11. Amendment Procedures
12. Implementation Program
13. Appendix

Crystal has structured its LSWMP to provide the information required by Minnesota Rules 8410 without holding strictly to the outline above. Throughout this document the City provides signposts identifying where a statutory or rulemaking requirement might be addressed.

The LSWMP must also satisfy Metropolitan Council requirements as contained in their current Water Resources Management Policy Plan. These requirements build on those of Rules 8410. Section 3, Regulatory Context, presents the expanded requirements of Metropolitan Council.

Beyond state level requirements and those of Metropolitan Council, all local plans must achieve consistency with watershed organization plans. Shingle Creek and Bassett Creek Watershed Management Commissions outline specific content for local plans that reiterate statutory and rule requirements as well as define unique requirements that address issues of local importance.

Section 2 – Physical Setting

2.1 LOCATION AND HISTORY

This section of Crystal's Local Surface Water Management Plan (LSWMP) provides information described in Rules 8410 under the heading of Land and Water Resources Inventory. Other information important to understanding the context for surface water management decisions in the City is also included.

The City of Crystal is located in Hennepin County in the northwestern portion of the Twin Cities metropolitan area about 12 miles northwest of downtown Minneapolis. Crystal is a fully-developed community of approximately six square miles bordered by Brooklyn Park and Brooklyn Center to the north, Golden Valley to the south, Robbinsdale to the east, and New Hope to the west.

Crystal was originally established as Crystal Lake Township in 1860 when the Hennepin County Government authorized its organization. The City of Crystal was incorporated in 1887, making it one of the older municipalities in Minnesota. Originally known as Crystal Village, reorganization in 1960 resulted in the final jurisdictional boundary and name.

The City experienced rapid development and population growth in the 1950s and was home to approximately 25,000 people by 1960. This rapid population growth continued through the 1960s, and by 1971, 31,000 people called Crystal home. Crystal's population has decreased slightly since 1971, but this reflects decreasing household size and not loss of housing stock. Looking forward, Crystal anticipates the population growth as outlined in the Comprehensive Plan.

2.2 Topography and Drainage

Gently rolling topography characterizes Crystal and much of the northwest portion of the Twin Cities Metropolitan area. The vast sheets of ice that formed this topography left behind a number of poorly drained depressions of various sizes, which ultimately became the area's wetlands and lakes. Prior to intensive cultivation and drainage, these wetlands and lakes were often isolated or landlocked. First with agricultural drainage and then through urban storm sewer systems, humans connected these depressions one to another so that adequate drainage occurred. This extension of drainage systems combines with urban and agricultural land practices to create the impairments seen in Minnesota's waters today.

The natural drainage in Crystal splits between the two watersheds: Shingle Creek to the north and Bassett Creek to the south. Shingle Creek itself does not appear in Crystal. However, its topographic watershed includes Crystal drainage that enters the City's storm sewer and drains into the Twin and Ryan Lakes chain, ultimately flowing into Shingle Creek. Similarly, the main stem of Bassett Creek does not appear in Crystal; however, the North Branch of Bassett Creek meanders through the south part of Crystal, and Crystal's storm sewer system directly connects to the creek in several locations as

shown in Figure 2.2. The jurisdictional boundaries of the watershed management commissions generally follow these natural drainage patterns.

Twin Creek begins in New Hope and travels through the northwestern corner of Crystal. It flows north into Brooklyn Park and then south back into Crystal capturing the majority of the runoff from the Crystal Airport, prior to flowing into DNR Wetland 639W and then Upper Twin Lake. Twin Creek continues through the Twin and Ryan Lakes chain and meets Ryan Creek east of Crystal's boundary. Ryan Creek flowing out of Ryan Lake eventually flows into Shingle Creek. Shingle Creek continues this drainage pattern as it travels 3.6 miles to meet the Mississippi River near 37th Avenue NE. The drainage from this portion of the City is conveyed to Twin Creek or the Twin Lakes Chain through the City's storm sewer conveyance system or man-made ditches.

Southern Crystal drains into the North Branch of Bassett Creek through several municipal storm sewer discharges. Just prior to leaving Crystal, the North Branch joins the main stem of Bassett Creek which then travels 3.5 miles through the cities of Golden Valley and Minneapolis, before entering the Mississippi River south of St. Anthony Falls.

2.3 SOILS

The Natural Resources Conservation Service (NRCS) published the *Soil Survey of Hennepin County, Minnesota* in 2004. The soil survey identifies the physical properties of the soils within the county and provides mapping to identify the locations of the various soils types. A map of the soils can be found online at https://gis.hennepin.us/naturalresources/map/default.aspx

The soil types found in Crystal are primarily dominated by the Hubbard complex, Hayden-Kingsley Complex and a broad mixture of various other soil types. These soils types can be classified into Hydrologic Soil Groups (HSG) 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.

Generally, the soils are of Type A and B (highly to moderately infiltrative) in the northern portion of the City north of County Highway 10 and within the boundaries of the Crystal Airport. Consistent with staff experience, the soils are generally more permeable to the northeast of the Hayden/Kingsley Complex, and less permeable soils occur to the southwest of this line. The soil survey can be used as a starting point when identifying potential areas that are suitable for the placement of infiltration Best Management Practices (BMPs); however, site-specific soils tests will still determine the exact location and performance of individual installations.

Once a soil analysis has been completed, the guidance in the Minnesota Storm water Manual should be followed regarding the use of infiltration vs. filtration. As a goal, every effort should be made to infiltrate storm water runoff rather than use filtration. Clay soils, depth to groundwater, contaminated soils, hot spots (sites prone to pollution such as industrial sites), areas within a 1-year time of travel within a Wellhead Protection Area (WPA), and depth to bedrock can be limiting factors in locating infiltration BMPs.

2.4 GEOLOGY AND GROUNDWATER

The soils within Crystal include variable soil types ranging from pockets of sandy soil in northern portions of the City to heavier soils throughout large portions of the remainder of the City. These surface soils overlay St. Peter Sandstone, which occurs 50 to 100 feet below the surface in the

northern portion of the City. In southern Crystal, the bedrock depth ranges from 100 to 150 feet below the surface. For additional information on Crystal's bedrock geology, one can consult the *Geologic Atlas: Hennepin County* (Balaban, 1989).

Crystal provides potable water to its residents in cooperation with the cities of New Hope and Golden Valley through a joint powers organization called the Joint Water Commission (JWC). The JWC has a long-term contract to purchase treated water from the City of Minneapolis. The water is drawn from the Mississippi River, treated, and pumped to reservoirs in Crystal and Golden Valley. From there it is distributed to the JWC's customers.

2.5 CLIMATE

The National Weather Service, a branch of the National Oceanic and Atmospheric Administration, publishes climate data for Crystal (Station 215838). Past history is available through the State of Minnesota's Department of Natural Resources webpage
https://www.dnr.state.mn.us/climate/historical/introduction.html

Rainfall frequency estimates are used as design tools in water resource projects. The National Weather Service Hydrometeorological Design Studies Center has released NOAA Atlas 14, Volume 8. The 24-hour precipitation depths reference information used in Crystal for different rainfall recurrence intervals is available through the State of Minnesota's Climatology office at
https://www.dnr.state.mn.us/climate/noaa_atlas_14.html

Crystal manages its water resources for specific design events so as to not cause erosion or flooding in downstream waterbodies. The City requires development and redevelopment to maintain or reduce discharge rates for the 2-year, 10-year, and 100-year, 24-hour storm events.

2.6 WATER RESOURCES

The City of Crystal is developed around a variety of surface water resources that are both aesthetically and recreationally valuable to the community, including lakes, wetlands, and creeks. The Minnesota Department of Natural Resources (DNR) has regulatory jurisdiction over many of the City's waterbodies defined as Public Waters of the State. The waterbodies identified by the Minnesota DNR as Public Waters are included in Table 2.1 . The map is available online through the Minnesota Department of Natural Resources
https://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps_metro.html

Table 2.1 - Minnesota DNR Public Waters in Crystal[1]

Type	Name	DNR ID
Lakes	Upper Twin Lake	27-42P
	Middle Twin Lake	27-42P
Wetlands	Unnamed Wetland Winnetka Hills neighborhood	27-0629P
	Unnamed Wetland	27-639W
	Unnamed Wetland (Memory Lane Pond)	27-641W
	Unnamed Wetland (Hagemeister Pond)	27-642W
	Unnamed Wetland (Gaulke Pond)	27-643W
	Bassett Creek Park Pond	27-646P
Creeks	Twin Creek	-
	Bassett Creek	-
	Unnamed Tributary of Bassett Creek[2]	-

[1] *Source: Minnesota DNR PWI Maps and Lists*

[2] *Identified in the Bassett Creek Watershed Management Plan as "North Branch of Bassett Creek"*

2.6.2 CREEKS

Twin Creek flows through the northwest portion of the City from New Hope, into Robbinsdale, and then down through Crystal into the Twin Lake system, which discharges to the Mississippi River via Ryan Lake and Shingle Creek. North Lions pond and the wetland to the north discharge into storm sewer pipes into Brooklyn Park, where the water then dives into and out of storm sewer pipes or ponds until it daylights ease of Douglas Drive into a ditched channel. The majority of the drainage from this portion of the City drains through storm sewer into the Twin Lake Chain. Shingle Creek is designated by the MPCA as an impaired water due to chloride, low dissolved oxygen, and low biotic integrity. Crystal's efforts to address the impairment are prominent in its implementation plan, which is provided in Section 8. Impaired waters are discussed in more detail in later sections of this plan as well as the following websites:

- Bassett Creek WMO website: http://www.bassettcreekwmo.org/
- Shingle Creek WMC website: http://www.shinglecreek.org/
- MPCA's website: https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list

In the southern portion of the City, the North Branch of Bassett Creek flows from the City of New Hope into Crystal and finally into Bassett Creek near Highway 100 and 29th Avenue N. Generally, Crystal's storm sewer system directly discharges into the creek as indicated by the mapped outfalls in Figure 2.1. The main stem of Bassett Creek and the North Branch of Bassett Creek (including Bassett Creek Park Pond) are classified as priority streams b the BCWMC, per Section 2.7.2.2 of the 2015 CWWMC Plan.

2.6.3 LAKES

The Twin Lakes Chain supports fishing and swimming and provides aesthetic benefits to the area. The drainage area to the lake chain encompasses 5,550 acres of fully developed urban and suburban land. The lakes are connected by channels of varying lengths that connect the system to Ryan Lake. Water quality in Upper Twin Lakes is considered poor, with frequent algal blooms, while Ryan and Middle Twin Lakes have moderately better water quality.

Monitoring data in the Twin Lakes Chain suggests that the chain is a highly productive system, with the greatest water quality problems occurring in Upper Twin Lake. The uppermost lake in the chain, Upper Twin Lake, is a hypereutrophic lake where both internal and watershed loading appear to be significant sources of phosphorus. The majority of phosphorus in Middle Twin Lake comes from Upper Twin Lake or Middle Twin's direct tributary watershed – internal loading is not identified as a significant contributor. Lower Twin Lake is a eutrophic lake where internal loading has the potential to increase algal productivity throughout the season. Ryan Lake, the last lake in the chain, is a deep, mesotrophic lake that has relatively good water quality for an urban lake.

The Twin Lake Chain including Ryan Lake were listed as Impaired Waters for excessive nutrients, and an approved TMDL implementation plan has been developed for this system. As a result of implementation actions taken in their drainage areas, the water quality in both Lower Twin and Ryan Lake has improved and those two lakes have been removed from the list of Impaired Waters. Upper Twin and Middle Twin continue to be impaired, and improvement actions continue.

More information regarding the impairments to the Twin Lakes Chain can be found in Section 6.4 as well as the following websites:

- Shingle Creek WMC website: http://www.shinglecreek.org/

- MPCA's website: https://www.pca.state.mn.us/water/tmdl/twin-and-ryan-lakes-excess-nutrients-tmdl-project

2.6.4 WETLANDS

Crystal's wetlands naturally store runoff and provide rate control. They also protect water quality by filtering storm water. However, Minnesota law now prevents the conversion of wetlands into storm water management ponds, so these storage and filtering functions will be protected and augmented by incremental implementation of Best Management Practices with redevelopment and street projects. In addition to storm water management functions, wetlands provide diverse wildlife habitat and aesthetic benefits to residents that cannot be quantified. Figure 2.2 presents the National Wetland Inventory (NWI) and Public Waters Inventory (PWI) for Crystal. The NWI identifies wetlands larger than a quarter acre in size.

Minnesota protects all wetlands through its Wetland Conservation Act (WCA). Crystal is the LGU that enforces the WCA within its municipal boundaries. The WCA requires that impacts to wetlands be avoided. If the impacts are proven to be unavoidable, then sequencing measures need to be taken to minimize the impacts. Wetlands, lakes, and streams that are classified as Public Waters on the Public Waters Inventory established by the Minnesota Department of Natural Resources (DNR) are offered an extra level of protection. Any work done affecting the course, current, or cross section of these waterbodies may require a Public Waters Work Permit, which is administered by the DNR.

Shingle Creek Watershed requires that municipalities within its jurisdiction perform a wetland function and values assessment for all priority wetlands. This assessment considers vegetative and habitat aspects to individual wetlands and ultimately leads to a management strategy catered to specific wetland types.

Bassett Creek Watershed requires municipalities to perform a function and values assessment within its jurisdictional area. Crystal's phased approach to performing these assessments will also cover wetlands within Bassett Creek Watershed's jurisdiction.

2.6.5 MLCCS AND MBS

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 land cover preservation into land planning, land use, and zoning decisions. In the City of Crystal, the MLCCS data shows that the landscape is dominated by artificial surfaces and associated areas. Crystal identifies numerous parks throughout its jurisdictional boundaries, and those areas typically contain areas of herbaceous vegetation and woodlands. The Crystal Airport is also found in the northeast corner of the City and has planted and cultivated vegetation.

According to the Minnesota DNR, the Minnesota Biological Survey (MBS) began in 1987 as a systematic survey of rare biological features on a county by county basis. The survey for Hennepin County is complete, and the Hennepin County map is available on the DNR website. A review of the natural communities and rare species within Crystal's boundaries did not show any areas of ecological significance.

2.6.6 UNIQUE FEATURES AND SCENIC AREAS

As a developed community, Crystal has numerous park areas found within its jurisdictional boundaries. Each park is classified as one of four types. The majority of the parks in the City are

neighborhood parks designed for unstructured play and to be within a 10 minute walking distance of residential neighborhoods (typically 1/2 mile). Community parks provide a more structured environment, specialty parks typically are tailored for specific athletic activities, and conservancy areas are designed to be passive areas with green space which may contain storm water detention facilities.

2.7 DRAINAGE SYSTEMS

The majority of the City's storm sewer was constructed prior to the mid 1970s, and as was the practice at that time, storm water management relied heavily on large diameter trunk storm sewer to route storm water away from impervious areas quickly and discharge this storm water directly into nearby wetlands, lakes, and streams. As a result, local storm water basins providing both rate control (to reduce downstream local flooding) and water quality treatment (to provide additional protection to downstream natural resources) are not common in Crystal. Rather, the City's storm water system discharges large portions of the City's residential and commercial/industrial areas directly to nearby water resources. The US Army Corp of Engineers constructed a Flood Control Project that included portions of Crystal. More information on this is available in Section 5.3 of this plan and in the Bassett Creek Watershed Management Commission's 2015 - 2025 Watershed Management Plan.

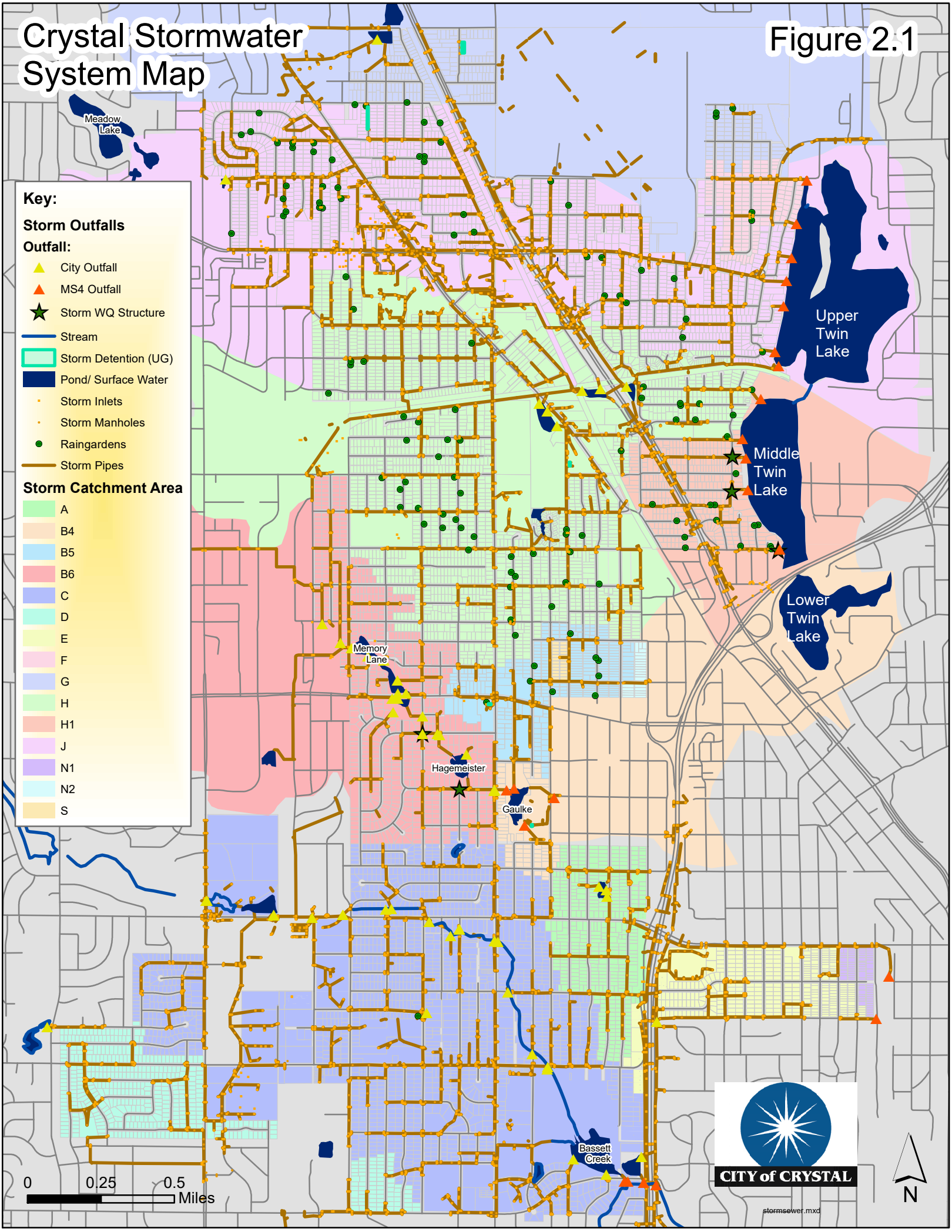
One challenge for the City as part of this LSWMP is to identify locations where the City's existing storm water system can be improved or new facilities added. Section 8.2 identifies potential implementation projects to improve the quality of Crystal's surface water discharge. The benefit to the City as a result of these storm water improvements could potentially include:

- Reduction in localized flooding
- Enhancement and restoration of existing natural resources
- Creation of new natural resources
- Improved water quality in the City's lakes, wetlands, and streams

Cities that developed over the same timeframe as Crystal all face the same challenge: how to retrofit substantive water quality and flood improvement projects in a fully-developed community. Crystal has had success in meeting this challenge by incrementally adding water quality and flood control improvements as part of its street improvement projects. Preservation of key storage areas is accomplished in the City of Crystal through the fact that the majority of these areas are located on public property. Figure 2.2 identifies the waterbodies located within the City that are considered key storage areas. Key storage areas not located within public property are protected by floodplain and flowage easements.

Crystal Stormwater System Map

Figure 2.1



2.8 FLOODPLAIN INFORMATION

The Federal Emergency Management Agency (FEMA) updated the Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRM) for Hennepin County in 2016. The FIRM map shows all 100-year floodplain boundaries for the county, and includes both the floodway and flood fringe for rivers, lakes, wetlands, and streams where FEMA has completed detailed engineering studies. Flood elevations are also provided for areas where detailed studies have been completed. FEMA FIRM maps are identified in Crystal and available online at: https://msc.fema.gov/portal/search

The Bassett Creek Watershed Management Commission (BCWMC) Watershed Management Plan identifies BCWMC's adopted 100-year floodplain elevations for waterbodies in Crystal within the jurisdiction of the BCWMC, namely the North Branch of Bassett Creek and a small portion of Bassett Creek. The 100-year floodplain information is identified the BCWMC Watershed Management Plan and includes 100-year floodplain elevations for the North Branch of Bassett Creek downstream of New Hope and for Bassett Creek from Highway 100 to Kentley Avenue.

Both the Shingle Creek Watershed Management Commission and the Bassett Creek Watershed Management Commission have completed hydrologic and water quality models. Bassett Creek's watershed-wide XP-SWIMM model was completed and adopted in 2017 as part of the Bassett Creek Hydrologic and Hydraulic Analyses – Phase 2 XPSWMM Model Report and is available online: http://www.bassettcreekwmo.org/application/files/2515/0240/9404/BCWMC_Ph2_XPSWMMReport_Final_August2017.pdf

2.9 PLANNING AND DEVELOPMENT

2.9.1 COMPREHENSIVE PLAN

Metropolitan Council requires municipalities within the metropolitan area (as defined by statute) to update their Comprehensive Plans on a decennial basis. Crystal's local Comprehensive Plan describes how the community wants to develop over the time period. Additionally, the Comprehensive Plan helps clarify the relationship between Crystal and the metropolitan area – particularly in terms of transportation planning, housing, and natural resource protection. Though Crystal's Comprehensive Plan identifies local community aspirations, it must also fit into the Metropolitan Council's Regional Development Framework to ensure coordination among local municipalities and the regional systems.

2.9.2 LAND USE

Crystal experienced a post World War II development boom driven by the population increases associated with the "baby boom" generation and that generation's parents' desire to obtain a more suburban lifestyle. By the mid 1970s, this development boom eliminated the semi rural land present prior to 1945. Development since 1970 filled vacant lots or redeveloped existing urban land uses. This process continues and will continue into the future as Crystal realizes a slight increase in population over the next 20 years.

By Metropolitan Council's definitions, Crystal is a fully-developed community lacking large undeveloped tracts of land.

In general, the decennial Comprehensive Plan Updates summarize significant land use changes anticipated by a community through the 2040 planning timeframe. However, Crystal is not anticipating a significant change to its land use over the next 20 years. In its land use guide plan, Crystal has not identified specific land use changes but rather identified guidance for redevelopment when and where it happens. As this redevelopment occurs, the City will seek opportunities to retrofit water quality improvements to these sites. However, in the near term, it appears that Crystal's best opportunity to improve the quality of its surface water discharge is through use of public lands for

water quality retrofits. As evidenced in Crystal's implementation plan, the City has followed this implementation model in recent years, in addition to opportunities as part of the street reconstruction program.

The City's Land Use Plan is available as part of the Comprehensive Planning document as well as online https://www.crystalmn.gov/our_city/maps_and_data.

Section 3 – Regulatory Setting

3.1 CITY OF CRYSTAL

The Crystal Department of Public Works manages the City's storm water infrastructure and is responsible for the monitoring and maintenance of storm sewers, ponding areas, water quality devices, and outlet control structures. The City Department of Public Works provides the design, operation, and maintenance necessary to minimize local flooding and improve water quality in the City's storm water system. Public Works also coordinates with watershed management organizations and other outside agencies in water resource management and conservation. City Code is the primary source of regulation of surface water management and protection in the City of Crystal.

3.2 HENNEPIN COUNTY

Hennepin County, originally part of Dakota County, was created in 1851. The County provides many services within the City of Crystal, including health services and property and vital records. Hennepin County was the first county to begin groundwater planning in 1988, with authority delegated to the Hennepin Conservation District. The plan received state approval (BWSR) in March 1994. Although the county has not formally adopted the plan, the county is proceeding with implementation of many aspects of the plan. In addition, the County's Department of Environmental Services provides education, outreach, and funding to individuals and organizations. These programs include the Hennepin County River Watch and the Wetland Health Evaluation Program.
Hennepin County Department of Environment and Energy provides technical service and assistance to county residents, local government units, watershed organizations, and other agencies. For local governments, their specific assistance has included contracting with them for implementation of natural and water resource management plans, the Wetland Conservation Act administration, and natural resource education. They also offer grants and administer state and federal cost share programs for restoration work, sealing of abandoned wells, and cleaning up of contaminated land. In late 2013 the Hennepin Conservation District was dissolved by the Board of Water and Soil Resources, and all duties and authorities of an SWCD were transferred to Hennepin County. The Department is involved in a wide variety of land and water conservation issues including assisting landowners with sustainable land use to working with municipalities to develop growth management strategies. Specifically they serve as experts in the administration of WCA, the Reinvest in Minnesota Program, and cost-share grants for financial assistance to landowners for protection of their land.

3.3 WATERSHED MANAGEMENT ORGANIZATIONS

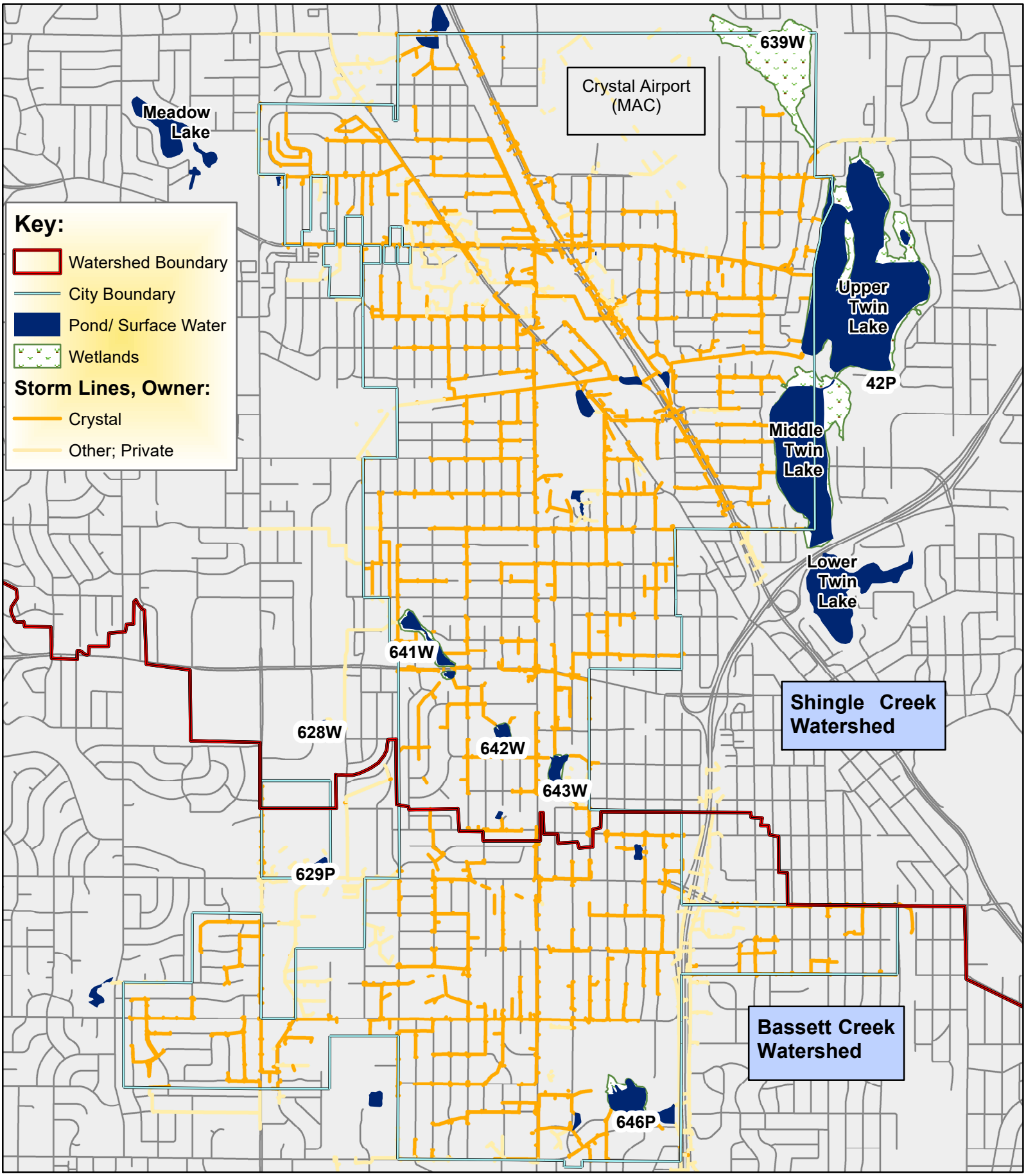
In 1982, the legislature approved the Metropolitan Surface Water Management Act, Chapter 103B of Minnesota Statutes. This act requires all metro-area local governments to address surface water management through participation in a Watershed Management Organization (WMO). A WMO can be organized as a watershed district, as a Joint Powers Agreement (JPA) among municipalities, or as a function of county government. There are 46 Watershed Management Organizations within the metropolitan area. The state considers watershed organizations as local units of government.
The City of Crystal is divided into multiple drainage basins that flow to two separately managed watershed organizations. Figure 2.1 shows Crystal's storm sewer sheds which define the areas tributary to different portions of the City's system. The watershed jurisdictional boundary for

BCWMC is found in sewer sheds A, C, D, E, and F. The watershed jurisdictional boundary for SCWMC is found in sewer sheds B4, B5, B6, G, H, H1, J, N1, N2, and S.
The powers and duties of watershed organizations include:

- Approval authority over Local Surface Water Management Plans.
- Ability to develop rules regarding management of the surface water system.
- Ability to determine a budget and raise revenue for the purpose of covering administrative and capital improvement costs.
- Regulation of land use and development when one or more of the following apply:
  - The City does not have an approved local plan in place.
  - The City is in violation of their approved local plan.
  - The City authorizes the watershed toward such regulation.
- Wetland Conservation Act administration when designated as the Local Government Unit (LGU) for a City.
- Other powers and duties as given in statute and joint powers agreements.

SCWMC was formed in 1984 and incorporates the northern portion of the City of Crystal, thus covering the City's discharge to Shingle Creek via Twin Creek and the Twin Lakes system. The jurisdictional boundary for the SCWMC within Crystal includes approximately 2,497 acres and is identified on Figure 2.2.

In 1984, the existing Bassett Creek Flood Control Commission (formed in 1968) revised its joint powers agreement and created the BCWMC. The BCWMC incorporates the southern portion of the City of Crystal, and thus incorporates the City's discharge to Bassett Creek via the North Branch of Bassett Creek. The jurisdictional boundary for the BCWMC within Crystal includes approximately 1,185 acres and is identified on Figure 2.2.



N

0 0.25 0.5 Miles

Stormsewers-Wetlands.mxd

2.2 Crystal Storm Pipes, Protected Waters

CITY of CRYSTAL

3.4 METROPOLITAN COUNCIL

Established by the Minnesota Legislature in 1967, the Metropolitan Council is the regional planning organization for the Twin Cities seven-county area. The Council manages public transit, housing programs, wastewater collection and treatment, regional parks, and regional water resources. Council members are appointed by the Minnesota Governor.
Metropolitan council has a current water resources management policy plan. This document supports preparation of comprehensive plans by outlining planning requirements for wastewater services, surface water management, and regional water supply.

3.5 STATE BOARD OF WATER AND SOIL RESOURCES (BWSR)

The Minnesota Board of Water and Soil Resources (BWSR) works through local governmental agencies to implement Minnesota's water and soil conservation policies. BWSR is the administrative agency for soil and water conservation districts, watershed districts, watershed management organizations, and county water managers. BWSR is responsible for implementation of the Metropolitan Surface Water Management Act (Minnesota Statutes 103B.201 to 103B.253) and the Wetland Conservation Act. Staff members are located in eight field offices throughout the state.

First established in 1937 as the State Soil Conservation Committee, the agency became part of the University of Minnesota in the 1950s, transferred to the Department of Natural Resources in 1971, then transferred to the Department of Agriculture in 1982. In 1987, the State Legislature established the current Board of Water and Soil Resources. The Board consists of 17 members, appointed by the governor to four-year terms. Multiple state and local agencies are represented on the Board. In 1992, BWSR adopted rules (8410), establishing the required content for Local Surface Water Management Plans.

BWSR serves as a technical expert to Local Government Units (LGU) in the administration of WCA, and thus has oversight over Bassett Creek Watershed Management Commission and Shingle Creek Watershed Management Commission as they administer WCA. The Watershed Management Organizations will continue in their role to properly administer the requirements of WCA.

3.6 MINNESOTA POLLUTION CONTROL AGENCY (MPCA)

The MPCA is Minnesota's lead environmental protection agency. Created by the State Legislature in 1967, the MPCA is responsible for monitoring environmental quality and enforcing environmental regulations to protect Minnesota's land, air, and water. The MPCA regulates Crystal's management of wastewater, storm water, and solid waste.

MPCA is the permitting authority in Minnesota for the National Pollutant Discharge Elimination System (NPDES), the federal program administered by the Environmental Protection Agency to address pollution in the nation's waters. The NPDES program originates with the federal Clean Water Act of the 1970s. The MPCA included the City of Crystal on the list of entities identified as owning and operating a Municipal Separate Storm Sewer System (MS4). Consequently, the MPCA required Crystal, along with many other local government entities and institutions in Minnesota, to obtain coverage under the General Permit in 2003. To obtain this coverage, Crystal developed a Storm Water Pollution Prevention Program (SWPPP) to address six minimum control measures:

1. Public education
2. Public involvement

3. Illicit discharge detection and elimination
4. Construction site runoff control
5. Post-construction runoff control
6. Pollution prevention in municipal operations

The NPDES permit requires renewal periodically and the City will update their SWPPP and submit a new permit application as required.

The MPCA has other roles related to the Clean Water Act as well. One of these requires the MPCA to publish a list of Minnesota's waters that do not meet federal water quality standards. For each waterbody or water course on this "impaired waters" list, the MPCA conducts a study to determine the allowable Total Maximum Daily Load (TMDL) for the pollutants that create the impairment. The MPCA list of impaired waters, known as the 303(d) list from the applicable section of the Clean Water Act, identifies impairments throughout Minnesota requiring TMDL studies. The following impairments occur within these waters assessed by the MPCA:

- Turbidity
- PCBs and other exotic chemicals
- Mercury
- Impaired Biota
- Fecal Coliform
- Low Dissolved Oxygen
- Excess Nutrients

Typically, the MPCA or watershed organizations conduct TMDL studies. Local governments often serve on advisory panels that guide the creation of the TMDL. The TMDL studies result in waste load allocations which essentially determine the maximum amount of a pollutant the waterbody can receive and still maintain its designated use (such as swimming or aquatic recreation). The waste load allocation is compared to the current pollutant loading, and a waste load reduction is determined. This waste load reduction is then distributed to MS4 permit holders within the waterbody's tributary area.

Local governments will need to review the results of completed TMDLs and review the adequacy of their Storm water Pollution Prevention Programs and Local Surface Water Management Plans to address the requirements of the TMDLs implementation plan. In Crystal, impaired waters which have approved TMDLs are the Twin Lakes Chain excess nutrient TMDL, the Shingle Creek chloride, DO, E. coli, and Biotic Integrity TMDsL, and the state-wide mercury TMDL which pertains to the Twin Lakes Chain.

To assist local government and others with implementing Best Management Practices to address impaired waters and protect other waters, the MPCA published the *Minnesota Storm water Manual*. *Minnesota Storm water Manual* provides detailed guidance on storm water management practices. In particular, low-impact development, better site design, and on-site infiltration of runoff are recommended to offset the adverse impacts created by additional impervious surfaces. These runoff volume reduction methods provide multiple benefits including groundwater recharge, protection of natural streambanks, reduced nutrient loads to lakes and wetlands, and reduced thermal impacts to aquatic habitat.

3.7 MINNESOTA DEPARTMENT OF NATURAL RESOURCES (DNR)

Originally created in 1931 as the Department of Conservation, the DNR has regulatory authority over the natural resources of the state. DNR divisions specialize in waters, forestry, fish and wildlife, parks and recreation, land and minerals, and related services. The Division of Waters administers programs in lake management, shoreland management, dam safety, floodplain management, wild and scenic rivers, the Public Waters Inventory (PWI), and permitting of development activity within public waters. Figure 2.2 shows the location of PWI waterbodies in the City of Crystal.

3.8 MINNESOTA DEPARTMENT OF HEALTH (MDH)

The MDH manages programs to protect the public health, including implementation of the Safe Drinking Water Act. The MDH has regulatory authority for monitoring water supply facilities such as water wells, surface water intakes, water treatment, and water distribution systems. The MDH also is responsible for the development and implementation of the wellhead protection program.

Crystal provides potable water to its residents in cooperation with the cities of New Hope and Golden Valley through a joint powers organization called the Joint Water Commission (JWC). The JWC has a long-term contract to purchase treated water from the City of Minneapolis. The water is drawn from the Mississippi River, treated, and pumped to reservoirs in Crystal and Golden Valley. From there, it is distributed to the cities of Crystal, New Hope, and Golden Valley.

The JWC has also installed three emergency backup wells.

3.9 MINNESOTA ENVIRONMENTAL QUALITY BOARD (EQB)

The EQB is comprised of five citizen members and the heads of ten state agencies that play an important role in Minnesota's environment and development. The EQB develops policy, creates long-range plans, and reviews proposed projects that may significantly influence Minnesota's environment.

3.10 MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT)

MnDOT is the state agency responsible for the planning, improvement, and maintenance of the state's highway system. MnDOT approval is required for any construction activity within state rights-of-way. MnDOT also administers funding for qualifying transportation projects completed in the City. Anticipated activities of MnDOT are periodically published in their State Transportation Improvement Plan (STIP).

3.11 U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

The EPA develops and enforces the regulations that implement environmental laws enacted by Congress; however, the MPCA bears responsibility for implementing many of the resulting programs within Minnesota. The NPDES program and the Impaired Waters list are both results of the Clean Water Act, as the EPA delegates responsibilities under this Act to the state level.

3.12 U.S. ARMY CORPS OF ENGINEERS (USACE)

Under Section 404 of the Clean Water Act, including subsequent modifications, the EPA and the USACE regulate the placement of fill into all wetlands of the U.S. In 1993, there was a modification of the definition of "discharge of dredged material" to include incidental discharges associated with excavation. This modification meant that any excavation done within a wetland required the applicant to go through Section 404 permitting procedures. In 1998, however, this decision was modified so that excavation in wetlands is now regulated by the USACE only when it is associated with a fill action.

3.13 FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

FEMA manages federal disaster mitigation and relief programs, including the National Flood Insurance Program (NFIP). This program includes floodplain management and flood hazard mapping.

3.14 NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

The Natural Resources Conservation Service (NRCS) is a division of the U.S. Department of Agriculture. Formerly named the Soil Conservation Service (SCS), the NRCS provides technical advice and engineering design services to local conservation districts across the nation. The *Soil Survey of Hennepin County, Minnesota* was published by the NRCS in 2004. The NRCS also developed hydrologic calculation methods that are widely used in water resources design.

3.15 U.S. GEOLOGICAL SURVEY (USGS)

The USGS provides mapping and scientific study of the nation's landscape and natural resources. USGS maps provide the basis for many local resource management efforts.

3.16 U.S. FISH AND WILDLIFE SERVICE (USFWS)

The USFWS works to conserve and protect the nation's fish, wildlife, plants, and habitat. The USFWS developed the National Wetlands Inventory (NWI) beginning in 1974, to support federal, state, and local wetland management work.

Section 4 – Related Studies, Plans, and Reports

This section of the Crystal Local Surface Water Management Plan (LSWMP) describes pertinent plans, studies, and reports used in the creation of this plan. These reports provide background information to understand the context for managing Crystal's surface water resources. Some of these resources identify implementation items which Crystal considered in formulating its own implementation plan.

4.1 2013 SHINGLE CREEK WATERSHED MANAGEMENT COMMMISION (SCWMC) THIRD GENERATION WATERSHED MANAGEMENT PLAN

The SCWMC Third Generation Watershed Management Plan was adopted in 2013. The storm water management goals identified in the SCWMC plan are generally incorporated into the Goals and Policies section (Section 7). Lastly, Crystal's implementation plan either incorporates SCWMC implementation items or defines a contributory role for Crystal as it assists watershed implementation efforts.

The SCWMC Management Plan is available online: http://www.shinglecreek.org/management-plan.html

4.2 2005 SCWMC SHINGLE CREEK CORRIDOR STUDY

Completed in August 2005, this study does not prescribe specific improvements, but rather develops a set of standards and principles to be used by cities with riparian areas so that these cities can manage the Shingle Creek corridor in a way that promotes its ecological restoration. Although not directly tributary to the Shingle Creek Corridor identified by this study, the City of Crystal lies within the overall tributary area to Shingle Creek and thus will seek to incorporate the ecological

restoration goals (as they apply to upstream tributaries and land management practices) into its upstream management activities. Included in the study is a destription of the developed Biotic and DO TMDL.

4.3 2007 TWIN AND RYAN LAKES NUTRIENT TOTAL MAXIMUM DAILY LOAD (TMDL)

The TMDL for this chain of four lakes was completed in 2007. The first lake in the chain, Upper Twin Lake, requires a 58% reduction in nutrient loads to the lake, while the other three - Middle Twin and Lower Twin and Ryan Lake - require a 12-19% reduction. A 5 Year Review was completed in 2014, which found that nutrient load from the watershed has been greatly reduced. The focus in the next five years will be on controlling rough fish and invasive aquatic vegetation.
Available online: http://www.shinglecreek.org/tmdls.html

4.4 2006 SHINGLE CREEK CHLORIDE TOTAL MAXIMUM DAILY LOAD (TMDL)

Shingle Creek was the first stream in the state to be designated an Impaired Water for excess chloride, found at the USGS monitoring station in 1996. Before that time, streams in Minnesota were rarely monitored for chloride, which is now found at high levels in numerous streams in the Metro area. The 2007 TMDL required a 71% reduction in chloride, mostly from road salt. A 5 Year Review was completed in 2014, which found that while road salt use has been reduced, there has been no improvement in stream water quality.
Available online: Available online: http://www.shinglecreek.org/tmdls.html

4.5 CRYSTAL LAKE NUTRIENT TMDL

Crystal Lake in Robbinsdale requires a 72% reduction in nutrient loading to consistently meet state water quality standards. Numerous small projects have been completed in the watershed, and in 2013 Robbinsdale constructed a hypolimnetic withdrawal system on the shoreline. Nutrient-rich water is pumped from the depths of the lake, treated, and then returned to the lake. A 5 Year Review concluded that the withdrawal system should continue to target the treatment of water pumped from the bottom of the lake, and that reductions in nutrient loading from the watershed should continue as opportunities arise.
Available online: http://www.shinglecreek.org/tmdls.html

4.6 2006 SCWMC WATER QUALITY PLAN

The Shingle Creek (and West Mississippi) Watershed Management Commissions' Water Quality Plan (adopted in September 2006) is intended to help achieve each watershed's goal of protecting and improving water quality. The SCWMC Water Quality Plan augments the more general water quality goals of the SCWMC Second Generation Watershed Management Plan by:
Setting forth the Commission's water quality goals, standards, and methodologies in more detail than the general goals and policies established in the Second Generation Management Plan,
Providing philosophical guidance for completing water resource management plans and TMDLs, and
Providing direction for the ongoing water quality monitoring programs that will be essential to determining if the TMDLs and implementation program are effectively improving water quality.

4.7 CRYSTAL SHOPPING CENTER AREA SUB-WATERSHED ASSESSMENT

Subwatershed assessments are intensive studies of small areas of land to identify the best locations for small Best Management Practices (BMPs) such as rain gardens, tree trenches, and bioinfiltration basins. They are usually completed in areas that are already developed and have little or no storm

water treatment, and where it is not practical to construct a large BMP such as a storm water pond. In 2015, SCWMC completed such assessment for the downtown Crystal area.
Available online:
http://www.shinglecreek.org/uploads/5/7/7/6/57762663/final_crystal_subwatershed_assessment.pdf

4.8 BIOCHAR AND IRON-ENHANCED SAND FILTERS

The Shingle Creek and West Mississippi Watershed Management Commissions obtained a federal grant to fund a project to field-trial three applications of a new promising yet simple technology to help reduce bacteria such as E. coli in storm water. In urban areas bacteria sources are diffuse – pet and wildlife waste, sanitary overflows and leakages - and options for reducing loads are limited. Biochar – a specially engineered type of ground charcoal –added to iron-enhanced sand filters has been effective in lab experiments at removing bacteria in synthetic storm water. The three field trials will test the effectiveness of these filters at treating real-world storm water runoff by adding the substance to storm water pond iron-enhanced sand filter benches; to filters placed in storm sewer catch basins; and to a filter bed to treat flow diverted from Shingle Creek. Construction occurred in 2017, and all the applications will be effectiveness monitored.
Available online:
http://www.shinglecreek.org/uploads/5/7/7/6/57762663/scwm_biochar_project_summary_and_overview_3_2016.pdf

4.9 2015 BASSETT CREEK WATERSHED MANAGEMENT COMMISSION (BCWMC) WATERSHED MANAGEMENT PLAN

The BCWMC adopted their Watershed Management Plan in 2015. This plan sets the vision and provides guidelines for managing surface water within the boundaries of the BCWMC. The Watershed Management Plan summarizes the location, history, goals, policies, and implementation tasks of the BCWMC. The BCWMC's general goals fall under the categories of water quality, flood control, erosion and sediment control, stream restoration, wetland management, groundwater, public ditches, and public involvement and information. The 2015 BCWMC Plan includes Bassett Creek Park Pond as part of the North Branch of Bassett Creek and is therefore subject to MPCA water quality standards for streams (as adopted by the BCWMC and presented in Table 2.7 of the 2015 BCWMC Plan.

Storm water management implementation items identified in the BCWMC plan that affect Crystal are included in the System Assessment section (Section 6) of this LSWMP. In the course of preparing this LSWMP, Crystal has considered the BCWMC storm water management goals identified and generally incorporated these into its own goal and policy statements. In similar manner, Crystal has considered BCWMC implementation items and either taken ownership of these implementation items or defined a cooperative role in assisting BCWMC in accomplishing these.
The plan is available online at http://www.bassettcreekwmo.org/document/wmp-plans

Section 5 – Water Resource Related Agreements

This section references and provides brief summaries of water resource related agreements to which Crystal is a party. The appendices include actual copies of the agreements referenced here.

5.1 SHINGLE CREEK WMC JOINT POWERS AGREEMENT

In 1984, the nine cities with land in the Shingle Creek watershed (Brooklyn Center, Brooklyn Park, Crystal, Maple Grove, Minneapolis, New Hope, Osseo, Plymouth, and Robbinsdale), entered into a Joint Powers Agreement (JPA) to form a watershed management organization charged with certain surface and groundwater management functions. The joint powers type of organization was selected because the cities believed it provided the best balance for the establishment of watershed-wide policies and strategies for meeting watershed management requirements while at the same time retaining the most flexibility and local input at the lowest cost. In 2006, the member cities adopted an amendment to the JPA that set an "assessment cap" for general fund purposes. In 2015 the JPA was again modified to extend the life of the JPA to January 1, 2025.

5.2 BASSETT CREEK WMC JOINT POWERS AGREEMENT

In 1969, the Bassett Creek Flood Control Commission was formed by adoption of a Joint Powers Agreement between the nine communities in the Bassett Creek Watershed, including Crystal. In accordance with provisions of the 1982 Metropolitan Surface Water Management Act, the Bassett Creek Flood Control Commission revised its Joint Powers Agreement and created the Bassett Creek Water Management Commission. Its mission is to control flooding and to maintain and enhance the quality of the surface and ground water resources in the watershed.

5.3 FLOOD CONTROL PROJECT BASSETT CREEK

On June 27, 1986, an agreement was filed between Bassett Creek Watershed Management Commission, the United States Corps of Engineers, Minneapolis, Golden Valley, Crystal, and Plymouth. The agreement was for the construction of a flood control structure and channel improvement along Bassett Creek. The construction involved the creation of a new tunnel discharging into the Mississippi River, culvert improvements, channel improvement, and creation of storage areas to minimize flooding and improve water quality. Ten locations were identified in the City of Crystal for these types of flood control improvements. The projects were subsequently completed and are summarized in Table 5.1.

The agreement also specifies that each municipality is responsible for the operation and maintenance of the flood control projects for those portions of the creek that lie within the City boundary, and enclosed in the agreement was an inspection form that was to be completed on a semiannual basis. The operation and maintenance activities are overseen by the Bassett Creek WMC, and as part of its Second Generation Watershed Management Plan the watershed required each City to complete a channel erosion inventory. Crystal completed its inventory in 2008. In 2016 the BCWMC adopted a Bassett Creek Watershed Management Commission Flood Control Project (FCP) Policies document. The document clarifies the maintenance responsibility for the FCP and assigns routine maintenance to the City for elements of the FCP within the City.

Table 5.1 - Flood Control Improvements Constructed

Location	Purpose
Highway 100 control structure	• Provide additional flood storage upstream of Highway 100
Highway 100 double box culvert	• Extend upstream culvert 70 feet
Detention pond and outlet between Bassett Creek park pond and Highway 100	• A detention pond and outlet structure was constructed for the attenuation of flood flows and to improve water quality
Bassett Creek park pond and outlet structure	• Replace outlet structure with two 36" x 58.5" arch reinforced concrete pipes and dredge ponds
Edgewood embankment	• Pond water to reduce flow downstream; however pond is modeled to overtop during a 1-percent chance design event • Installation of gabions is designed to prevent erosion downstream
Channel crossing improvements at 34th Avenue N, 32nd Avenue N, Brunswick, Douglas Drive, Edgewood Avenue, Georgia Avenue, 36th Avenue N, and Hampshire Avenue	• Repair culverts and crossings that were failing and impeding flows
Markwood Channel improvements (8' x 4' box culvert)	• Box culvert improved capacity of system and prevented water from flooding upstream

Section 6 – System Assessment

Previous sections of this Local Surface Water Management Plan (LSWMP) provide background on the physical and regulatory forces shaping surface water management in Crystal. This section describes problems and challenges of specific waters, neighborhoods or programs identified by the City, watershed organizations and others. Minnesota Statutes and Rules and Metropolitan Council guidance documents require "issues and corrective actions" or "problems and corrective actions" as elements of Local Surface Water Management Plans. The intent of this section is to serve the same purpose as this issue or problem identification requirement but to augment this with a broader assessment of the challenges facing Crystal. The assessment includes storm water management issues identified by the City, the two watersheds with jurisdiction within the City, and other state and federal agencies.

6.1 STORMWATER MANAGEMENT ISSUES AND POSSIBLE CORRECTIVE ACTIONS

The following list of items presented in Table 6.1 represent current storm water management issues or concerns as identified by the documents included in Section 4 of this plan. It is not the intent of this list to include all of the current storm water management issues identified in the watershed documents in Section 4, only those issues with a possible corrective action that directly affects the City. The implementation of the possible corrective actions will be addressed in the implementation section (Section 8).

Table 6.1 - Storm water Management Issues and Possible Corrective Actions[1]

Water-shed ID[2]	Storm water Issue	Issue Category	Issue Identified by:	Possible Corrective Actions
SC	Flooding in the Memory Lane, Hagemeister, and Gaulke pond system (Crystal typically pumps down the Gaulke Pond on average once a year to a storm sewer that drains to Twin Lakes).	Water Quantity	City	• Expand the flood-stage capacity of existing ponds where feasible.
SC	Increased impervious surface as watershed becomes fully developed will increase the duration and frequency of bank full conditions and should be addressed and monitored.	Water Quantity	SCWMC-WMP	• Encourage the reduction of impervious surface by promoting low impact development principles and strategies for new development and redevelopment projects. • Consider changes to the zoning ordinance to explicitly allow one or more types of permeable pavement, reduce the minimum number of parking spaces required, or institute a maximum number of parking spaces allowed. • Implement the abstraction standards identified in the Shingle Creek WMP.
SC	Standards that have prevented flooding potential as the Shingle Creek watershed has developed should be continued or enhanced as development is completed.	Water Quantity	SCWMC-WMP	• New development or redevelopment projects shall not increase the existing 100-year peak rate from the site. • Protect key flood storage areas, wetlands, ditches, and drainageways and maintain channel capacity. • Seek opportunities to provide additional rate control to reduce the 100-year peak discharge rate from Crystal.
SC	Water quality and stability of Shingle Creek should be improved.	Water Quality	SCWMC - Shingle Creek Corridor Study, WMP	• Improvement projects or management strategies shall not increase the 100-year elevation of Shingle Creek nor its tributaries or floodplain storage areas. • Any fill that impacts flood storage in wetlands or floodplains shall be mitigated with compensating storage within the same subreach or reach.
SC	Shingle Creek Chloride TMDL - Excessive chloride levels in Shingle Creek.	Water Quality	Shingle Creek Chloride TMDL	• Incorporate the implementation plan activities into the City SWPPP. • Calibrate salt spreaders annually.

[1] This storm water management issues list only includes those issues directly affecting the City of Crystal, as identified by any of the documents listed in Section 4, and is not meant to incorporate all of the storm water management issues identified in the documents in Section 4.
[2] Designates if the storm water issue is in the Shingle Creek (SC) and/or Bassett Creek Watershed (BC).
[3] Item identified in Table 12-2 or 12-3 of the BCWMC WMP.

Water-shed ID[2]	Storm water Issue	Issue Category	Issue Identified by:	Possible Corrective Actions
				• Use the Road Weather Information Service and other sensors to improve salt application decisions.
				• Evaluate new technologies on an annual basis.
				• Investigate and adopt new salt products, such as Clear Lane, where feasible and cost effective.
				• Maintain good housekeeping practices associated with the handling of road salt to minimize the potential for wash-off.
				• Provide operator training.
				• Stockpile snow away from sensitive areas.
				• Sweep City streets in late winter to remove as much residual salt as possible.
				• Track and report activities in annual NPDES report and provide a copy to the Commission.
SC	General water resource water quality degradation	Water Quality	SCWMC-WMP	• Work with SCWMC to develop management plans for affected water resources.
SC	Twin/Ryan Lakes TMDL – Water quality in Twin Lake Chain shall meet the TMDL Waste Load Allocation	Water Quality	SCWMC-WMP	• Twin Lake DNR Wetland 639W improvements, which shall either consist of diverting flows or increasing storage. – Completed
				• Construct Becker Park Storm Water Infiltration Gallery – Construction in 2019
				• Twin Oak Pond - Construction of a water quality pond adjacent to Twin Oak Park receives the first flush of flows from the Bass Lake Road Trunk Storm Sewer. - Completed
				• Work with SCWMC to develop a Twin Lake Management Plan.
				• Promote good housekeeping practices among property owners in Twin Lake Chain's subwatershed.
				• Sweep streets at least twice annually.
				• Incorporate storm water management BMPs with City projects, commercial, and residential redevelopment.
				• Require at a minimum the abstraction of 1.0" of runoff from new impervious surfaces per Commission/NPDES requirements

Water-shed ID[2]	Storm water Issue	Issue Category	Issue Identified by:	Possible Corrective Actions
SC	Wetland protection and restoration	Water Quality	SCWMC-WMP	• Wetland mitigation should be provided within the same subwatershed.
				• Prioritize wetlands and complete wetland functions and values assessment.
				• Establish buffer strip requirements adjacent to wetlands and watercourses.
				• Identify wetland restoration possibilities and construct or encourage the construction of restoration projects.
BC	Flooding issues adjacent to North Branch Bassett Creek	Water Quantity	BCWMC-WMP	• Investigate home low opening elevations adjacent to the North Branch of Bassett Creek to identify potential flooding issues.
				• Repair areas obstructing creek flows.
BC	Water quality in the North Branch of Bassett Creek	Water Quality	BCWMC-WMP	• Corrective actions to address impaired waters list, including E. coli.
BC	Erosion/sedimentation along the North Branch of Bassett Creek	Water Quality	BCWMC-WMP	• Review the results of the stream inventory that was completed in 2008.
				• Develop stream restoration projects for eroding sections of the creek.
BC	Maintenance of the North Branch of Bassett Creek Flood Control Structures	Water Quantity	BCWMC-WMP	• Annually inspect flood control structures and remove any sediment, debris, and repair any failing structures.
				• BCWMC will assist in funding larger structural repair projects.

6.2 WETLAND INVENTORY AND ASSESSMENT

Wetlands play an important part of the natural storm drainage system, and help to maintain water quality, reduce flooding and erosion, provide food and habitat for wildlife, and provide open spaces and natural landscape for residents to enjoy. Protecting wetlands is an important element to water resource protection and is apparent in the current Metropolitan Council's Water Resources Management Policy Plan and both the Shingle Creek and Bassett Creek Watershed Management Plans.

Watershed and Metropolitan Council policies either advise or require that a wetland function and value assessment be completed for each of the wetlands located within the City. These function and values assessments lead to wetland management protection standards in areas such as:

- Pretreatment requirements
- Limitations to bounce and inundation
- Buffer widths

Function and values assessments allow the City and watersheds to prioritize wetlands for both protection and potential enhancement. All wetlands would have a base level of protection as provided by the Wetland Conservation Act, state permits, and local policies. However, augmented protection standards could be provided for particular types of wetlands identified through the assessment. The function and values assessments use the Minnesota Routine Assessment Method (MnRAM). MnRAM is a widely accepted set of protocols to assess the values of wetlands based on their ability to perform desired functions, such as improving water quality, reducing flow rates, and providing fish and wildlife habitat. The assessment evaluates characteristics such as plant community diversity and structure, connectivity to other habitat types, location in the watershed, and a wide range of other factors.

The following functions are typically assessed for each wetland:

- Wildlife Habitat
- Fishery Habitat
- Amphibian Habitat
- Aesthetics/Recreation/Education
- Commercial Value
- Maintenance of Hydrologic Regime
- Floodwater Storage
- Protection of Downstream Water Quality
- Wetland Water Quality
- Shoreline Protection Value (for wetlands fringing lakes)
- Groundwater Interaction
- Restoration Potential
- Protection of Downstream Water Quality
- Wetland Water Quality
- Stormwater Sensitivity
- Stormwater Pretreatment Needs

For each assessed wetland, MnRAM outputs a rating of Exceptional, High, Moderate, Low, or Not Applicable (N/A) for each of these functions. These ratings form the basis for wetland management standards.

The City is using an incremental approach to completing their Wetland Inventory. The Wetland Inventory will include a field inventory of all wetlands identified in the City and an evaluation of the functions and values of each wetland. Details regarding the implementation process necessary to complete the Wetland Inventory are included in Section 8.

6.3 WATER QUALITY MONITORING

Water quality data is being gathered by the Shingle Creek and Bassett Creek Watershed Management Commissions within the boundaries of the City of Crystal and immediately adjacent to the City boundaries to gather data for TMDLs, impaired waters, and water quality policies established in watershed management plans. The respective watersheds collection the information and have it available on their websites.

6.4 IMPAIRED WATERS AND TOTAL MAXIMUM DAILY LOADS (TMDLS)

The list of Impaired Waters is known as the 303(d) list from the applicable section of the federal Clean Water Act; these waters are ones that do not currently meet their designated use due to the impact of a particular pollutant or stressor. If monitoring and assessment indicate that a waterbody is impaired by one or more pollutants, it is placed on the list. At some point a strategy would be developed that would lead to attainment of the applicable water quality standard. The process of developing this strategy is commonly known as the Total Maximum Daily Load (TMDL) process and involves the following phases:

1. Assessment and listing
2. TMDL study
3. Implementation plan development and implementation
4. Monitoring of the effectiveness of implementation efforts

As delegated by the Environmental Protect Agency (EPA), the Minnesota Pollution Control Agency (MPCA) is responsible for implementing the requirements of the federal Clean Water Act. Information on the MPCA program can be obtained at the following web address: http://www.pca.state.mn.us/water/tmdl/index.html.

Four waterbodies within the City of Crystal are currently identified on the state list of Impaired Waters: Bassett Creek, North Branch of Bassett Creek, Upper Twin Lake, and Middle Twin Lake. In addition, three other waterbodies in adjacent communities receiving discharge from Crystal are currently identified on the state list of Impaired Waters: Shingle Creek, Lower Twin Lake, and Ryan Lake. The Twin Lakes chain (Upper, Middle, Lower, and Ryan Lakes) has an approved TMDL for Total Phosphorus. Shingle Creek has an approved TMDL for Chloride, dissolved oxygen (DO), impaired biota, and E. coli. Bassett Creek and North Branch of Bassett Creek impairment is addressed by the Upper Mississippi River Bacteria TMDL Study. Crystal has integrated activities from the respective TMDL implementation plans into both its SWPPP and the implementation program presented in Section 8 of this LSWMP.

Regarding the City's role in future TMDLs and TMDL Implementation Plans, the City recognizes that the responsibility for completion and implementation of the TMDL studies lies with the primary stakeholders contributing to the impairment. The City intends to cooperate with the watersheds in the development of the TMDL studies, acknowledging that the watersheds will take the lead on these studies. It is the intention of the City to fully implement the items and actions identified in existing and future TMDL Implementation Plans and designate adequate funding for these efforts.

A map of impaired waters is available online through the Minnesota Pollution Control Agency: https://www.pca.state.mn.us/water/impaired-waters-viewer-iwav

6.5 COMPARISON OF REGULATORY STANDARDS

Development and redevelopment within Crystal is subject to review from the City and one of the two watershed management organizations having jurisdiction in the City. The City recognizes that compliance with the BCWMC and SCWMC requirements is their responsibility as LGU, and they will continue to take this responsibility. The City will see that projects that fall within watershed review authority have obtained watershed comments and approval prior to Crystal issuing permits for the project.

Each watershed has established rules governing storm water management and protection of natural resources in their watershed management plans. Their goals and policies overlap Crystal's standards in some respect and cover ground not covered by Crystal in other respects. Ultimately, it is not the goal of Crystal's Local Surface Water Management Plan that watershed and Crystal regulatory programs be identical. Rather, it is the goal of this plan that the regulatory programs are compatible and that it be understood that if one entity's regulations are silent on a subject another entity's may not be. Project proposers should take care that all standards are considered. In all cases, where rules or ordinance diverge, the more restrictive will be used by Crystal.

Table 6.2 - Existing City Performance Standards

Official Control	Regulatory or Cooperating Agency	Performance Standards
Floodplain Management	DNR, Watersheds	• A zoning provision which regulates the placement of fill and/or a structure in the floodplain, which is the land affected by the 100-year regional flood
	Watersheds	• City's minimum building elevations are consistent with BCWMC requirements. • Floodplain requirements are consistent with the BCWMC's requirements regarding no net loss of floodplain storage and no increase in flood level.
Erosion and Sediment Control	MPCA/ Watersheds	• Storm water management plan submittal • Dewatering treatment • Waste and materials management • Tracking • Inlet protection • Soil stabilization within 14 days • Sediment control consisting of sediment basins for sites > 10 acres and for sites < 10 acres silt fence or other approved measures • Stockpile protection • Fines
Water Quality	MPCA/ Watersheds	• City Code has been updated to be consistent with Bassett Creek Watershed and Shingle Creek Watershed Commission requirements for water quality treatments and buffer requirements.
Water Quantity	MPCA/ Watersheds	• Storm water management plan submittal • Match existing rates for the 2, 10, and 100-year storm events • Prevention of accelerated channel erosion • Sequencing of preferred treatment options: infiltration, flow attenuation by using open space, storm water retention, and storm water detention
Shoreland Protection	DNR	• City code language
Illicit Discharge Detection and Elimination	MPCA	• City code language
Lawn Fertilizer Application Control	City	• City code language
Wetland Management	BWSR/ Watersheds	• City Code has been updated to be consistent with Bassett Creek Watershed and Shingle Creek Watershed Commission requirements for buffer requirements.
Storm Sewer Utility	City	• Charges for the improvement, maintenance, and operation of the storm sewer system

6.6 NORTH BRANCH BASSETT CREEK STREAM INVENTORY

As a requirement of the 2004 BCWMC WMP, the City completed a stream inventory of North Branch Bassett Creek in 2008. The inventory shows that the majority of the issues along the stream are failing/eroding streambanks. Some of the other problems encountered are culvert failures, debris in the stream, and failing retaining walls, with segment 5 experiencing the worst of the erosion problems. A more detailed discussion regarding the cost for doing repairs and amount of streambank that could be repaired on an average annual basis has been provided in Section 8.1.4.

Section 7 – Goals and Policies

7.1 GENERAL

This section outlines the City's goals and policies for storm water management. The goals identified in this section represent broad storm water management categories aimed at addressing the purposes of storm water management planning identified in Minnesota State Statute 103B.201, as follows:

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

The specific policies under each goal will guide implementation of the Local Surface Water Management Plan to achieve the particular storm water management goals and provide consistency between the City's policies, those of the two watersheds with jurisdiction within the City, and any items identified as a result of an approved TMDL implementation plan.

7.2 SURFACE WATER GOALS AND POLICIES

The following goals and policies reflect current City policy and the City's current Storm water Pollution Prevention Program (SWPPP), as well as additional goals and policies necessary for consistency with the goals and policies of State, regional, and local watershed authorities.

7.2.1 WATER QUANTITY

Goal 1: Control the rate of storm water runoff from development and redevelopment to minimize the impact on downstream structures and water resources.

Policy 1.1: Peak storm water runoff rates from new development, redevelopment, and site expansion projects must not exceed the existing rates for the 2-year, 10-year, and 100-year storm events; or exceed the capacity of downstream conveyance facilities; or contribute to downstream flooding.

Policy 1.2: New storm sewer conveyance systems must be sufficient for the five-year recurrence design storm over their direct drainage as determined by the rational method or other method approved by the City Engineer. However, where existing downstream systems are not sufficiently sized for this conveyance capacity then a lesser conveyance system design capacity must be used.

Policy 1.3: In addition to the 5-year storm sewer design criteria, storm sewer systems must be designed to convey the 100-year ponded outflow from any tributary pond, wetland, lake or other storm water storage facility. This 100-year ponded conveyance capacity is added to that necessary for the five-year direct drainage capacity.

Policy 1.4: The City will seek opportunities to upgrade existing systems to provide the conveyance capacity described above. However, limitations in downstream storm sewer capacity may preclude this.

Policy 1.5: All drainage system analyses and designs will be based on proposed full development land use patterns.

7.2.2 WATER QUALITY

Goal 2: Improve the quality of storm water runoff discharging to the City's lakes, streams, and wetlands.

Policy 2.1: The City is committed to reviewing new development, redevelopment, and site expansion projects in the context of nondegradation, and will require BMPs necessary to maintain or reduce existing total phosphorus, total suspended solids, and storm water runoff volume loads discharging to public waters and watercourses, where feasible.

Policy 2.3: New water quality ponds and other site Best Management Practices shall provide an aggregate water quality volume that meets the water quality volume identified in the Permanent Storm water Management System requirements of the NPDES construction site permit. Where water quality ponds are used for all or a portion of this water quality volume, the applicable design standard will be a permanent pool volume for runoff from a 2.5-inch 24-hour rainfall. This shall supersede the construction site permit requirements only when the City standard leads to a larger permanent pool volume.

Policy 2.4: For sites that do not trigger the permanent storm water management controls of the NPDES construction site permit, Best Management Practices must be used to accomplish no increase in pollutant loading or water volume loading over existing conditions. As stated in Policy 2.2, it is the City's intent to seek reductions in pollutant and water volume loading over existing conditions, wherever feasible.

Policy 2.5: Existing City Code requires that storm water detention facilities have a skimming device to keep oil, grease, and other floatable material from moving downstream into public waters. In addition to the ordinance provisions, these facilities shall be designed to provide skimming (1-foot below the pond normal water elevation) of floatable debris for up to the 5-year, 24-hour storm event, beyond which over-topping the skimmer may occur.

Policy 2.6: Consistent with the WMO design standards, new water quality ponds shall be designed to maintain an average depth of four feet or greater for large ponds or three feet or greater for ponds with less than 3 acre-feet of wet volume. Pond maximum depth shall be no deeper than 10-feet.

Policy 2.7: The Bassett Creek and Shingle Creek Watershed Management Commissions have their own water quality performance standards and thresholds for projects that fall under these standards. When considering the use of Best Management Practices to meet NPDES, City or Watershed standards all three performance standards must be checked. The standard that leads to the highest level of water quality (typically defined as the higher phosphorus reduction capacity) shall be the applicable standard for that particular project.

Policy 2.8: As required by City Ordinance Section 530.15, any person wishing to obtain a building permit, zoning or subdivision approval must consider the following storm water management practices in the following descending order of preference:

1. Natural Infiltration of precipitation on-site
2. Flow attenuation by use of open vegetated swales and natural depressions
3. Storm water retention facilities
4. Storm water detention facilities

In addition to the ordinance provisions an applicant must consider using the following water quality BMPs:

- Bioretention
- Infiltration/filtration
- Storm water recycling and reuse for irrigation (e.g. cisterns, rain barrels)
- Preserving natural topography and land cover
- Using natural swales and depressions as they currently exist

Additional information regarding these BMPs as well as other strategies that will minimize future impacts to water resources can be found in the Minnesota Storm water Manual, at http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html.

Policy 2.9: Redevelopment projects that propose to increase the existing impervious area by any amount shall provide water quality treatment and volume management capacity such that existing runoff volume, existing phosphorus load, and existing total suspended solids load are all maintained or reduced.

Policy 2.10: Redevelopment projects that disturb more than 50% of the site and also meet Shingle Creek Watershed Management Commission project review thresholds must meet Shingle Creek's rules for the entire site development and not just the new impervious area. This policy applies to areas within Shingle Creek jurisdiction only.

Policy 2.11: Small redevelopment projects that do not trigger the permanent storm water management controls described above must consider feasible and practical Best Management Practices (BMPs) to reduce existing runoff volume, phosphorus loads, and total suspended solids loads. If no BMPs are found feasible, then the project submittals must include a narrative or other description of how site constraints make this so.

Policy 2.12: Consistent with City ordinance, Section 665, the City prohibits the application of fertilizer which contains any amount of phosphorus or other compound containing phosphorus, such as phosphate, except when an exemption included in Section 665 can be claimed.

Policy 2.13: Storm water detention facilities and other Best Management Practices used to meet the storm water management policies and ordinances of the City of Crystal shall be designed according to the most current guidance as reflected in the Minnesota Pollution Control Agency's "Protecting Water Quality in Urban Areas" and their "Minnesota Storm water Manual." Where storm water detention facilities are the BMP of choice, these should be designed according to best practices and the requirements of Section 530.15 of Crystal's Ordinance.

Policy 2.14: The City will update its City Code Section 530 to include the performance standards for water quality.

7.2.3 FLOOD CONTROL

Goal 3: Provide a reasonable level of storm water flood protection within the City to minimize property damage and limit public capital and maintenance expenditures due to storm water flooding.

Policy 3.1: Crystal will review and update as necessary its Floodplain Overlay District Ordinance as required by FEMA and the Minnesota DNR, or as needed for compliance with watershed standards, to ensure adequate protection for structures and eligibility for flood insurance programs.

Policy 3.2: Crystal will require that low floor elevations of adjacent structures be a minimum of 2 feet above the established 100-year High Water Level of the adjacent waterbody or watercourse.

Policy 3.3: Wherever feasible, overflow routes from storm water basins and low areas shall be established and maintained to provide relief during storms which exceed design conditions.

Policy 3.4: The City will preserve existing storage volumes in storm water ponds and other storm water storage facilities. The City will seek to preserve natural storage on

the landscape when this storage is not otherwise protected by existing ordinance, rules or law.

Policy 3.5: The City of Crystal will prohibit encroachment that reduces the storage capacity of floodplains, unless approved by the jurisdictional watershed and/or compensatory floodplain storage is provided.

Policy 3.6: The City of Crystal will permanently secure access to storm water ponds, and other components of its drainage system by requiring the dedication of land and/or protective easements; which includes the preservation of wetlands, drainageways, floodplains, and open waterbodies used for storm water storage.

Policy 3.7: Regulate land development within the Floodplain Overlay District to ensure that floodplain capacity and flood elevations are not adversely impacted by development, and that new structures are protected from damage.

Policy 3.8: Crystal adopts the official 100-year floodplain elevations for the North Branch of Bassett Creek, Bassett Creek Park Pond, and Edgewood Pond as identified in the current BCWMC Watershed Management Plan.

7.2.4 GROUNDWATER AND VOLUME MANAGEMENT

Goal 4: Reduce pollutant loads to waterbodies and encourage groundwater recharge and protection by reducing the volume of storm water runoff from development, redevelopment, and street reconstruction projects.

Policy 4.1: The NPDES construction activity permit requires that new development and redevelopment that falls under the permanent storm water management requirements of that permit provide a one-inch water quality volume for all new impervious surfaces within the tributary area of an impaired water. Where site conditions allow, at least 1-inch of runoff must be infiltrated per Commission/NPDES requirements. The City will require new development and redevelopment to provide runoff volume control BMPs that infiltrate runoff from impervious surfaces, taking into consideration site limitations including, but not limited to: soil conditions, depth to groundwater, groundwater protection concerns, and the presence of industrial activity. Other methods of runoff volume abstraction (volume management techniques) that achieve a level of benefit equivalent to the standard could also be used, pending City approval.

Policy 4.2: Where specific projects do not trigger the permanent storm water management requirements of the NPDES construction activity permit, the City will nonetheless endeavor to retrofit ½-inch of volume management to the new impervious surface of the project.

Policy 4.3: In all projects regardless of whether they meet the permanent storm water management requirements of the NPDES construction site permit, the City will endeavor to retrofit volume management practices to existing impervious surfaces, to the extent practical.

Policy 4.4: As a means of meeting volume management standards, the City will encourage minimization of impervious surface, disconnection of hard surfaces, and promote the preservation of natural vegetation.

Goal 5: In the effort to recharge groundwater, the City will also take efforts to prevent pollutants from entering the groundwater system.

Policy 5.1: The City will follow the guidance identified in the Minnesota Storm water Manual for the siting of infiltration systems to prevent pollution of the groundwater.

7.2.5 EROSION AND SEDIMENT CONTROL

Goal 6: Prevent sediment from construction sites from entering the City's surface water resources.

Policy 6.1: As per City Code Section Crystal will continue to enforce the existing erosion control ordinance for all sites requiring a building permit subdivision approval, or other permit to allow land disturbing activities. The current ordinance has provisions for submittal, review, approval, erosion control, and sediment control, pollution prevention, dewatering and tracking.

Policy 6.2: The City will update its erosion and sediment control ordinance to incorporate the policies identified in the Water Management Organizations and MPCA Construction General Permit, where applicable, which will include bringing its erosion control requirements up-to-date with the NPDES Construction Site General Permit and include provisions for inspection and maintenance of BMPs, final stabilization, and enforcement.

7.2.6 RECREATION, FISH AND WILDLIFE HABITAT, AND SHORELAND MANAGEMENT

Goal 7: Protect and enhance opportunities for water recreation.

Policy 7.1: Coordinate efforts with state, county and neighboring municipalities to enhance water-based recreation to the extent practical.

Goal 8: Protect and enhance fish and water related wildlife habitats.

Policy 8.1: Preserve protected waters and wetlands that provide habitat for fish spawning and wildlife.

Policy 8.2: In conformance with the SCWMC the City will coordinate efforts to protect threatened and endangered species with the Minnesota Department of Natural Resources, if any are identified.

Policy 8.3: In conformance with the SCWMO the City will coordinate efforts to protect areas of significant natural communities with the Minnesota Department of Natural Resources; however no significant natural areas have been identified.

Policy 8.4: Management practices shall promote and encourage the use of streams and lakes as wildlife corridors.

Policy 8.5: The City will cooperate with the SCWMC to encourage the restoration of shoreline by the establishment of native shoreline buffers and stabilizing eroding shorelines.

Goal 9: Conserve and protect shoreland areas within the City.

Policy 9.1: In conformance with the Twin Lakes Chain TMDL management efforts will seek to protect non-disturbed shoreland areas and restore disturbed shorelines and streambanks to their natural state, where feasible.

Policy 9.2: Management efforts will seek to preserve streambank and lakeshore vegetation during and after construction projects, and create buffer zones along shorelines where natural vegetation is maintained.

Policy 9.3: Investigate the need for and, if necessary develop a shoreland ordinance as part of the zoning ordinance.

7.2.7 WETLAND, LAKE, AND STREAM MANAGEMENT

Goal 10: Protect and preserve wetlands to maintain or improve their function and value.

Policy 10.1: The City will continue to enforce City Code Section regarding wetland protection and in accordance with the WCA standards. The City is the LGU for enforcing the WCA within their municipal boundaries. The City will request assistance from SCWMC and BCWMC when the situation warrants watershed assistance.

Policy 10.2: The City will annually inspect wetlands classified as Preserve for terrestrial and emergent aquatic invasive vegetation, such as buckthorn and purple loosestrife, and attempt to control or treat invasive species, where feasible.

Policy 10.3: The City will complete the functional assessment of wetlands identified in the Bassett Creek Watershed Management Commission and Shingle Creek Watershed Management Commissions Water Management Plans on a case-by-case basis. Assessments in the Shingle Creek Watershed Management Area were completed for priority wetlands by the middle of 2010. The priority wetlands for Crystal are the Memory Lane Pond System, wetland 639W, and the wetland between Upper and Middle Twin Lakes.

Policy 10.4: The City updated its wetland management provisions identified in City Code Section to include wetland management standards that are based on the wetland functions and values assessment.

Policy 10.5: Wetland alterations, where allowed, shall be managed according to City Code Section. If the impact of an alteration is unavoidable, it should be mitigated through replacement, wetland restoration, and/or improvements to existing wetland function and value.

Policy 10.6: The City will coordinate wetland regulation with review agencies - the City, the State, the U.S. Army Corps of Engineers, and the local watershed authorities.

Policy 10.7: The City requires that a delineation of all wetlands within a project site be completed and that a report detailing the delineation findings be provided.

Policy 10.8: The City of Crystal will obtain a function and values assessment of all wetlands within a project site. This requirement, but not the delineation requirement, will be waived if the City is in possession of a prior functions and values assessment that is no more than five years old.

Policy 10.9: On public projects the City will perform a function and values assessment for wetlands within the City and downstream of the project area. Buffer width may be used as a means of partially satisfying its water quality and volume management standards (preservation or restoration of natural vegetation).

Policy 10.10: As per City Code Section 530.15 the pretreatment requirements are described in the water quantity, water quality, and volume management policies.

Policy 10.11: The City will seek expanded buffers for all wetlands when direct drainage from project sites cannot be practically collected and treated in a water quantity, water quality or volume management BMP.

Goal 11: Manage lakes and creeks to improve water quality.

Policy 11.1: The City of Crystal adopts the waterbody classifications, goals and subsequent water quality management standards developed by the BCWMC and SCWMC. Additionally, the City adopts the water quality performance standards and the current version of the BCWMC Requirements for Improvements and Development Proposals (2017, as amended).

Policy 11.2: The City will continue to implement water quality improvements such as raingardens and infiltration practices with its street reconstruction program to meet the phosphorus load reduction for the Twin and Ryan Lakes TDML.

Policy 11.3: According to the requirements of its MS4 permit and guidance provided in this LSWMP. The City of Crystal will make the necessary modifications to its SWPPP to include implementation priorities and action to meet the TMDL Waste Load Allocation for the Twin and Ryan Lakes Chain.

Policy 11.4: The City will continue activities identified in its SWPPP to meet its obligation under the Shingle Creek Chloride TMDL Implementation Plan. The following are key areas the City will focus on: product application and equipment decisions, product stockpile management, product type and quality, operator training, clean-up and snow stockpiling, and ongoing research into salt alternatives.

Policy 11.5: Upon approval of a TMDL Implementation Plan for the impaired waters the City will review whether modifications to the City's SWPPP are warranted to address the TMDL Waste Load Allocation (WLA) identified by the TMDL process. The SWPPP update process to address TMDL WLAs and implementation activities follows the direction of the City's MS4 Permit. The City intends to coordinate TMDL implementation efforts with outside agencies to address the items identified in the TMDL Implementation Plans.

7.2.8 PUBLIC PARTICIPATION, COORDINATION, AND EDUCATION

Goal 12: Coordinate the implementation of storm water management efforts with the watersheds, adjacent municipalities, and City residents according to the commitments made in Crystal's SWPPP.

Policy 12.1: In conformance with its SWPPP, Crystal established an Environmental Quality Commission to develop recommendations in coordination with other entities such as community groups, nonprofit organizations, lake conservation districts, soil and water conservation districts, Shingle Creek and Bassett Creek Water Management Organizations, school districts, the University of Minnesota Extension, Hennepin County and regional, state and federal agencies. Its mission will be to: (1) identify the audience or audiences involved, (2) educational goals for each audience in terms of increased awareness, increase understanding, acquired skills and/or desired changes in behavior, (3) activities used to reach educational goals for each audience, (4) activity implementation plans, including assigning responsibilities for given activities and schedules, and (5) developing performance measures that can be used to determined success in reaching educational goals.

Policy 12.2: Review recommendations from the Environmental Quality Commission.

Policy 12.3: Implement a public participation project such as adopt-a-lake or storm drain stenciling.

Policy 12.4: Coordinate with the Shingle Creek and Bassett Creek Water Management Organizations to develop defensible engineering and technical standards for runoff volume, rate control, and water quality consistent with NPDES Phase II and more specifically addressing local needs.

Policy 12.5: Continue the training program for all City staff, especially Public Works, regarding threats to water quality and how best to address these problems.

Policy 12.6: Communicate with the BCWMC and SCWMC regarding the implementation, schedule, and funding of the storm water management improvements identified in the LSWMP and Watershed Management Plans.

Policy 12.7: Crystal forwards development plans to the watersheds for their review.

Policy 12.8: Work with adjacent municipalities and the watersheds in planning and implementing mutually beneficial regional storm water management improvements.

Policy 12.9: Use available opportunities through its newsletter, website, public meetings, Comprehensive Plan, or interpretive elements at parks and open space sites to inform its residents about the value of local water resources, the effects of storm water runoff, and opportunities for stewardship of water and natural resources.

Policy 12.10: Work with local watershed management organizations, Hennepin County, and others when appropriate and as resources are available to participate in

resource management plans or studies that benefit water and natural resources.

Policy 12.11: In conformance with SCWMC Policy the City will review their education and public outreach program and adopt applicable requirements.

7.2.9 POLLUTION PREVENTION

Goal 13: Detect and address urban pollutants discharged to storm sewers.

Policy 13.1: The City will address pollutant sources through enforcement of codes and public education.

Policy 13.2: Implement the hazardous materials response procedures as administered through the West Metro Fire Services.

Policy 13.3: The City will complete employee training in the operation, maintenance and inspection of storm water facilities, as included in the SWPPP.

Policy 13.4: The City will monitor storm sewer outfalls for pollutants as outlined in the City's NPDES permit.

Policy 13.5: The City will prohibit the discharge of foreign material into the storm water system. Such material shall include, but not be limited to, waste oil, paint, grass clippings, leaves, and ecologically harmful chemical.

Policy 13.6: The City will continue to address the proper application of pesticides, herbicides, and fertilizers through internal City staff training and public education, as included in the SWPPP.

Policy 13.7: The City will not allow the drainage of sanitary sewer or non-permitted industrial wastes onto any land or into any watercourse or storm sewer discharging into Bassett Creek or Shingle Creek.

7.2.10 MONITORING AND MAINTENANCE

Goal 14: Maintain the function and effectiveness of storm water management structures through monitoring and maintenance.

Policy 14.1: In conformance with City Code the City will require that an operation and maintenance plan for all proposed storm water management BMPs be submitted with all development and redevelopment projects.

Policy 14.2: In conformance with City Code the City will inspect and monitor the construction and installation of all new storm water facilities and require that such facilities be surveyed to create as-built drawings.

Policy 14.3: As per the City SWPPP Crystal will inspect and maintain City storm water facilities, with minimum inspection and maintenance responsibilities as follows:

1. Maintenance activities include, but are not limited to, removal of floating material, clearing of blocked inlets, pipes or structures, street sweeping to remove debris and litter, repairing eroded ground, reestablishing ground cover and dredging sediment from ponds.
2. The City will inspect storm water management facilities after major precipitation events and in response to complaints or input from the general public or other government agencies. Certain facilities will be inspected more frequently as warranted.
3. The City will keep records of inspections and maintenance including dates, observations and actions taken.
4. The City will perform annual monitoring of their structural pollution control devices such as trap manholes, grit chambers, sumps, floatable skimmers and trap, separators and other small settling or filtering devices.
5. The City will annually inspect at least 20% of MS4 outfalls, sediment basins and ponds.

Policy 14.4: The City will maintain the Bassett Creek flood control project features and related structures, including removing debris, vegetation, etc in accordance with the Bassett Creek Watershed Management Commission Flood Control Project (FCP) Policies document approved by the Commission on May 19, 2016 and July 21, 2016.

Policy 14.5: The City of Crystal acknowledges that the Bassett Creek Watershed Management Commission has responsibility for Bassett Creek's main channel and designated water quantity storage facilities from the Watershed Management Plan.

Policy 14.6: The City will sweep City streets at a minimum two times/year.

7.2.11 FUNDING

Goal 15: Secure adequate funding to support implementation of the surface water management plan.

Policy 15.1: Fund implementation of the plan with revenue from the storm water utility and periodically review the storm water utility rates to determine if the revenues are adequate.

Policy 15.2: Seek grant funds or other resources to assist with special projects or implementation of LSWMP goals and policies.

Section 8 – Implementation Plan

8.1 OVERVIEW

Section 6 - System Assessment, identifies the water resources management challenges faced by the City of Crystal. Section 7 - Goals and Policies, sets general policy direction and City aspirations towards meeting these challenges. The Crystal Local Surface Water Management Plan Implementation Plan describes specific things Crystal will do in the near term to accomplish

substantive improvements in its surface water discharge and thus directly address its water resource management challenges in conformance with its stated goals and polices.

The Implementation Plan reflects the needs and concerns of many stakeholders including the City Council, City Staff, citizens, and watershed management organizations. The program also considers Crystal's ability to fund these items through its general levy, watershed management organization assistance, or storm water utility.

Capital improvements consist of "on-the-ground" projects intended to remedy issues identified as current problems. The capital projects focus on a variety of issues including: phosphorus and chloride reduction, DO/Biotic levels, and increase infiltration.

NPDES MS4 Permit Compliance refers to activities necessary to meet Crystal's obligations under its general permit coverage. These activities primarily include annual meetings, SWPPP updates, and SWPPP implementation.

Operation and Maintenance items consist primarily of the general maintenance of Crystal's drainage system including ponds, storm sewer, culverts, and flood control structures. Operation and maintenance overlaps somewhat with Crystal's MS4 obligations in that certain operation and maintenance activities are specified in the City's SWPPP.

Official Controls include ordinance and policy revisions intended to achieve water quality benefits. Each proposed implementation item has a specific impetus and is identified in the tabulated implementation program later in this section. In 2018 the City updated the City Code to be in compliance with watershed management organizations, MPCA, and DNR provisions related to:

- Storm water Management
- Erosion and Sediment Control
- Illicit Discharge Detection and Elimination
- Floodplain Management
- Wetland Management

The City has current regulatory standards for storm water management, and these can be found in City Code. The City faces many challenges as it moves forward, due to the Twin and Ryan Lakes Chain TMDL and impairments to Bassett Creek and Shingle Creek. BCWMC water quality performance standards based on MIDS is also included in the most recent version of the BCWMC Plan.

As defined in the NDPES construction activity permit, sites discharging to impaired waters will be required to provide a one-inch water quality volume, and at least ½-inch of the water quality volume must be infiltrated. The Shingle Creek Watershed Management Commission has a similar policy in that it requires that the first 1-inch of runoff volume must be abstracted from new impervious surfaces. BCWMC water quality performance standards based on MIDS are included in the most recent version of the BCWMC Plan and are adopted by reference in city code.

The City's current regulatory program for Erosion and Sediment Control can be found in City Code. The City is a designated MS4; therefore they are required to develop an erosion and sediment control program and support the program through ESC ordinance adoption at a minimum. The ordinance has

provisions for plan review, erosion prevention, sediment control, pollution prevention, inspection and maintenance, and enforcement.

The MS4 permit requires that Cities has an Illicit Discharge Detection and Elimination Program. The program must contain a regulatory component to prevent illicit discharges. An illicit discharge could be the dumping of hazardous wastes into the storm sewer or an illegal connection that would allow pollutants to enter the storm sewer system.

The overarching goal of Crystal's implementation program is quite simple: to improve the quality of its surface waters, its surface water discharge, and to achieve sustainable site development practices. This will be done through capital improvements, NPDES MS4 permit compliance, performing routine operation and maintenance, and adopting/revising appropriate official controls.

8.2 WETLAND INVENTORY AND ASSESSMENT

The Metropolitan Council's current Water Resources Management Policy Plan, the Shingle Creek Watershed Management Plan, and the Bassett Creek Watershed Management Plan either advise or require that a wetland function and value assessment be completed for each of the wetlands located within the City.

The City is planning on providing this wetland function and value assessment on a project by project basis, with the exception of those wetlands identified as priority by the Shingle Creek Watershed Management Commission. The wetland function and value assessment was completed in 2010 for the following priority wetlands: Memory Lane pond system, wetland 639W, and the wetland between Upper and Middle Twin Lakes. A few of the wetlands within the City already have an assessment completed and once all the wetlands within the City have been inventoried the data will be compiled and provided to the appropriate Watershed Management Organizations for incorporation into their Wetland Management Plans.

Once this is completed, the City may update its Wetland Protection Standards found in City Code.

8.3 IMPLEMENTATION PROGRAM

Implementation Table

Project Description	Funding Source	Who?
Continue to implement performance standards through project review and permitting	Stormwater Utility	City
Continue to perform inspections associated for permitted projects	Engineering General Fund	City/Contract
Periodically review City official controls and update as needed	Engineering General Fund	City
Perform inspection and maintenance activities as documented in City SWPPP	Various	City
Update plan and schedule to prioritize stormwater infrastructure replacement	Engineering General Fund	City/Contract
Continue to implement stormwater and surface water education, outreach, and commun	Various	City/Watershed
Develop and maintain a list of BMP implementation and retrofit opportunities	Engineering General Fund	City/Watershed
Maintain pond buffer areas	Stormwater Utility	City
The City will sweep City streets at a minimum two times/year.	Streets General Fund	City
Inspect storm water management facilities	Engineering General Fund	City
Keep records of inspections	Stormwater Utility	City
Perform annual monitoring of their structural pollution control devices	Stormwater Utility	City
Annually inspect at least 20% of MS4 outfalls, sediment basins and ponds.	Engineering General Fund	City
Inspect and monitor the construction and installation of all new storm water facilities	Stormwater Utility	City/Watershed
Continue training program for Public Works staff	Stormwater Utility	City/Contract

8.4 TEN-YEAR IMPLEMENTATION PROGRAM

In the Appendix B is Crystal's Storm Water Capital Improvement Program. Crystal's program follows from the issues identified within this LSWMP current assessment section. More importantly, the Implementation Program aligns with Crystal's goals and policies as presented in Section 7. The implementation program incorporates Crystal's Storm Water Pollution Prevention Plan (SWPPP) through direct reference of items that appear in the SWPPP including their potential financial impact. The implementation program summary shows planned year funding source and budgeted cost for every item.

Below is a list of various sources of revenue that the City will utilize to augment municipal funding for the implementation program identified above:

- Grant monies possibly secured from various agencies. This could include Watershed Management Organizations, Hennepin County, MnDOT, the MPCA, the DNR, 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.
- Other sources potentially including tax increment financing, tax abatement, state aid, and others.

The City's storm water utility is the primary source for the studies, programs, and improvements identified in this Plan. The City reviews the funding adequacy of their storm water utility in conjunction with their 5-year Capital Improvement Program update every two years.

8.3 CURRENT CITY PRACTICES

Current City Practices are best summarized in the Crystal Storm water Pollution Prevention Program or SWPPP attached to this Local Surface Water Management Plan as an Appendix. These current practices provide water quality benefits through the operation of Crystal's Public Works Department. Current practices are described in the goals and policies of Section 7, and are summarized here:

- Maintain current storm sewer system map
- Illicit discharge detection and response action plan
- Illicit discharge detection and elimination response action plan
- Site operator requirements for erosion and sediment control
- Construction site runoff inspection program
- Annual water resource infrastructure inspection plan
- Implementation of water resource infrastructure inspection plan
- Infrastructure repair and maintenance
- Public parking lot and street sweeping
- Privately constructed water resource infrastructure performance plan
- Privately constructed water resource infrastructure performance implementation

8.4 PROJECT REVIEW

The City and respective watershed will coordinate the review of potential developments in accordance with the management plans of the appropriate watershed. For Bassett Creek Watershed Management Commission, the requirements are outlined in the BCWMC Requirements for Improvements and Development Proposals (2017, as amended), and the review process is outlined in Section 5.1.1.1 of the BCWMC Plan and Section 3 of the Requirements document.

Section 9 – Administration

9.1 REVIEW AND ADOPTION PROCESS

Review and adoption of this Local 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 surface 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.

9.2 PLAN AMENDMENTS AND FUTURE UPDATES

This Local Surface Water Management Plan will be incorporated into the City's Comprehensive Plan update and will be applicable until an updated plan will be required. Periodic plan amendments may be required to incorporate major changes in local practices. In particular, changes in the two applicable Watershed Management Plans may require updates to this plan. Plan amendments will be incorporated by following the review and adoption steps outlined above.

The City views changes in local practice (e.g. modifications to the City's minimum engineering standards, improved storm water system maintenance techniques, etc.) that do not impact the standards or policies identified in this plan as only minor changes in local practice, and thus would not necessitate a plan amendment or update.

Appendix A – CRYSTAL SWPPP

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

MS4 SWPPP Application for Reauthorization

for the NPDES/SDS General Small Municipal Separate Storm Sewer System (MS4) Permit MNR040000 reissued with an effective date of August 1, 2013

Stormwater Pollution Prevention Program (SWPPP) Document

Doc Type: Permit Application

Instructions: This application is for authorization to discharge stormwater associated with Municipal Separate Storm Sewer Systems (MS4s) under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit Program. **No fee** is required with the submittal of this application. Please refer to "Example" for detailed instructions found on the Minnesota Pollution Control Agency (MPCA) MS4 website at http://www.pca.state.mn.us/ms4.

Submittal: This *MS4 SWPPP Application for Reauthorization* form must be submitted electronically via e-mail to the MPCA at ms4permitprogram.pca@state.mn.us from the person that is duly authorized to certify this form. All questions with an asterisk (*) are required fields. All applications will be returned if required fields are not completed.

Questions: Contact Claudia Hochstein at 651-757-2881 or claudia.hochstein@state.mn.us, Dan Miller at 651-757-2246 or daniel.miller@state.mn.us, or call toll-free at 800-657-3864.

General Contact Information (*Required fields)

MS4 Owner (with ownership or operational responsibility, or control of the MS4)

*MS4 permittee name: City of Crystal *County: Hennepin
(city, county, municipality, government agency or other entity)

*Mailing address: 4141 Douglas Drive

*City: Crystal *State: MN *Zip code: 55422

*Phone (including area code): 763-531-1160 *E-mail: tom.mathisen@crystalmn.gov

MS4 General contact (with Stormwater Pollution Prevention Program [SWPPP] implementation responsibility)

*Last name: Mathisen *First name: Tom
(department head, MS4 coordinator, consultant, etc.)

*Title: City Engineer/Public Works Director

*Mailing address: 4141 Douglas Drive

*City: Crystal *State: MN *Zip code: 55422

*Phone (including area code): 763-531-1160 *E-mail: tom.mathisen@crystalmn.gov

Preparer information (complete if SWPPP application is prepared by a party other than MS4 General contact)

Last name: Schleeter First name: Brad
(department head, MS4 coordinator, consultant, etc.)

Title: Senior Water Resources Engineer

Mailing address: STANTEC 2335 HWY 36 W

City: Saint Paul State: MN Zip code: 55113

Phone (including area code): 651-604-4801 E-mail: brad.schleeter@stantec.com

Verification

1. I seek to continue discharging stormwater associated with a small MS4 after the effective date of this Permit, and shall submit this *MS4 SWPPP Application for Reauthorization* form, in accordance with the schedule in Appendix A, Table 1, with the SWPPP document completed in accordance with the Permit (Part II.D.). ☒ Yes
2. I have read and understand the NPDES/SDS MS4 General Permit and certify that we intend to comply with all requirements of the Permit. ☒ Yes

Certification (All fields are required)

☒ Yes - *I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted.*

I certify that based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of civil and criminal penalties.

This certification is required by Minn. Stat. §§ 7001.0070 and 7001.0540. The authorized person with overall, MS4 legal responsibility must certify the application (principal executive officer or a ranking elected official).

By typing my name in the following box, I certify the above statements to be true and correct, to the best of my knowledge, and that this information can be used for the purpose of processing my application.

Name: Thomas A. Mathisen
(This document has been electronically signed)

Title: City Engineer/Public Works Director Date (mm/dd/yyyy): 02/24/2014

Mailing address: 4141 Douglas Drive

City: Crystal State: MN Zip code: 55422

Phone (including area code): 763-531-1160 E-mail: tom.mathisen@crystalmn.gov

***Note:** The application will not be processed without certification.*

Stormwater Pollution Prevention Program Document

I. Partnerships: (Part II.D.1)

A. List the **regulated small MS4(s)** with which you have established a partnership in order to satisfy one or more requirements of this Permit. Indicate which Minimum Control Measure (MCM) requirements or other program components that each partnership helps to accomplish (List all that apply). Check the box below if you currently have no established partnerships with other regulated MS4s. If you have more than five partnerships, hit the tab key after the last line to generate a new row.

☐ No partnerships with regulated small MS4s

Name and description of partnership	MCM/Other permit requirements involved
Shingle Creek WMO – MOU	MCM 1, 3,4 and 5
Basset Creek WMO – MOU	MCM 1, 3,4 and 5

B. If you have additional information that you would like to communicate about your partnerships with other regulated small MS4(s), provide it in the space below, or include an attachment to the SWPPP Document, with the following file naming convention: *MS4NameHere_Partnerships.*

The City has a signed Memorandum of Understanding with the Shingle Creek Water Management Commission and Basset Creek Water Management Commission (WMCs). The City uses the watershed organizations to provide articles and brochures on all issues regarding stormwater protection. The district also issues their own permits on projects within the City and conducts their own review of BMPs and erosion control inspection.

II. Description of Regulatory Mechanisms: (Part II.D.2)

Illicit discharges

A. Do you have a regulatory mechanism(s) that effectively prohibits non-stormwater discharges into your small MS4, except those non-stormwater discharges authorized under the Permit (Part III.D.3.b.)? ☐ Yes ☒ No

1. If **yes:**

   a. Check which *type* of regulatory mechanism(s) your organization has (check all that apply):

   ☐ Ordinance ☐ Contract language
   ☐ Policy/Standards ☐ Permits
   ☐ Rules
   ☐ Other, explain: _____

   b. Provide either a direct link to the mechanism selected above or attach it as an electronic document to this form; or if your regulatory mechanism is either an Ordinance or a Rule, you may provide a citation:

   Citation:

   Direct link:

   ☐ Check here if attaching an electronic copy of your regulatory mechanism, with the following file naming convention: *MS4NameHere_IDDEreg.*

2. If **no:**

   Describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, this permit requirement is met:

   The City has completed a draft ordinance document and will refine the document to include the requirements of the MPCA MS4 permit so that a new ordinance will be enacted with 12 months of the date permit coverage is extended.

Construction site stormwater runoff control

A. Do you have a regulatory mechanism(s) that establishes requirements for erosion and sediment controls and waste controls? ☒ Yes ☐ No

1. If **yes:**

a. Check which *type* of regulatory mechanism(s) your organization has (check all that apply):

☒ Ordinance ☐ Contract language
☐ Policy/Standards ☐ Permits
☐ Rules
☐ Other, explain: _____

b. Provide either a direct link to the mechanism selected above or attach it as an electronic document to this form; or if your regulatory mechanism is either an Ordinance or a Rule, you may provide a citation:

Citation:

Direct link:

http://www.crystalmn.gov/docs/city_code/CRYSTAL_CODE___CHAPTER_5_10_22_2013__2_.pdf

Construction Site Stormwater Runoff Control regulatory mechanisms begin in Section 530.

☐ Check here if attaching an electronic copy of your regulatory mechanism, with the following file naming convention: *MS4NameHere_CSWreg.*

B. Is your regulatory mechanism at least as stringent as the MPCA general permit to Discharge Stormwater Associated with Construction Activity (as of the effective date of the MS4 Permit)? ☐Yes ☒ No

If you answered **yes** to the above question, proceed to C.

If you answered **no** to either of the above permit requirements listed in A. or B., describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

The City will update its erosion control ordinance to meet the requirements of this permit within 12 months of the date permit coverage is extended.

C. Answer **yes** or **no** to indicate whether your regulatory mechanism(s) requires owners and operators of construction activity to develop site plans that incorporate the following erosion and sediment controls and waste controls as described in the Permit (Part III.D.4.a.(1)-(8)), and as listed below:

1.	Best Management Practices (BMPs) to minimize erosion.	☒ Yes	☐ No
2.	BMPs to minimize the discharge of sediment and other pollutants.	☒ Yes	☐ No
3.	BMPs for dewatering activities.	☒ Yes	☐ No
4.	Site inspections and records of rainfall events	☐ Yes	☒ No
5.	BMP maintenance	☒ Yes	☐ No
6.	Management of solid and hazardous wastes on each project site.	☒ Yes	☐ No
7.	Final stabilization upon the completion of construction activity, including the use of perennial vegetative cover on all exposed soils or other equivalent means.	☒ Yes	☐ No
8.	Criteria for the use of temporary sediment basins.	☐ Yes	☒ No

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

The City will update its erosion control ordinance to include recording rainfall events with the required inspection records and add criteria for the use of temporary sediment basins. This update will be completed within 12 months of the date permit coverage is extended.

Post-construction stormwater management

A. Do you have a regulatory mechanism(s) to address post-construction stormwater management activities? ☒ Yes ☐ No

1. If **yes:**

a. Check which *type* of regulatory mechanism(s) your organization has (check all that apply):

☒ Ordinance ☐ Contract language
☐ Policy/Standards ☐ Permits
☐ Rules
☐ Other, explain: _____

b. Provide either a direct link to the mechanism selected above or attach it as an electronic document to this form; or if your regulatory mechanism is either an Ordinance or a Rule, you may provide a citation:

Citation:

Direct link:

http://www.crystalmn.gov/docs/city_code/CRYSTAL_CODE___CHAPTER_5_10_22_2013__2_.pdf

Post-construction Stormwater Management regulatory mechanisms begin in Section 530.

☐ Check here if attaching an electronic copy of your regulatory mechanism, with the following file naming convention: *MS4NameHere_PostCSWreg.*

B. Answer **yes** or **no** below to indicate whether you have a regulatory mechanism(s) in place that meets the following requirements as described in the Permit (Part III.D.5.a.):

1. **Site plan review:** Requirements that owners and/or operators of construction activity submit site plans with post-construction stormwater management BMPs to the permittee for review and approval, prior to start of construction activity. ☒ Yes ☐ No

2. **Conditions for post construction stormwater management:** Requires the use of any combination of BMPs, with highest preference given to Green Infrastructure techniques and practices (e.g., infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs, etc.), necessary to meet the following conditions on the site of a construction activity to the Maximum Extent Practicable (MEP):

   a. For new development projects – no net increase from pre-project conditions (on an annual average basis) of: ☐ Yes ☒ No
      1) Stormwater discharge volume, unless precluded by the stormwater management limitations in the Permit (Part III.D.5.a(3)(a)).
      2) Stormwater discharges of Total Suspended Solids (TSS).
      3) Stormwater discharges of Total Phosphorus (TP).

   b. For redevelopment projects – a net reduction from pre-project conditions (on an annual average basis) of: ☐ Yes ☒ No
      1) Stormwater discharge volume, unless precluded by the stormwater management limitations in the Permit (Part III.D.5.a(3)(a)).
      2) Stormwater discharges of TSS.
      3) Stormwater discharges of TP.

3. **Stormwater management limitations and exceptions:**

   a. Limitations

      1) Prohibit the use of infiltration techniques to achieve the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)) when the infiltration structural stormwater BMP will receive discharges from, or be constructed in areas: ☐ Yes ☒ No
         a) Where industrial facilities are not authorized to infiltrate industrial stormwater under an NPDES/SDS Industrial Stormwater Permit issued by the MPCA.
         b) Where vehicle fueling and maintenance occur.
         c) With less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.
         d) Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater.

      2) Restrict the use of infiltration techniques to achieve the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)), without higher engineering review, sufficient to provide a functioning treatment system and prevent adverse impacts to groundwater, when the infiltration device will be constructed in areas: ☐ Yes ☒ No
         a) With predominately Hydrologic Soil Group D (clay) soils.
         b) Within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features.
         c) Within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, subp. 13.
         d) Where soil infiltration rates are more than 8.3 inches per hour.

3) For linear projects where the lack of right-of-way precludes the installation of volume control practices that meet the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)), the permittee's regulatory mechanism(s) may allow exceptions as described in the Permit (Part III.D.5.a(3)(b)). The permittee's regulatory mechanism(s) shall ensure that a reasonable attempt be made to obtain right-of-way during the project planning process. ☒ Yes ☐ No

4. **Mitigation provisions:** The permittee's regulatory mechanism(s) shall ensure that any stormwater discharges of TSS and/or TP not addressed on the site of the original construction activity are addressed through mitigation and, at a minimum, shall ensure the following requirements are met:

   a. Mitigation project areas are selected in the following order of preference: ☐ Yes ☒ No
      1) Locations that yield benefits to the same receiving water that receives runoff from the original construction activity.
      2) Locations within the same Minnesota Department of Natural Resource (DNR) catchment area as the original construction activity.
      3) Locations in the next adjacent DNR catchment area up-stream
      4) Locations anywhere within the permittee's jurisdiction.

   b. Mitigation projects must involve the creation of new structural stormwater BMPs or the retrofit of existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP. ☐ Yes ☒ No

   c. Routine maintenance of structural stormwater BMPs already required by this permit cannot be used to meet mitigation requirements of this part. ☐ Yes ☒ No

   d. Mitigation projects shall be completed within 24 months after the start of the original construction activity. ☐ Yes ☒ No

   e. The permittee shall determine, and document, who will be responsible for long-term maintenance on all mitigation projects of this part. ☐ Yes ☒ No

   f. If the permittee receives payment from the owner and/or operator of a construction activity for mitigation purposes in lieu of the owner or operator of that construction activity meeting the conditions for post-construction stormwater management in Part III.D.5.a(2), the permittee shall apply any such payment received to a public stormwater project, and all projects must be in compliance with Part III.D.5.a(4)(a)-(e). ☒ Yes ☐ No

5. **Long-term maintenance of structural stormwater BMPs:** The permittee's regulatory mechanism(s) shall provide for the establishment of legal mechanisms between the permittee and owners or operators responsible for the long-term maintenance of structural stormwater BMPs not owned or operated by the permittee, that have been implemented to meet the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)). This only includes structural stormwater BMPs constructed after the effective date of this permit and that are directly connected to the permittee's MS4, and that are in the permittee's jurisdiction. The legal mechanism shall include provisions that, at a minimum:

   a. Allow the permittee to conduct inspections of structural stormwater BMPs not owned or operated by the permittee, perform necessary maintenance, and assess costs for those structural stormwater BMPs when the permittee determines that the owner and/or operator of that structural stormwater BMP has not conducted maintenance. ☒ Yes ☐ No

   b. Include conditions that are designed to preserve the permittee's right to ensure maintenance responsibility, for structural stormwater BMPs not owned or operated by the permittee, when those responsibilities are legally transferred to another party. ☒ Yes ☐ No

   c. Include conditions that are designed to protect/preserve structural stormwater BMPs and site features that are implemented to comply with the Permit (Part III.D.5.a(2)). If site configurations or structural stormwater BMPs change, causing decreased structural stormwater BMP effectiveness, new or improved structural stormwater BMPs must be implemented to ensure the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)) continue to be met. ☒ Yes ☐ No

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within twelve (12) months of the date permit coverage is extended, these permit requirements are met:

B.2.a-b, B.3.a.1)-2): The current stormwater management ordinance does not specify BMP performance in terms of TSS and TP removal. The City will amend the post construction stormwater ordinance within the next 12 months to clarify the TSS and TP removal efficiency of BMPs and the maintenance of BMPs, specifically, ownership transfer and changes in BMP performance.

B.4: The City does not allow for off-site mitigation in lieu of meeting the stormwater management requirements on-site. As this practice is more restrictive than the MS4 permit and therefore will remain, the City will not modify its regulatory

mechanisms to meet the requirements of B.4.

Note: The City is bound legally to update their stormwater management requirements to be at least as stringent as the Water Management Commissions in the City. While the Shingle Creek WMC has updated their rules and standards, the Basset Creek WMC has yet to finalize their new rules. Once the Bassett Creek WMC revises the rules, the City of Crystal will take the most restrictive of the two rules and adopt them city-wide.

III. Enforcement Response Procedures (ERPs): (Part II.D.3)

A. Do you have existing ERPs that satisfy the requirements of the Permit (Part III.B.)? ☐ Yes ☒ No

1. If **yes**, attach them to this form as an electronic document, with the following file naming convention: *MS4NameHere_ERPs.*
2. If **no**, describe the tasks and corresponding schedules that will be taken to assure that, with twelve (12) months of the date permit coverage is extended, these permit requirements are met:

   The City will create a written procedures that will satisfy the requirements of this permit within 12 months of the date permit coverage is extended.

B. Describe your ERPs:

The City currently contacts the City engineer or City Inspector for direction in addressing response procedures.

IV. Storm Sewer System Map and Inventory: (Part II.D.4.)

A. Describe how you manage your storm sewer system map and inventory:

City has an existing map of stormwater resources and structures and updates the map with Local Surface Water Management Plans updates.

B. Answer **yes** or **no** to indicate whether your storm sewer system map addresses the following requirements from the Permit (Part III.C.1.a-d), as listed below:

1. The permittee's entire small MS4 as a goal, but at a minimum, all pipes 12 inches or greater in diameter, including stormwater flow direction in those pipes. ☒ Yes ☐ No
2. Outfalls, including a unique identification (ID) number assigned by the permittee, and an associated geographic coordinate. ☒ Yes ☐ No
3. Structural stormwater BMPs that are part of the permittee's small MS4. ☒ Yes ☐ No
4. All receiving waters. ☒ Yes ☐ No

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

C. Answer **yes** or **no** to indicate whether you have completed the requirements of 2009 Minnesota Session Law, Ch. 172. Sec. 28: with the following inventories, according to the specifications of the Permit (Part III.C.2.a.-b.), including:

1. All ponds within the permittee's jurisdiction that are constructed and operated for purposes of water quality treatment, stormwater detention, and flood control, and that are used for the collection of stormwater via constructed conveyances. ☒ Yes ☐ No
2. All wetlands and lakes, within the permittee's jurisdiction, that collect stormwater via constructed conveyances. ☒ Yes ☐ No

D. Answer **yes** or **no** to indicate whether you have completed the following information for each feature inventoried.

1. A unique identification (ID) number assigned by the permittee. ☒ Yes ☐ No
2. A geographic coordinate. ☒ Yes ☐ No
3. Type of feature (e.g., pond, wetland, or lake). This may be determined by using best professional judgment. ☒ Yes ☐ No

If you have answered **yes** to all above requirements, and you have already submitted the Pond Inventory Form to the MPCA, then you do not need to resubmit the inventory form below.

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

E. Answer **yes** or **no** to indicate if you are attaching your pond, wetland and lake inventory to the MPCA on the form provided on the MPCA website at: http://www.pca.state.mn.us/ms4 , according to the specifications of Permit (Part III.C.2.b.(1)-(3)). Attach with the following file naming convention: *MS4NameHere_inventory*. ☐ Yes ☒ No

If you answered **no,** the inventory form must be submitted to the MPCA MS4 Permit Program within 12 months of the date permit coverage is extended.

V. Minimum Control Measures (MCMs) (Part II.D.5)

A. MCM1: Public education and outreach

1. The Permit requires that, within 12 months of the date permit coverage is extended, existing permittees revise their education and outreach program that focuses on illicit discharge recognition and reporting, as well as other specifically selected stormwater-related issue(s) of high priority to the permittee during this permit term. Describe your **current** educational program, including **any high-priority topics included**:

   The current public education program includes distributing brochures and educational materials at City Hall, links to stormwater management in the City along with City ordinances on the City's website, submitting articles on water quality issues to the local paper and city newsletters.

2. List the categories of BMPs that address your public education and outreach program, including the distribution of educational materials and a program implementation plan. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

   Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the U.S. Environmental Protection Agency's (EPA) *Measurable Goals Guidance for Phase II Small MS4s* (http://www.epa.gov/npdes/pubs/measurablegoals.pdf).

   If you have more than five categories, hit the tab key after the last line to generate a new row.

Established BMP categories	**Measurable goals and timeframes**
Brochures	Make at least 3 MS4 related brochures available at City Hall continuously.
Website	Updates to the site and number of hits to the site
City Newsletter	Include at least 1 MS4 related articles in each edition in our quarterly newsletter *The Crystal Connection*. We track the number of delivered copies and variety of articles annually.
Partnership with Shingle Creek and Basset Creek WMCs	Maintain public education partnership with both watersheds. Continue to highlight city/watershed project partnerships on the City's website and quarterly newsletter. The number of partnership projects varies by year, and we track the number of project highlights appearing annually.

BMP categories to be implemented	**Measurable goals and timeframes**
Update City website	Update the City's website to include a stormwater page where links to the City's Surface Water Management Plan, SWPPP Document, pertinent City code, and other MS4 related items can be easily located and viewed. We will complete this action within 12 months of the date permit coverage is extended.

3. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

   David Fritzke GIS/Engineering Technician

B. MCM2: Public participation and involvement

1. The Permit (Part III.D.2.a.) requires that, within 12 months of the date permit coverage is extended, existing permittees

shall revise their current program, as necessary, and continue to implement a public participation/involvement program to solicit public input on the SWPPP. Describe your current program:

Each year the City solicits input from the residents on the City's SWPPP at a regular City Council meeting. Notices are published in local paper 30 days prior to the meeting and posted at City Hall. All public input is recorded and addressed by staff or consultants in a timely matter. The city will update the SWPPP as necessary to incorporate these comments if they are determined to be relevant.

2. List the categories of BMPs that address your public participation/involvement program, including solicitation and documentation of public input on the SWPPP. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

   Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (http://www.epa.gov/npdes/pubs/measurablegoals.pdf). **If you have more than five categories**, hit the tab key after the last line to generate a new row.

Established BMP categories	**Measurable goals and timeframes**
Annual Meeting	Document attendance and comments received
Public Notice	30 days prior to the meeting in local paper.
SWPPP Availability	SWPPP and Stormwater Plan are on the City's website

BMP categories to be implemented	**Measurable goals and timeframes**
Continue with current practices	

3. Do you have a process for receiving and documenting citizen input? ☒ Yes ☐ No

   If you answered **no** to the above permit requirement, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, this permit requirement is met:

4. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

   David Fritzke GIS/Engineering Technician

C. MCM 3: Illicit discharge detection and elimination

1. The Permit (Part III.D.3.) requires that, within 12 months of the date permit coverage is extended, existing permittees revise their current program as necessary, and continue to implement and enforce a program to detect and eliminate illicit discharges into the small MS4. Describe your current program:

   The City has created a City-wide storm sewer map, has ongoing training of City staff on illicit discharge detection and continues to publish and make educational materials available to residents on illicit discharge detection and elimination.

2. Does your Illicit Discharge Detection and Elimination Program meet the following requirements, as found in the Permit (Part III.D.3.c.-g.)?

   a. Incorporation of illicit discharge detection into all inspection and maintenance activities conducted under the Permit (Part III.D.6.e.-f.)Where feasible, illicit discharge inspections shall be conducted during dry-weather conditions (e.g., periods of 72 or more hours of no precipitation). ☐ Yes ☒ No

   b. Detecting and tracking the source of illicit discharges using visual inspections. The permittee may also include use of mobile cameras, collecting and analyzing water samples, and/or other detailed procedures that may be effective investigative tools. ☐ Yes ☒ No

   c. Training of all field staff, in accordance with the requirements of the Permit (Part III.D.6.g.(2)), in illicit discharge recognition (including conditions which could cause illicit discharges), and reporting illicit discharges for further investigation. ☐ Yes ☒ No

   d. Identification of priority areas likely to have illicit discharges, including at a minimum, evaluating land use associated with business/industrial activities, areas where illicit discharges have been identified in the past, and areas with storage of large quantities of significant materials that could result in an illicit discharge. ☐ Yes ☒ No

e. Procedures for the timely response to known, suspected, and reported illicit discharges. ☐ Yes ☒ No

f. Procedures for investigating, locating, and eliminating the source of illicit discharges. ☐ Yes ☒ No

g. Procedures for responding to spills, including emergency response procedures to prevent spills from entering the small MS4. The procedures shall also include the immediate notification of the Minnesota Department of Public Safety Duty Officer, if the source of the illicit discharge is a spill or leak as defined in Minn. Stat. § 115.061. ☐ Yes ☒ No

h. When the source of the illicit discharge is found, the permittee shall use the ERPs required by the Permit (Part III.B.) to eliminate the illicit discharge and require any needed corrective action(s). ☐ Yes ☒ No

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

The City will adopt an illicit discharge ordinance and revise its Emergency Response Procedures in 2014 as part of their requirements of the MPCA MS4 permit. This ordinance will address the requirements listed above in a-h.

3. List the categories of BMPs that address your illicit discharge, detection and elimination program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

   Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (http://www.epa.gov/npdes/pubs/measurablegoals.pdf).

   If you have more than five categories, hit the tab key after the last line to generate a new row.

Established BMP categories	**Measurable goals and timeframes**
Illicit discharge inspection	Continue to inspect and document illicit discharge and connection inspections during dry weather conditions. We summarize the number of inspections and reported illicit discharges annually.
Stormwater system map	Regularly update our existing stormsewer base map to include recently constructed infrastructure.
Training	Continue annual staff training on procedures for reporting and handling illicit discharges. We track the number of staff training annually.

BMP categories to be implemented	**Measurable goals and timeframes**
Adopt an Illicit Discharge Ordinance	Adopt an illicit discharge ordinance within 12 months of the date permit coverage is extended.
Establish illicit discharge ERPs	Create Enforcement Response Procedures for illicit discharges, including a program for reporting, tracking, and eliminating illicit discharges. We will complete this task within 12 months of the date permit coverage is extended.
Potential illicit discharge prioritization	Identify areas and outfalls in these areas that should be considered high priority outfalls. This work will be completed within 12 months of the date permit coverage is extended.

4. Do you have procedures for record-keeping within your Illicit Discharge Detection and Elimination (IDDE) program as specified within the Permit (Part III.D.3.h.)? ☐ Yes ☒ No

   If you answered **no**, indicate how you will develop procedures for record-keeping of your Illicit Discharge, Detection and Elimination Program, within 12 months of the date permit coverage is extended:

   Within 12 months of the date permit coverage is extended, the City will create a spreadsheet that will contain the time, date, and location of any detected illicit discharges. Each entry will also have a description of the discharge, procedures used to stop the discharge and any remediation or preventative actions taken.

5. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

   David Fritzke GIS/Engineering Technician

D. MCM 4: Construction site stormwater runoff control

1. The Permit (Part III.D.4) requires that, within 12 months of the date permit coverage is extended, existing permittees shall revise their current program, as necessary, and continue to implement and enforce a construction site stormwater runoff control program. Describe your current program:

   The City has an adopted construction site stormwater runoff control ordinance and follows an established site plan review process. Public works department staff currently conducts erosion control inspections.

2. Does your program address the following BMPs for construction stormwater erosion and sediment control as required in the Permit (Part III.D.4.b.):

   a. Have you established written procedures for site plan reviews that you conduct prior to the start of construction activity? ☒ Yes ☐ No

   b. Does the site plan review procedure include notification to owners and operators proposing construction activity that they need to apply for and obtain coverage under the MPCA's general permit to *Discharge Stormwater Associated with Construction Activity No. MN R100001?* ☒ Yes ☐ No

   c. Does your program include written procedures for receipt and consideration of reports of noncompliance or other stormwater related information on construction activity submitted by the public to the permittee? ☒ Yes ☐ No

   d. Have you included written procedures for the following aspects of site inspections to determine compliance with your regulatory mechanism(s):

      1) Does your program include procedures for identifying priority sites for inspection? ☐ Yes ☒ No

      2) Does your program identify a frequency at which you will conduct construction site inspections? ☐ Yes ☒ No

      3) Does your program identify the names of individual(s) or position titles of those responsible for conducting construction site inspections? ☐ Yes ☒ No

      4) Does your program include a checklist or other written means to document construction site inspections when determining compliance? ☒ Yes ☐ No

   e. Does your program document and retain construction project name, location, total acreage to be disturbed, and owner/operator information? ☒ Yes ☐ No

   f. Does your program document stormwater-related comments and/or supporting information used to determine project approval or denial? ☒ Yes ☐ No

   g. Does your program retain construction site inspection checklists or other written materials used to document site inspections? ☒ Yes ☐ No

   If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met.

   The City currently conducts inspections by members of the public works department staff. Any violations or corrective actions are reported to the City and the City takes appropriate action. Within 12 months of the date permit coverage is extended the City will establish site inspection procedures which will identify priority sites for inspection, define the required frequency of inspections, assign and identify responsible persons to conduct inspections and establish checklists and forms to document inspection results.

3. List the categories of BMPs that address your construction site stormwater runoff control program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

   Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (http://www.epa.gov/npdes/pubs/measurablegoals.pdf). **If you have more than five categories**, hit the tab key after the last line to generate a new row.

Established BMP categories	**Measurable goals and timeframes**
Ordinance	Continue to enforce existing construction site runoff control ordinance.
Inspections	Public Works staff will continue to perform erosion control inspections on active projects. We track the number of inspections performed annually.
Public Education	Make educational materials available continuously to residents and contractors on acceptable erosion control BMPs when working in the City. Track the number of educational materials available annually.
Plan review process	Continue to implement our plan review procedure and track the number of projects reviewed annually.

BMP categories to be implemented	Measurable goals and timeframes
Program updates	Make the necessary updates to our construction stormwater program, as indicated above, within 12 months of the date permit coverage is extended.
Ordinance updates	Revise our construction site runoff control ordinance as necessary to meet MS4 Permit requirements within 12 months of the date permit coverage is extended.

4. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

   Tom Mathisen, City Engineer/Public Works Director

E. MCM 5: Post-construction stormwater management

1. The Permit (Part III.D.5.) requires that, within 12 months of the date permit coverage is extended, existing permittees shall revise their current program, as necessary, and continue to implement and enforce a post-construction stormwater management program. Describe your current program:

   The City has developed and approved an ordinance which includes abstraction and filtration requirements as part of new development and re-development projects. The local Wastershed Management Commissions, have similar requirements.

2. Have you established written procedures for site plan reviews that you will conduct prior to the start of construction activity? ☒ Yes ☐ No

3. Answer **yes** or **no** to indicate whether you have the following listed procedures for documentation of post-construction stormwater management according to the specifications of Permit (Part III.D.5.c.):

   a. Any supporting documentation that you use to determine compliance with the Permit (Part III.D.5.a), including the project name, location, owner and operator of the construction activity, any checklists used for conducting site plan reviews, and any calculations used to determine compliance? ☒ Yes ☐ No

   b. All supporting documentation associated with mitigation projects that you authorize? ☒ Yes ☐ No

   c. Payments received and used in accordance with Permit (Part III.D.5.a.(4)(f))? ☒ Yes ☐ No

   d. All legal mechanisms drafted in accordance with the Permit (Part III.D.5.a.(5)), including date(s) of the agreement(s) and names of all responsible parties involved? ☒ Yes ☐ No

   If you answered **no** to any of the above permit requirements, describe the steps that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met.

   The City of Crystal will update the requirements of post-construction stormwater management to include standards addressing volume reduction/control in 2014.

4. List the categories of BMPs that address your post-construction stormwater management program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

   Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (http://www.epa.gov/npdes/pubs/measurablegoals.pdf). **If you have more than five categories**, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Stormwater Management ordinance	Continue to enforce our post-construction stormwater management ordinance. Track number annual permits and stormwater BMPs installed
Inspection of new stormwater BMPs	Public Works staff inspects recently installed stormwater BMPs to verify proper installation. We track the number of installations inspected annually.
Plan review process	Continue to implement our plan review procedures and track the number of projects reviewed annually.

BMP categories to be implemented	Measurable goals and timeframes
Ordinance updates	Revise post-construction stormwater management regulatory mechanisms as necessary to meet MS4 Permit requirements within 12 months of the date permit coverage is extended.
BMP construction guidance	Partnership with Shingle Creek WMC and/or Bassett Creek WMC to prepare BMP construction guidance materials. We will complete this task within 12 months of the date permit coverage is extended.

5. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

   David Fritzke GIS/Engineering Technician

F. MCM 6: Pollution prevention/good housekeeping for municipal operations

1. The Permit (Part III.D.6.) requires that, within 12 months of the date permit coverage is extended, existing permittees shall revise their current program, as necessary, and continue to implement an operations and maintenance program that prevents or reduces the discharge of pollutants from the permittee owned/operated facilities and operations to the small MS4. Describe your current program:

   The Public Works Director for the City oversees the street sweeping operations as well as the inspection of all pollution control devices, storm sewer pipes, ponds, wetlands and outfalls. He is also responsible for evaluating the effectiveness of each of these activities and the maintenance associated with keeping the system functional.

2. Do you have a facilities inventory as outlined in the Permit (Part III.D.6.a.)? ☒ Yes ☐ No

3. If you answered **no** to the above permit requirement in question 2, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, this permit requirement is met:

4. List the categories of BMPs that address your pollution prevention/good housekeeping for municipal operations program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

   Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. For an explanation of measurable goals, refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (http://www.epa.gov/npdes/pubs/measurablegoals.pdf).

   If you have more than five categories, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Written Maintenance Plan	Continue to implement our written system maintenance plan and document annual operations as detailed in plan. This maintenance plan includes the following operations: park and lawn maintenance, City vehicle maintenance, winter de-icing practices, etc.
Street Sweeping	Continue annual street sweeping
Record keeping	Continue to maintain records of maintenance activities and track these maintenance activities annually.
Annual Inspections	Continue to inspect Structural Stormwater BMPs annually, and ponds and outfalls at least once within the permit term. Continue to document BMPs inspected and frequency of inspections.

BMP categories to be implemented	Measurable goals and timeframes
Pond assessment	Relying on the guidance provided by the MPCA, we will develop a procedure for determining the TP and TSS treatment effectiveness of City owned ponds within the length of the permit term.
Stockpile, and storage and handling area inspections	Increase current inspection frequency to quarterly inspections of City owned and operated stockpiles, and storage and material handling areas.
Staff training	Enhance our existing annual staff training program to meet the requirements of the MS4 permit. We will begin this training program within 12 months of the date permit coverage is extended.

5. Does discharge from your MS4 affect a Source Water Protection Area (Permit Part III.D.6.c.)? ☐ Yes ☒ No

   a. If **no**, continue to 6.

   b. If **yes**, the Minnesota Department of Health (MDH) is in the process of mapping the following items. Maps are available at http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm. Is a map including the following items available for your MS4:

      1) Wells and source waters for drinking water supply management areas identified as vulnerable under Minn. R. 4720.5205, 4720.5210, and 4720.5330? ☐ Yes ☐ No

      2) Source water protection areas for surface intakes identified in the source water assessments conducted by or for the Minnesota Department of Health under the federal Safe Drinking Water Act, U.S.C. §§ 300j – 13? ☐ Yes ☐ No

   c. Have you developed and implemented BMPs to protect any of the above drinking water sources? ☐ Yes ☐ No

6. Have you developed procedures and a schedule for the purpose of determining the TSS and TP treatment effectiveness of all permittee owned/operated ponds constructed and used for the collection and treatment of stormwater, according to the Permit (Part III.D.6.d.)? ☐ Yes ☒ No

7. Do you have inspection procedures that meet the requirements of the Permit (Part III.D.6.e.(1)-(3)) for structural stormwater BMPs, ponds and outfalls, and stockpile, storage and material handling areas? ☒ Yes ☐ No

8. Have you developed and implemented a stormwater management training program commensurate with each employee's job duties that:

   a. Addresses the importance of protecting water quality? ☐ Yes ☒ No

   b. Covers the requirements of the permit relevant to the duties of the employee? ☐ Yes ☒ No

   c. Includes a schedule that establishes initial training for new and/or seasonal employees and recurring training intervals for existing employees to address changes in procedures, practices, techniques, or requirements? ☐ Yes ☒ No

9. Do you keep documentation of inspections, maintenance, and training as required by the Permit (Part III.D.6.h.(1)-(5))? ☒ Yes ☐ No

   If you answered **no** to any of the above permit requirements listed in **Questions 5 – 9**, then describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

   The City will establish a training program as part of the updated SWPPP and site inspection procedures. The City will also examine the effectiveness of the City's BMPs as to their TSS and TP removal efficiencies.

10. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

    Tom Mathisen City Engineer/Public Works Director

VI. Compliance Schedule for an Approved Total Maximum Daily Load (TMDL) with an Applicable Waste Load Allocation (WLA) (Part II.D.6.)

A. Do you have an approved TMDL with a Waste Load Allocation (WLA) prior to the effective date of the Permit? ☐ Yes ☒ No

1. If **no**, continue to section VII.
2. If **yes**, fill out and attach the MS4 Permit TMDL Attachment Spreadsheet with the following naming convention**:** *MS4NameHere_TMDL.*

   This form is found on the MPCA MS4 website: http://www.pca.state.mn.us/ms4.

VII. Alum or Ferric Chloride Phosphorus Treatment Systems (Part II.D.7.)

A. Do you own and/or operate any Alum or Ferric Chloride Phosphorus Treatment Systems which are regulated by this Permit (Part III.F.)? ☐ Yes ☒ No

1. If **no**, this section requires no further information.
2. If **yes**, you own and/or operate an Alum or Ferric Chloride Phosphorus Treatment System within your small MS4, then you must submit the Alum or Ferric Chloride Phosphorus Treatment Systems Form supplement to this document, with the following naming convention: *MS4NameHere_TreatmentSystem*.
   This form is found on the MPCA MS4 website: http://www.pca.state.mn.us/ms4.

VIII. Add any Additional Comments to Describe Your Program

TMDL Wasteload Allocation Excel Spreadsheet PART II.D.6.a.-e.

Copy and paste from the Master List MS4 TMDL Spreadsheet for your MS4 to the space below.

Attach this completed form with your SWPPP Document at the time of submittal. At a ***minimum,*** *provide all of the information "*" items (TMDL Project Name, Type of WLA, Numeric WLA, Unit, Flow Condition, and Pollutant of Concern).*

Permittee name	Preferred ID	TMDL project name*	Waterbody ID	Type of WLA*	Numeric WLA*	Unit*	Percent reduction	Flow condition*	Waterbody name	Pollutant of concern*	Date approved
Crystal City	MS400012	Shingle Creek and Bass Creek Biota and Dissolved Oxygen TMDL	07010206-506	Categorical	11.8	kg/day		N/A	Shingle Creek; Lower Shingle Creek Watershed	Nitrogenous biochemical oxygen demand	11/4/2011
Crystal City	MS400012	Shingle Creek and Bass Creek Biota and Dissolved Oxygen TMDL	07010206-506	Categorical	35.8	kg/day		N/A	Shingle Creek; Upper Shingle Creek Watershed	Nitrogenous biochemical oxygen demand	11/4/2011
Crystal City	MS400012	Shingle Creek Chloride TMDL	07010206-506	Categorical			63%	Winter Low Flow (60% to 100%)	Shingle Creek	Chloride	2/14/2007
Crystal City	MS400012	Shingle Creek Chloride TMDL	07010206-506	Categorical			71%	Winter Runoff (60% to 0%)	Shingle Creek	Chloride	2/14/2007
Crystal City	MS400012	Shingle Creek Chloride TMDL	07010206-506	Categorical	24.8	tons/day		High	Shingle Creek	Chloride	2/14/2007
Crystal City	MS400012	Shingle Creek Chloride TMDL	07010206-506	Categorical	8.8	tons/day		Moist	Shingle Creek	Chloride	2/14/2007
Crystal City	MS400012	Shingle Creek Chloride TMDL	07010206-506	Categorical	4.5	tons/day		Mid-Range	Shingle Creek	Chloride	2/14/2007
Crystal City	MS400012	Shingle Creek Chloride TMDL	07010206-506	Categorical	3.4	tons/day		Dry	Shingle Creek	Chloride	2/14/2007
Crystal City	MS400012	Shingle Creek Chloride TMDL	07010206-506	Categorical	1.9	tons/day		Low	Shingle Creek	Chloride	2/14/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-01	Categorical	0.9	kg/day Average Precipitation Year		N/A	North Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-02	Categorical	0.4	kg/day Average Precipitation Year		N/A	Middle Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-03	Categorical	1.5	kg/day Average Precipitation Year		N/A	South Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0058-00	Categorical	0.5	kg/day Average Precipitation Year		N/A	Ryan Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-01	Categorical	1.7	kg/day Wet Precipitation Year		N/A	North Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-02	Categorical	0.7	kg/day Wet Precipitation Year		N/A	Middle Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-03	Categorical	2.3	kg/day Wet Precipitation Year		N/A	South Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0058-00	Categorical	0.8	kg/day Wet Precipitation Year		N/A	Ryan Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-01	Categorical	0.8	kg/day Dry Precipitation Year		N/A	North Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-02	Categorical	0.3	kg/day Dry Precipitation Year		N/A	Middle Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0042-03	Categorical	1.5	kg/day Dry Precipitation Year		N/A	South Twin Lake	Phosphorus	11/9/2007
Crystal City	MS400012	Twin and Ryan Lakes Nutrient TMDL	27-0058-00	Categorical	0.4	kg/day Dry Precipitation Year		N/A	Ryan Lake	Phosphorus	11/9/2007

Compliance Schedule PART II.D.6.f.-g.

Is your MS4 currently meeting its WLA for any approved TMDLs? **Go to:** **Go to:**

☑ **NO** (Complete Table 1, Strategies for continued BMP implementation beyond the term of this permit, and Table 2 below) Table 1 Strategies…

☐ **YES** (Provide the following information below)

If YES, indicate the WLAs (may be grouped by TMDL Project) you believe are reasonably being met. For each WLA, list the implemented BMPs and provide a narrative strategy for the long-term continuation of meeting each WLA. PART II.D.6.g.(1)-(2)

TABLE 1

Interim Milestone (Best Management Practice)	BMP ID	Implementation Date	Shingle Creek and Bass Creek Biota and Dissolved Oxygen TMDL-NBOD	Shingle Creek Chloride TMDL Phosphorus	Twin and Ryan Lakes Nutrient TMDL - Phosphorus
Public Education - Brochures and newsletter articles on illicit discharges	BMP 1-3	ongoing	X	X	X
Illicit Discharge Ordinance	BMP 3-1	2014	X	X	X
Increase Infiltration in Watershed	BMP 4-1	ongoing with re-development	X	X	X
Retrofit BMPs to add stormwater treatment in the watershed	BMP 4-2	ongoing with re-development	X	X	X
Stormwater Pond/BMP Inspection	BMP 4-3	ongoing	X	X	X
Construction Site runoff Control- Ordinance and inspection	BMP 5-1	ongoing	X	X	X
Street Sweeping Best Management Practices including: Sweeper calibration, Covering deicer stock piles, Operator Training, and Clean up of snow stockpiles.	BMP 6-1	ongoing	X	X	X

Strategies for continued BMP implementation beyond the term of this permit. PART II.D.6.f.(3)

The City will continue to practice BMPS outlined in the above table and in the City SWPPP and Stormwater Management Plan (SWMP). Since there are no projects identified for the City of Crystal, the City will pursue permanent BMPs as new development is proposed. The City will also use the results of the monitoring to pinpoint sources of TSS and actual loading levels.

Table 2

Target dates the applicable WLA(s) will be achieved. PART II.D.6.f.(4)

TMDL Project	Target Date to Achieve WLA
Shingle Creek and Bass Creek Biota and Dissolved Oxygen TMDL	2063
Shingle Creek Chloride TMDL - Phosphorus	2063
Twin and Ryan Lakes Nutrient TMDL - Phosphorus	2063

APPENDIX B – CRYSTAL STORMWATER CAPITAL IMPROVEMENT PROGRAM

Capital Improvement Plan - Storm Drainage Fund 515

Department	Year to Replace	Item	Cost	2018 Estimated Amounts	2019 Estimated Amounts	2020 Estimated Amounts	2021 Estimated Amounts	2022 Estimated Amounts	2023 Estimated Amounts	2024 Estimated Amounts	2025 Estimated Amounts	2026 Estimated Amounts	2027 Estimated Amounts	2028 Estimated Amounts	2029 Estimated Amounts
Storm water	2018	Dredge Winnetka pond	$ 1,000,000.00	$ 1,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Storm water	2019	Becker Park infiltration project [1]	$ 2,750,000.00	-	2,750,000	-	-	-	-	-	-	-	-	-	-
Storm water	2020	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	100,000	-	-	-	-	-	-	-	-	-
Storm water	2020	Brownwood pond dredging and expansion	$ 500,000.00	-	-	700,000	-	-	-	-	-	-	-	-	-
Storm water	2020	Saving for flood control structure replacement	$ 175,000.00	-	-	175,000	-	-	-	-	-	-	-	-	-
Storm water	2021	6804 - Gaulke Pond design, dredging, lift station rehab	$ 850,000.00	-	-	-	850,000	-	-	-	-	-	-	-	-
Storm water	2021	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	-	100,000	-	-	-	-	-	-	-	-
Storm water	2021	Saving for flood control structure replacement	$ 175,000.00	-	-	-	175,000	-	-	-	-	-	-	-	-
Storm water	2022	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	-	-	100,000	-	-	-	-	-	-	-
Storm water	2022	W. Broadway and Kentucky Infiltration	$ 150,000.00	-	-	-	-	150,000	-	-	-	-	-	-	-
Storm water	2022	Saving for flood control structure replacement	$ 175,000.00	-	-	-	-	175,000	-	-	-	-	-	-	-
Storm water	2023	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	-	-	-	100,000	-	-	-	-	-	-
Storm water	2023	Pond Dredging	$ 700,000.00	-	-	-	-	-	700,000	-	-	-	-	-	-
Storm water	2023	Equipment Replacement	$ 20,000.00	-	-	-	-	-	20,000	-	-	-	-	-	-
Storm water	2023	Saving for flood control structure replacement	$ 50,000.00	-	-	-	-	-	50,000	-	-	-	-	-	-
Storm water	2024	Equipment Replacement	$ 20,000.00	-	-	-	-	-	-	20,000	-	-	-	-	-
Storm water	2024	Rate Control,water quality, structure Rehab projects	$ 100,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -
Storm water	2024	Saving for flood control structure replacement	$ 175,000.00	-	-	-	-	-	-	175,000	-	-	-	-	-
Storm water	2025	Bassett Creek Park Pond Dredging and 29th culver replacement	$ 2,500,000.00	-	-	-	-	-	-	-	2,500,000	-	-	-	-
Storm water	2025	Equipment Replacement	$ 20,000.00	-	-	-	-	-	-	-	20,000	-	-	-	-
Storm water	2025	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	-	-	-	-	-	100,000	-	-	-	-
Storm water	2025	Saving for flood control structure replacement	$ 175,000.00	-	-	-	-	-	-	-	175,000	-	-	-	-
Storm water	2026	Equipment Replacement	$ 20,000.00	-	-	-	-	-	-	-	-	20,000	-	-	-
Storm water	2026	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	-	-	-	-	-	-	100,000	-	-	-
Storm water	2026	Saving for flood control structure replacement	$ 175,000.00	-	-	-	-	-	-	-	-	175,000	-	-	-
Storm water	2027	Equipment Replacement	$ 20,000.00	-	-	-	-	-	-	-	-	-	20,000	-	-
Storm water	2027	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	-	-	-	-	-	-	-	100,000	-	-
Storm water	2027	Saving for flood control structure replacement	$ 175,000.00	-	-	-	-	-	-	-	-	-	175,000	-	-
Storm water	2028	Equipment Replacement	$ 20,000.00	-	-	-	-	-	-	-	-	-	-	20,000	-
Storm water	2028	Rate Control,water quality, structure Rehab projects	$ 100,000.00	-	-	-	-	-	-	-	-	-	-	100,000	-
Storm water	2028	Saving for flood control structure replacement	$ 175,000.00	-	-	-	-	-	-	-	-	-	-	175,000	-
Storm water	2029	Equipment Replacement	$ 20,000.00	-	-	-	-	-	-	-	-	-	-	-	20,000
Storm water	2029	Saving for flood control structure replacement	$ 175,000.00	-	-	-	-	-	-	-	-	-	-	-	175,000
Storm water	2029	Yunkers Park storage project	$ 1,500,000.00	-	-	-	-	-	-	-	-	-	-	-	1,500,000
				$ 1,000,000	$ 2,750,000	$ 975,000	$ 1,125,000	$ 425,000	$ 870,000	$ 295,000	$ 2,795,000	$ 295,000	$ 295,000	$ 295,000	$ 1,695,000

(1) Secured grants of $1,375,000 have been included in the cash flow analysis below.