



Local Surface Water Management Plan

City of Maple Grove

February 2009

Project Number: 116-07-221



February 3, 2009

Rick Lestina
Water Resources Engineer
City of Maple Grove
12800 Arbor Lakes Parkway
Maple Grove, Minnesota 55369

Re: Final Report
Local Surface Water Management Plan
Project Number: 116-07-221

Dear Mr. Lestina,

With this letter we formally transmit the final report of the Local Surface Water Management Plan for the City of Maple Grove. This plan is intended to be a component of the Maple Grove 2030 Comprehensive Plan. The LSWMP incorporates comments from Shingle Creek/ West Mississippi Watershed Management Organizations, Elm Creek Watershed Management Commission, Metropolitan Council and Maple Grove City Staff.

We would be pleased to discuss the contents of this report and the findings of our study with the City Council and Staff or other interested parties at any mutually convenient time.

Please don't hesitate to contact Earth Evans (651-604-4811) or Bob Barth (651-604-4740) with questions or comments.

Respectfully submitted,
BONESTROO

A large, stylized handwritten signature in black ink, appearing to read "Bob Barth".

Bob Barth
Project Manager

A smaller, more fluid handwritten signature in black ink, appearing to read "Earth Evans".

Earth Evans, P.E.
Water Resources Engineer

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Executive Summary

This Local Surface Water Management Plan will serve as a comprehensive planning document to guide the City of Maple Grove 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 three Watershed Management Commissions having jurisdiction within the City: Elm Creek Watershed Management Commission (WMC), Shingle Creek WMC, and West Mississippi WMC.

The preparation of this plan included a full review of the current surface water system in Maple Grove. The physical system was mapped to establish watershed sub-basins and runoff paths. This information was used to create a hydrologic model of the entire City, using HydroCAD modeling software. The modeled sub-basins and system layout are shown on the Drainage Map attached to this plan. Model input and results are summarized in Appendix C.

In the months and years ahead, the City will face multiple challenges in surface water management. Having applied for NPDES permit coverage, the City must now begin to implement new programs to address stormwater pollution. The governing Watershed Management Commissions within the City will continue to implement surface water standards that impact City reconstruction and development projects. The MPCA will continue to complete local TMDL studies that will lead to challenging implementation projects throughout the City. Growth in and around the City will put additional pressure on local surface water resources, while the aging infrastructure will require significant reconstruction and capital investment.

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.

The goals and policies outlined in this plan are grouped by their relationship to the key issues listed below:

- Section 7.2 Land Development and Redevelopment – Goals and policies to prevent flooding and adverse impacts to water resources from land disturbance and impervious surfaces.
- Section 7.3 Water Resource Management – Goals and policies for managing Maple Grove's wetlands, lakes, streams and groundwater, to preserve the functions and values of these resources.
- Section 7.4 Management of Floodplains, Shorelands and Natural Areas – Goals and policies for managing these areas, to preserve the functions and values of these resources.
- Section 7.5 Citywide Program Elements - Goals and policies for managing water resources and drainage systems on a citywide scale, to effectively achieve surface water management goals.
- Section 7.6 Support of Other Agencies - Goals and policies to coordinate local surface water management with the work of Watershed Management Commissions and state agencies.

This Surface Water Management Plan will be incorporated into the City's 2008 Comprehensive Plan update and will be applicable until 2018, at which time an updated plan will be required. Periodic amendments

may be required to incorporate changes in local practices. In particular, changes in the three applicable Watershed Management Plans may require revisions to this plan.

Section 1 - Purpose and Scope

1.1 PURPOSE

This Local Surface Water Management Plan will serve as a comprehensive planning document to guide the City of Maple Grove 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 *2030 Water Resources Management Policy Plan*, and the three Watershed Management Commissions having jurisdiction within the City: Elm Creek Watershed Management Commission, Shingle Creek Watershed Management Commission, and West Mississippi Watershed Management Commission. This plan may be periodically amended to remain current with local practices and policies.

1.2 SCOPE

This plan is organized as follows:

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 Maple Grove, and past studies and agreements related to surface water resources.

Section 6 summarizes the inventories, assessments and modeling completed for this plan, and provides a current assessment of surface water management in Maple Grove.

Section 7 lists the goals and policies identified to address surface water management needs in the City.

Section 8 summarizes current ordinances and capital projects planned to implement the goals and policies listed in Section 7.

Section 9 outlines the continued administration of this plan.

Section 2 – Physical Setting

2.1 LOCATION AND HISTORY

The City of Maple Grove is located in the northwestern portion of the Twin Cities Metropolitan Area in north-central Hennepin County (**Figure 2.1**). Winnebago Indians were the only inhabitants of the Maple Grove area until European settlers arrived in the mid-19th century. Early industry in the City centered on potato farming and sawmill and creamery operations. The City maintained a primarily agricultural identity until after World War II when the population of Maple Grove began to accelerate. The population in 1880 was 1,155. In 1950, population had increased to 1,778. In 1990 Maple Grove’s population was 38,756 and by the end of 2005, it was over 55,000.

Maple Grove’s population is anticipated to continue to grow through 2030, as shown in **Table 2.1**, and remains one of the state’s fastest growing and dynamic cities. Strong City management and excellent location has allowed high quality residential, commercial and industrial growth to take place. Portions of the City still have a unique rural flavor and the City has an exceptional parks and recreation program with over 40 developed parks.

TABLE 2.1 MAPLE GROVE POPULATION

Year	Population	Number of Households
2000	49,253	17,145
2010	63,500	24,500
2020	75,359	30,144
2030	84,000	34,000

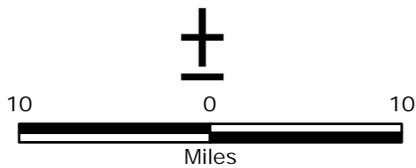
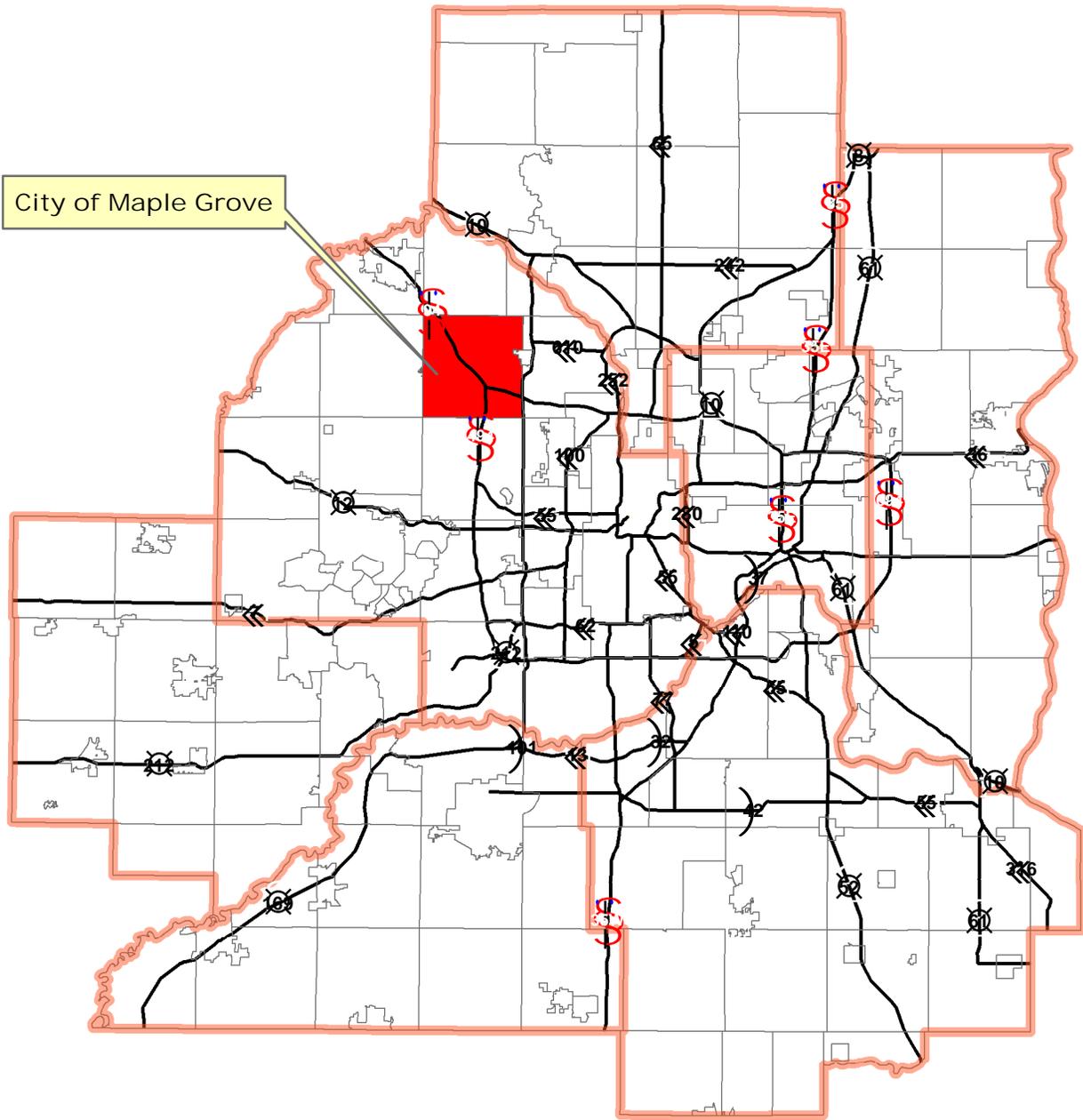
Source: Metropolitan Council - 2030 January 2007 Water Resources Policy Forecasts

2.2 TOPOGRAPHY

The terrain in most of Maple Grove can be described as gently rolling with large depressions covered by lakes and wetlands. The northeastern corner of the City is a glacial outwash plain characterized by extremely flat topography.

The dominant geological feature in Maple Grove is remnants of the deteriorating Grantsburg sublobe of the Wisconsin glaciation which had stagnated over the area some 16,000 years ago. This feature is referred to as the Emmons-Faribault moraine. This moraine is characterized by a rolling topography with a relief of 20 to 30 feet. The northeastern portion of the City is part of the Mississippi Valley outwash plain. This area is characterized by a nearly level topography that was formed by glacial till within and on top of the glacier deposited by the meltwater from the rapidly melting glacier. Depressions formed by the melting ice became lakes of which most are now wetlands by the process of natural eutrophication over time.

City of Maple Grove



Surface Water Management Plan



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Figure 2.1 Location Map



2.3 SOILS AND SURFICIAL GEOLOGY

The Soil Conservation Service (SCS) published the *Hennepin County Soil Survey* in 2004. The *Soil Survey* provides mapping and physical properties for soil types found in the area.

The *Soil Survey* assigns each soil type to a hydrologic soil group (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.

Table 2.2 lists the relative amount and primary hydrologic soil group for the soil series identified within Maple Grove. The hydrologic soil classification map for Maple Grove is shown in **Figure A1.1**. The vast majority of the soils in Maple Grove are classified as HSG B. The *Soil Survey* did not assign specific soil types to the City's large gravel mining area and therefore no hydrologic soil group is associated with this area within the *Survey*. In these areas, the majority of soil is Heyder sandy loams and Heyder complexes, HSG B soils, and has a relatively high rate of infiltration.

TABLE 2.2 SOIL SURVEY DATA FOR MAPLE GROVE

Soil Series	% of study area	Primary Hydrologic Group
Hayden	32.2	B
Waterbody, GMA	9.2	--
Heyder	7.9	B
Cordova	6.8	C/D
Hamel	6.1	C
Glencoe	4.7	B/D
Nessel	4.4	B
Klossner	4.0	D
Boots	3.7	A/D
Dundas	3.0	B/D
Estherville	2.7	B
Erin	2.6	B
Dakota	2.2	B
LeSueur	1.4	B
Palms	1.3	A/D
Kalmarville	1.3	B/D
Kingsley	1.0	B

*Two hydrologic soil groups such as B/D indicate a soil group's properties in a drained/undrained condition.

All of Maple Grove is within the Grantsburg Loamy Till Plain, which covers extensive parts of northern and western Hennepin County. The loam of the Grantsburg Till Plain varies in thickness but is usually more than forty feet thick.

The undeveloped portions of Maple Grove are within two landscapes of this surficial glacial formation: the Corcoran Till Plain and, to a lesser extent, the Rogers Till Plain. The Corcoran is the flatter of the two. A third, closely related landscape that was mostly developed for urban purposes by 1998 is the Fish Lake Highlands.

The Rogers Plain, found in only three northwestern Sections of Maple Grove, has formations of plateaus and broad lowlands. The land falls and rises imperceptibly to form low mounds and shallow closed depressions that express a gentle relief. The elevation difference between the mounds and shallow depressions is less than ten feet. Other instances of the Rogers Plain are found in the Cities of Corcoran and Hassan.

The Corcoran Plain, covering most of the undeveloped portions of the city, has more relief than the Rogers Plain. It is gently undulating with wet basins, low knolls and low ridges. Swales lined with black soil run downhill between grayish brown soils and outlet into marshy lakes. This is also prime agricultural soil. However, it is judged to be less picturesque than the Fish Lake Highlands because it has less change in elevation.

Soil wetness is a problem in the Grantsburg Till Plain. There are numerous lakes, wetlands and drainage channels. Vertical water drainage is blocked by a layer of "tight" soils, leading to wet basements on hilltop sites, road heaving, septic tank backups during wet periods, and stunted corn. About seventy percent of this landscape has a seasonal high water table within three feet of the surface.

2.4 CLIMATE

Climate data for Maple Grove (Station 218037) are published by the National Weather Service (NWS) station at Chanhassen, MN. The NWS is a branch of the National Oceanic and Atmospheric Administration (NOAA). **Tables 2.3 and 2.4** provide a summary of precipitation and snowfall data for Maple Grove.

Rainfall frequency estimates are used as design tools in water resource projects. Rainfall frequencies are summarized in *Technical Paper No. 40, Rainfall Frequency Atlas of The United States*, published by the U.S. Weather Bureau in 1961. The U.S. Weather Bureau was combined with other agencies in 1970 to form the National Oceanic and Atmospheric Administration (NOAA). **Table 2.5** lists rainfall frequencies for Maple Grove.

TABLE 2.3 AVERAGE MONTHLY PRECIPITATION, 1971-2000

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
inches	1.02	0.72	1.78	2.86	3.58	4.77	4.70	4.92	3.57	2.61	2.15	0.93	33.61

TABLE 2.4 AVERAGE MONTHLY SNOWFALL, 1971-2000

Month	NOV	DEC	JAN	FEB	MAR	APR	ANNUAL
Snow(in)	7.2	7.2	11.4	6	8.4	0.9	41.1

TABLE 2.5 24-HOUR RAINFALL DEPTHS AND FREQUENCY

Recurrence Interval (yrs)	24-hr Rainfall Depth (in)
1	2.4
2	2.8
5	3.5
10	4.2
25	4.7
50	5.2
100	5.9

2.5 WATER RESOURCES

Surface water resources within Maple Grove include several lakes, ponds, wetlands, and streams. The Minnesota Department of Natural Resources (DNR) has regulatory jurisdiction over the lakes, wetlands, and watercourses defined as public waters within the State. **Figure A1.2** shows a map of the DNR Public Waters/Wetlands Map located within the City.

2.5.1 STREAMS

Elm Creek, Rush Creek, Eagle Creek, Pike Creek and their tributaries provide an efficient means to drain the majority of the City of Maple Grove. Because such a large portion of the study area drains to these creeks, it is important that the creeks be protected from the increase in runoff rates and volumes that can result from development.

Elm Creek represents the main natural drainage feature within the City. The creek crosses Highway 10, Interstate 94 and Highway 101 as it generally flows southwest to northeast from Plymouth across the center of the City to Dayton. Elm Creek eventually empties into the Mississippi River in the City of Champlin. The majority of Maple Grove drains directly to Elm Creek or one of its tributaries. Elm Creek has been classified as impaired by the MPCA due to low oxygen (**Table 6.2**).

Maple Creek is a tributary to Elm Creek that enters the City at the western boundary in the southwest corner of the City and flows northeast to its confluence with Elm Creek, approximately one half mile east of Lawndale Lane. The Maple Creek has been restored downstream of its crossing at Bass Lake Road and remains as a ditched section upstream of that location.

The **North Fork of Rush Creek** flows southeast across the Dayton-Maple Grove border in the northwest corner of the City before emptying into the main stem of Rush Creek. A portion of the northwest portion of the City drains directly to the North Fork. The confluence of the main stem and North Fork form a large wetland just upstream of the main stem crossing west of Interstate 94.

Rush Creek flows northeast across the Corcoran-Maple Grove border and continues across the northwest corner of the City before it converges with the North Fork of Rush Creek where it turns east, generally following the Dayton-Maple Grove border to its confluence with Elm Creek. Rush Creek drains a relatively large amount of the land area in the northwest corner of the City. Rush Creek has been identified as impaired for a Fish Index of Biological Integrity (IBI) by the MPCA (**Table 6.2**). A Fish IBI is a scientifically validated combination of measurements concerning fish communities.

Eagle Creek provides conveyance of outflow from Eagle Lake. The creek flows east, across Highway 169, to Brooklyn Park where it empties into Bass Creek. The Eagle Creek watershed, consisting mainly of drainage to Eagle Lake, is almost entirely developed and includes portions of the drainage system for Highways I-94/694.

Pike Creek is a small stream that drains to Pike Lake and has a length of approximately 7,500 feet. The creek flows in a southeasterly direction and crosses Hemlock Lane upstream of Pike Lake. A stream restoration project completed in 2001 corrected severe erosion along 1,300 feet of channel downstream of Hemlock Lane. The headwaters of Pike Creek consist of a small wetland east of I-494. The majority of the Pike Creek drainage area consists of low density residential and commercial land use.

Rosemary Creek extends from Plymouth (Mud Lake) about one and two-thirds miles, northwest across Vicksburg Lane to its confluence with Elm Creek, about 2000 feet south of Bass Lake Road. The headwater of the creek flows through a sequence of wetland basins encompassed in agricultural land. It subsequently flows through a large, medium-low density residential development before crossing a large sequence of shallow marsh surrounding Vicksburg Lane.

Nottingham Creek commences at Bass Lake Road and flows one and one-quarter miles north to its confluence with Elm Creek at about one third mile southwest of Weaver Lake Road. The creek is primarily encompassed within large areas of wetland marsh.

2.5.2 LAKES

Maple Grove's numerous lakes are described below and help to define the City's identity, enhance its aesthetics, and provide recreational opportunities for its residents. Table 2.6 follows the lake descriptions and is included to summarize the lake's ordinary high water levels (OHWs) as set by the DNR.

Mud Lake (DNR Lake # 27-0112) is located in the northeast portion of the City entirely within the Elm Creek Park Reserve and covers approximately 65 acres. Mud Lake is actually classified as a wetland. The Mud Lake watershed is nearly 300 acres and consists primarily of park land with some single family and medium density residential land uses. Mud Lake drains southwest to the Elm Creek.

Cook Lake (DNR Lake # 27-0120-02) is a small lake located on the western border of Maple Grove northwest of Highway 101. The lake covers approximately 16 acres, has an average depth of seven feet and has a maximum depth of 20 feet. The Cook Lake watershed consists mainly of golf course and rural residential land uses. Cook Lake drains north via a series of wetlands through Corcoran to the South Fork of Rush Creek.

Fish Lake (DNR Lake # 27-0118) is located in the south central portion of the City, southwest of Interstate 94. The majority of land use within the Fish Lake watershed is classified as low density residential. The lake has an area of approximately 244 acres and an average depth of 19 feet. The lake discharges north across Weaver Lake Road and Interstate 94 to Rice Lake. The Fish Lake Regional Park, administered by the Three Rivers Park District, is situated on the south side of the lake and provides access for fishing and boating. Extensive long term water quality and water level monitoring has been performed on the lake by the Three Rivers Park District and the ECWMC since 1980 and the lake is listed as a water body of concern for water quality in the ECWMC Management Plan (**Section IV**). A Fish Consumption Advisory has been issued for the lake by the MPCA (**Table 6.2**).

Rice Lake (DNR Lake # 27-0116) is located in the center of the City, northeast of Interstate 94. This large, relatively shallow lake is actually an impoundment created by a dam in Elm Creek has a surface area of approximately 314 acres and a maximum depth of approximately 11 feet. The majority of the lake's watershed is residential. Elm Creek empties into the northwestern corner of the lake beneath Interstate 94 and departs from the northeast portion of the lake before it flows north through the City. The City maintains a public access on the north side of the lake which supports a fishery of panfish and Northern pike. Water quality information has been collected for Rice Lake by the Citizen Lake Monitoring Program (CAMP), the City and the ECWMC.

Weaver Lake (DNR Lake # 27-0117) is situated in the east central portion of the City, east of Troy Lane and south of Weaver Lake Road. The lake has a maximum depth of 57 feet and comprises an area of 149 acres. The lake discharges southeast to Elm Creek and its watershed primarily consists of low density residential land use which has been fully developed since the mid-90s. Water level elevations have been recorded on the lake since 1988. Extensive water quality monitoring has been performed by the ECWMC since 1980 and the lake is listed as a water body of concern for water quality in the ECWMC Management Plan (**Section IV**). A Fish Consumption Advisory has been issued for the lake by the MPCA (**Table 6.2**).

Cedar Island Lake (DNR Lake # 27-0119) is situated in the southeast quadrant of the City, east of Interstate 494 and south of Interstate 94/694. Along with Eagle Lake and Pike Lake, it forms a chain of lakes known as the Eagle Lake chain. This small, shallow lake encompasses approximately 81 acres and has a median depth of five feet and a maximum depth of seven feet. The lake has a watershed area of approximately 642 acres and a pumped outlet to storm sewer that ultimately drains to Eagle Lake. Water levels have been recorded on Cedar Island Lake dating back to 1964. Monitoring has revealed that the lake is subject to poor water quality and clarity which has led to the lake being listed as impaired for excess nutrients (**Table 6.2**). A draft TMDL has been commissioned by the Shingle Creek Watershed Management Commission to address the impairment in Cedar Island, Eagle and Pike Lakes (**Section 4.7**).

Eagle Lake (DNR Lake # 27-0111-01) is located approximately one mile southeast of Cedar Island Lake, southwest of the intersection of Interstate 94/694 and Highway 169. Along with Cedar Island Lake and Pike Lake, it forms a chain of lakes known as the Eagle Lake chain. Eagle Lake has a surface area of 291 acres, an average depth of 12.5 feet, and a maximum depth of 34 feet. Approximately 2,879 acres drain to the lake. Riparian wetlands surround the lake, and several channels have been cleared through the emergent vegetation to provide boat access for lakeshore properties. Eagle Lake discharges through Eagle Creek to the east. Shingle Creek is formed about one-half mile to the east, where Eagle Creek joins with Bass Creek.

Pike Lake (DNR Lake # 27-0111-01) is located southwest of and immediately adjacent to Eagle Lake. Along with Cedar Island Lake and Eagle Lake, it forms a chain of lakes known as the Eagle Lake chain. The Pike Lake drainage area is approximately 1,071 acres in size and is conveyed downstream via Pike Creek. Pike Lake has a surface area of approximately 58 acres, an average depth of 7 feet, and a maximum depth of 22 feet. Most of the Pike Lake watershed is developed with some pockets of vacant land available for commercial development. Pike Lake drains via channel directly to Eagle Lake. Pike Lake is listed as impaired for excess nutrients by the MPCA (**Table 6.2**).

TABLE 2.6 LAKE ORDINARY HIGH WATER LEVELS (OHW)

Lake	OHW (el. above MSL)
Mud	872.4
Cook	940.8
Fish	891.8
Rice	891.4
Weaver	915.1
Cedar Island	902.4
Eagle	874.2
Pike	

2.5.3 WETLANDS

Approximately 950 wetland basins have been identified in Maple Grove based on the City’s 2007 wetland evaluation (shown on **Figure A1.2**). All wetlands have some U.S. Army Corps of Engineers (USCOE section 404) regulations restricting dredge and fill activities. Approximately 75 of the City’s wetlands are also regulated by the DNR under the Minnesota Protected Waters and Wetlands program. The remainder of the wetlands will also be regulated by the City under the Minnesota Wetland Conservation Act of 1991.

Many of the wetlands in Maple Grove have been impacted by either agriculture or urbanization. Wetlands located in agricultural areas may have supported diverse vegetation prior to non-native settlement. Drainage and agricultural use generally leave behind wetlands with non-native plants such as reed canary grass. Some of these wetlands can be restored by plugging drain tiles, increasing the water level, or improving water quality in the runoff entering the wetland. Several of the wetlands in Maple Grove contain small portions of undisturbed characteristics that show they were once of higher quality.

As previously stated, the City acts as the LGU responsible for protection of many of the City’s wetlands under the Wetland Conservation Act. As the LGU, the City inventories and assesses the wetlands in the City to determine restoration opportunities and levels of protection needed prior to the development of their surrounding areas. The City’s wetland inventory evaluates the condition of wetlands and establishes management criteria and priority status for the protection and management of wetlands and adjacent natural resources (forests, lakes, and streams).

2.6 NATURAL RESOURCES

The Minnesota Department of Natural Resources Natural Heritage Database identifies several plant communities as moderate to outstanding diversity along with several rare species occurrences within the City. Many of these are associated with the City’s key water resources, particularly Elm Creek, Rush Creek and their tributaries.

The City contains endangered animal species that have been identified in and near Fish Lake along with a number of maple-basswood forest areas (Elm Creek Watershed Management Plan, 2003). Table 2.7 lists rare species that are identified within the City, current status, and typical habitat types in which they would utilize.

TABLE 2.7 RARE SPECIES IDENTIFIED IN MAPLE GROVE

Common Name	Scientific Name	State Status	Habitat
Birds			
Acadian flycatcher	<i>Empidonax virescens</i>	Special Concern	Large tracts of deciduous forest
Bald eagle	<i>Haliaeetus leucocephalus</i>	Special Concern	Tall trees, lakes and wetlands
Henslow's sparrow	<i>Ammodramus henslowii</i>	Endangered	Grasslands
Trumpeter swan	<i>Cygnus buccinators</i>	Threatened	Emergent marsh, small ponds and lakes
Reptiles and Amphibians			
Blanding's turtle	<i>Emydoidea blandingii</i>	Threatened	Emergent marsh, ponds, and grasslands
Fish			
Pugnose shiner	<i>Notropis anogenus</i>	Special Concern	Vegetated shorelines of lakes and streams
Plants			
American ginseng	<i>Panax quinquefolius</i>	Special Concern	Deciduous forests

A Natural Resource Inventory was completed in 2005 using Minnesota Land Cover Classification System (MLCCS) to assign codes to different land cover types based on plant communities. Several areas were identified as high value communities with many corresponding to water features throughout the City. The communities include forest, woodland, shrubland, herbaceous, and open water habitats. This inventory allows the City to identify high value natural communities to protect, maintain, and even restore.

The Metropolitan Council identifies the following lakes within the City as Priority Lakes: Weaver Lake, Fish Lake, Eagle Lake, and Pike Lake. Priority Lakes are those that have been identified as being of highest priority for the development of management plans and for improvement. Special precautions are taken by the City to help protect these lakes and limit the amount of disturbance.

The City is developing a connected greenway system that provides buffers and protection for wetlands and creeks. Trails within the greenway system provide opportunities for Maple Grove residents to view and learn about the City's water and natural resources. These greenways also allow wildlife a natural environment to move between differing habitat types by limiting their encounter with more dangerous open areas. The metro greenway corridor currently encompasses the northern portion of Elm Creek and portions of Rush Creek within the City.

Additional natural resources information for Maple Grove is available in the watershed management plans adopted by Elm Creek Watershed Management Commission, and the West Mississippi and Shingle Creek Watershed Management Commission.

2.7 DRAINAGE SYSTEM

The City is well drained by a system of creeks that flow through and/or out of the City. The main drainage basin in the Shingle Creek watershed, Eagle Lake, is a headwater for Eagle Creek, a direct tributary of Shingle Creek. The remaining portions of the Shingle Creek watershed are drained by natural or man made ditches that flow into Shingle Creek. Shingle Creek eventually conveys surface drainage into the Mississippi River.

The northeastern portion of the City is part of the Mississippi River basin. Drainage from this area flows through Brooklyn Park by a series of natural ditches and stormwater facilities. The remainder of the City is drained by Elm Creek or its tributaries. Elm Creek flows into Maple Grove from Plymouth in the southwestern corner of the City. The creek meanders northerly through the City into Rice Lake, a man made lake created by the construction of a dam across the Elm Creek channel. An unnamed tributary from the southeasterly corner of Corcoran flows across the southwestern corner of the City into Elm Creek prior to its confluence with Rice Lake.

The northwestern portion of the City is drained by the North Fork of Rush Creek, and Rush Creek. These two creeks flow out of Corcoran across the northern portion of the City and discharge into Elm Creek near its outlet of the City. Drainage through the Elm Creek watershed eventually discharges into the Mississippi River.

2.8 PLANNING AND DEVELOPMENT

2.8.1 COMPREHENSIVE PLANS

The City of Maple Grove's current comprehensive *Land Use Plan* was adopted in 1999. The City revised the plan in 2000, 2004, and has also completed their 2008 update. The plan recognizes the need to preserve and enhance the large number of lakes, wetlands, streams and floodplain areas within the City and states that these features will continue to be a major factor in the City's planning and land use decisions. The City has established a Comprehensive Plan Review Committee that meets on an ongoing basis to discuss necessary plan changes and amendments.

Maple Grove's Gravel Mining Area consists of almost 2,000 contiguous acres of active and retired mining areas located in the southeast portion of the City. The *Gravel Mining Area Special Area Plan* was prepared by the City in 1996 to guide redevelopment of the site. An environmental impact statement (known as an Alternative Urban Area-wide Review) was completed in 1997 to expedite later agency approvals. The Metropolitan Council approved a Major Plan Amendment to the City's comprehensive *Land Use Plan* based on the *Special Area Plan*. The Special Area Plan recognizes that redevelopment of the Gravel Mining Area to residential, commercial and industrial land uses will not affect natural surface water features and that, for many years, there has been no stormwater flow from the Gravel Mining Area into Shingle Creek because the gravel mining activities have kept all stormwater on site. As the area develops, stormwater will be diverted into the Creek within the rates specified in this Plan.

2.8.2 LAND USE

Proposed land uses within the City are shown in **Figure A1.3**. Existing land uses are shown on **Figure A1.6**. Single-family uses cover a majority of the City. Commercial and business uses are concentrated along the major highways that dissect the City. Park and open space uses are located throughout the community,

with the largest areas in the northeast and southwest portions of the City within the Elm Creek Park Reserve and Fish Lake Regional Park.

Section 3 – Regulatory Setting

3.1 CITY SERVICES

Maple Grove’s Department of Engineering manages the City’s stormwater infrastructure and is responsible for the monitoring and maintenance of storm sewers, ponding areas, water quality devices and outlet control structures. The Department also provides the design, operation, and maintenance necessary to minimize local flooding and improve water quality in the City’s stormwater system and also coordinates with Watershed Management Commissions and other outside agencies in water resource management and conservation.

An assessment of the City ordinances pertaining to surface water management and protection is presented in **Section 6.1**.

3.2 HENNEPIN COUNTY

Hennepin County, originally part of Dakota County, was created in 1851. The County provides many services within the City of Maple Grove, including health services and property and vital records. The County has authority to review and comment on this Plan.

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 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.

3.3 HENNEPIN CONSERVATION DISTRICT (HCD)

In the 1930’s, Soil and Water Conservation Districts were created in response to national concern over erosion and floods. These Districts were organized along county boundaries with the purpose of managing and directing conservation programs and assisting landowners in conserving soil and water resources. The Hennepin Soil and Water Conservation District was established in 1949 through State Statute 103C.

The HCD provides technical assistance to county residents, local government units, watersheds and other agencies. The HCD assists with implementation of natural resource management plans, the Wetland Conservation Act, natural resource education, and application of sound natural resource practices. HCD programs are funded through County allocation, grants, contracts with local government units, contracts with watersheds, and state and federal cost share. Within the City of Maple Grove, the HCD provides administration and technical services, including project review, for the Elm Creek and Pioneer-Sarah Watershed Management Commissions.

3.4 THREE RIVERS PARK DISTRICT

Three Rivers Park District is an independent, special park district established by the State Legislature in 1957. As a special park district, Three Rivers Park District is charged with the responsibilities of acquisition, development and maintenance of large park reserves, regional parks and regional trails for the benefit and use of the citizens of suburban Hennepin County, Scott County, the metropolitan areas, and the State of Minnesota.

The Three Rivers Park District is also responsible for managing the Park District's water resources in cooperation with the surrounding communities and Watershed Management Commissions in a way that is environmentally responsible and that will maintain lake water quality at or above the levels experienced in 1989. Within the City of Maple Grove, the Park District manages Elm Creek Park Reserve, Fish Lake Regional Park and Eagle Lake Regional Park.

3.5 WATERSHED MANAGEMENT COMMISSIONS

In 1955, the Minnesota State Legislature established the Watershed Act. This act provided the means to create watershed districts (or similar), special purpose units of local government with broad authority to regulate land use planning, flood control and conservation issues. There are currently 46 watershed districts (or similar) in the state.

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 entity. A watershed management entity 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 entities within the metropolitan area.¹

The City of Maple Grove is divided into multiple drainage basins that flow to three separately managed watersheds. **Figure A1.4** shows the three Watershed Management Commissions with jurisdiction in the City. These agencies each have authority for review and approval of this local surface water management plan.

3.5.1 ELM CREEK WATERSHED MANAGEMENT COMMISSION (ECWMC)

ECWMC was formed in 1973 and covers portions of Champlin, Corcoran, Dayton, Maple Grove, Medina and Plymouth. ECWMC administration is provided by Hennepin County Environmental Services (HCES). ECWMC covers approximately 26.3 square miles in Maple Grove.

3.5.2 SHINGLE CREEK / WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSIONS (SC/WMWMC)

The Shingle Creek Watershed Management Commission (SCWMC) was formed in 1984 and covers portions of Brooklyn Center, Brooklyn Park, Crystal, Maple Grove, Minneapolis, New Hope, Osseo, Plymouth, and Robbinsdale. SCWMC covers approximately 7.7 square miles in Maple Grove. The West Mississippi Watershed Management Commission (WMWMC) was also formed in 1984, covers portions of Brooklyn Center, Brooklyn Park, Champlin, Maple Grove, and Osseo and occupies approximately 0.8 square miles in Maple Grove. Because many of the communities that are members of the SCWMC are also members of the

WMWMC, the WMCs often work jointly on issues of interest to both, have adopted similar standards, and have cooperatively prepared a Watershed Management Plan.

3.6 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. ²

The Metropolitan Council reviews municipal comprehensive plans, including this local surface water management plan. The Council adopted the *Water Resources Management Policy Plan* in 2005, establishing the expectations to be met in local plans. The Council's goals focus on water quality standards and pollution control, "to reduce the effects of nonpoint source pollution on the region's wetlands, lakes, streams and rivers." ³

3.7 STATE BOARD OF WATER AND SOIL RESOURCES (BWSR)

The Minnesota Board of Water and Soil Resources (BWSR) works through local government agencies to implement Minnesota's water and soil conservation policies. The BWSR is the administrative agency for soil and water conservation districts, watershed districts, Watershed Management Commissions and county water managers. The BWSR is responsible for implementation of the Metropolitan Surface Water Management Act and the Wetland Conservation Act. Staff members are located in eight field offices throughout the state. ⁴

First established in 1937 as the State Soil Conservation Committee, the agency became part of the University of Minnesota in the 1950's, 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. ⁵

In 1992, the BWSR adopted rules (8410), establishing the required content for local surface water management plans.

3.8 MINNESOTA POLLUTION CONTROL AGENCY (MPCA)

The MPCA is the state'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 the land, air and water. The MPCA regulates Maple Grove's management of wastewater, stormwater and solid waste. ⁶

The 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 polluted stormwater runoff. Maple Grove's most recent NPDES permit was granted in 2006 and will provide the City with coverage until 2011. To obtain coverage, the City was required to develop a stormwater 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

A copy of Maple Grove's SWPPP is included in Appendix E.

In addition to the NPDES program, the MPCA is required to publish a list of impaired waters; lakes and streams in the state that are not meeting federal water quality standards. For each water body on the list, the MPCA is required to conduct a study to determine the allowable Total Maximum Daily Load (TMDL) for each pollutant that exceeds the standards. The 2006 MPCA list of impaired waters identifies 2,250 TMDL reports needed for 1,297 lakes, rivers and streams in the state. Local governments will be required to incorporate completed TMDL studies into their surface water management plans. Impaired waters in Maple Grove are summarized in **Table 6.2**.

In response to these multiple regulatory activities, the MPCA published the *Minnesota Stormwater Manual* (Version 1.1, 2006), providing stormwater management tools and guidance. The Manual presents a unified statewide approach to stormwater practices.

3.9 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.

3.10 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.

3.11 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.

3.12 MINNESOTA DEPARTMENT OF TRANSPORTATION (MN/DOT)

Within the City, Mn/DOT administers several state highway systems. Mn/DOT approval is required for any construction activity within state right-of-ways. Mn/DOT also administers a substantial amount of funding for transportation projects completed in the City. Anticipated activities of Mn/DOT are periodically published in their State Transportation Improvement Plan (STIP). Mn/DOT is considered a Municipal Separate Storm Sewer System (MS4) responsible for stormwater runoff management from their property under the NPDES MS4 general permit. Mn/DOT owns highways I-94, I-494, I-694, and State Highway 81 within the Maple Grove City limits.

3.13 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 the result of the Clean Water Act, administered by the EPA.

3.14 U.S. ARMY CORP 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.

3.15 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. FEMA published the initial Flood Insurance Rate Map (FIRM) for Maple Grove in 1980. The effective FIRM was updated for Hennepin County, including Maple Grove, in 2004.

3.16 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 Washington and Ramsey Counties Minnesota* was published by the Soil Conservation Service in 1977. The SCS also developed hydrologic calculation methods that are widely used in water resources design.

3.17 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.

3.18 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

4.1 1996 MAPLE GROVE STORMWATER MANAGEMENT PLAN

The City's 1996 Stormwater Management Plan (SWMP) serves as the basis for this Plan. The 1996 SWMP identifies, from a regional perspective, the stormwater quantity and quality improvements within the City to address local and regional flooding issues, water quality improvement, infrastructure management, stormwater planning, etc. for future development, redevelopment, and capital improvement projects within the City.

To meet current stormwater management regulatory requirements, the City must update the 1996 SWMP to be in compliance with the various state, regional, and local agencies with jurisdiction in the City. The scope of this Plan includes key updates to portions of the 1996 SWMP including:

- Discussions regarding the current regulatory setting in which the Plan is being prepared
- Assessment of City's stormwater management system, identifying issues and possibly corrective actions
- The City's stormwater management goals and policies
- Implementation of the City's stormwater management system

4.2 2001 GRAVEL MINING AREA STORMWATER MANAGEMENT PLAN

The City's 2001 Gravel Mining Area Stormwater Plan represents the latest revision of the Storm Water Management Plan for the Gravel Mining Area. The original storm water management plan has been adjusted based on the AUAR and Special Area Plan described in **Section 2.9.1** as well as the development plans for Arbor Lakes, Maple Lakes and Boulder Ponds. The upgrade of CR 130 (Elm Creek Boulevard/77th Avenue) is also incorporated. The plan includes:

- Description of the proposed system including pipes and storm water ponds
- Discussion of the need to line storm water ponds
- Costs estimates of storm water facilities
- Cost allocations and new storm water rates
- Recommendations for implementation

4.3 2002 MAPLE CREEK DRAINAGE STUDY

The Maple Creek Drainage study, commissioned in 2001 by the City, presents recommendations for surface water management in the area tributary to Maple Creek. Maple Creek is a tributary to Elm Creek in

southwestern Maple Grove. The Study builds upon the City's 1996 SWMP. The City commissioned the study to address ongoing erosion concerns along the creek channel with a developing watershed.

The study recommends a surface water system to collect, store, treat, and convey surface water throughout the study area under ultimate development conditions.

4.4 2003 ELM CREEK WATERSHED MANAGEMENT PLAN (ELM CREEK WMP)

The ECWMC's Elm Creek Watershed Management Plan was completed in April 2003. The plan includes goals, policies and strategies for protection of water and natural resources within ECWMC's jurisdiction. Surface water management issues identified in the Plan specific to the City of Maple Grove relate to the water quality in Fish Lake, Rice Lake, Mud Lake, Weaver Lake, and Elm Creek. Broader issues identified for the entire watershed management area include flooding and rate control, water quality and quantity impacts on recreation and fish and wildlife, soil erosion, and inter-jurisdictional flooding. Specific issues identified within the City are identified in **Section 6.5**

4.5 2004 SHINGLE CREEK/WEST MISSISSIPPI SECOND GENERATION WATERSHED MANAGEMENT PLAN (SHINGLE CREEK/WEST MISSISSIPPI WMP)

The SCWM WMC completed its *Second Generation Watershed Management Plan* cooperatively in May 2004. A major plan amendment was adopted by both Commissions in December 2006. A major plan amendment in 2007 revised the capital improvement plan and plan amendment process and adopted a capital improvements cost share policy. A 2008 major plan amendment adopted revised rules effective 1/1/09. The plan provides a summary of the water and natural resources within the Commissions' boundaries and identifies several issues throughout. These issues relate to the management of stormwater runoff, erosion and sediment, wetland, lakes, streams, floodplains, groundwater, and public education. The plan identifies goals, policies and implementation actions targeting these issues.

4.6 2007 MAPLE GROVE NONDEGRADATION REPORT

The 2007 Maple Grove Nondegradation Report outlines the results of a loading assessment and nondegradation analysis completed for the City. The City was designated by the Minnesota Pollution Control Agency (MPCA) as one of the selected Municipal Separate Storm Sewer Systems (MS4) that is required to complete a nondegradation analysis as part of the National Pollutant Discharge Elimination System (NPDES) requirements. Cities are selected for this requirement based on high population growth from census data taken from 1990 to 2000 and projected growth as determined by Metropolitan Council and the State Demographer from 2000 to 2020.

Rules for completion of the nondegradation review are outlined in the MPCA's Permit No. MNR040000. Under the rules stated in the permit, the City is required to complete a loading assessment and a nondegradation report and submit the documents to the MPCA by September 3, 2007. The Report outlines the results of a water quality modeling and stormwater treatment analysis for systems that are in place within the City of Maple Grove. The Report outlines the results of the assessment which has been performed to estimate the changes in annual average flow volumes and total suspended solids and phosphorus loadings that may have occurred from 1988 to the present. The Report also anticipates changes

to future loading from current day conditions to the year 2020. Paraphrased from The Report are the following findings:

- Approximately 3,400 acres of agricultural land and 900 acres of open space were developed in the City of Maple Grove between 1988 and 2004. Of these areas 54% was transformed into single family residential, 14% into multi-family residential, 14% into commercial, 12% into industrial and 6% into institutional land uses.
- From 1988 to 2004 there was a net decrease in annual runoff volume, total phosphorus and total suspended solids on a city-wide basis. This reduction primarily occurred due to the change in land use from agricultural land to urban land uses. Other methods that led to a reduction in runoff volume are infiltration and evaporation that occurred in stormwater management ponds. Total phosphorus and total suspended solids reduction occurred due to sedimentation in stormwater management ponds that incorporated NURP treatment.
- On an individual site development basis, it is noted that a small number of selected developments did generate an increase in runoff volume and pollutant loading. This occurred in areas converted from open space to more intense urban land uses (typically commercial and industrial).
- Given the reductions in runoff volume, total phosphorus and total suspended solids loadings citywide, it is apparent that these selected areas with loading increases were offset by the reductions from agricultural areas that were developed.
- For future development, in cases where open space is converted into a higher density land urban development, if the City's policies were to incorporate infiltration of the first 0.5 inch of runoff from rainfall events, these increases in pollutant loadings could be eliminated.

The mitigation plan and management measures (again, paraphrased from The Report) are as follows:

- The City will develop a monitoring program to verify that the assumptions used in The Report relative to pollutant loadings, removal efficiencies and infiltration rates are reasonable.
- New development will be required to use enhanced BMPs as needed to comply with the nondegradation standard on a site by site basis.
- The City will work with the MPCA and the Watershed Districts as necessary in the future to address concerns regarding impaired water and will work to implement TMDL plans within the community to address these additional concerns as the plans are prepared.

Based on the loading assessment, the Report outlines a plan that the City can implement in the future to make certain that the City will be compliant with the nondegradation standards required by the MPCA. It is anticipated this mitigation plan will be incorporated into the City's Stormwater Pollution Prevention Program to remain compliant with NPDES permit requirements.

4.7 2006 CEDAR ISLAND, PIKE, EAGLE LAKES NUTRIENT TMDL

A draft version of the Cedar Island, Pike, Eagle Lakes Nutrient TMDL and implementation plan was completed in 2006 on behalf of the SC WMC. The TMDL is in its final stages of review by the MPCA and Environmental Protection Agency (EPA) and is expected to be approved in early 2009. The associated Implementation Plan will be adopted in November 2008 and is expected to be approved by the MPCA by the end of 2008. The goal of this TMDL is quantify the pollutant reductions needed to meet the water quality standards for nutrients in the three lakes. Cedar Island Lake would require a 67% decrease in the

phosphorus loads to meet water quality goals set by the MPCA. Pike Lake requires a 29% reduction and Eagle Lake a 26% reduction. Reductions in Pike Lake would benefit Eagle Lake. Internal loadings account for roughly 70% of the Cedar Island Lake loadings. Pike Lake is also significantly affected by internal loadings as is Eagle Lake, although it is difficult to determine to what extent this affects water quality in Eagle Lake. The six implementation principles developed are:

- Restore biological integrity
- Control internal load
- Retrofit BMPs
- Require load and volume reduction with new development
- Communication
- Stewardship

Preliminary strategies and recommended action items are also included in the TMDL to implement the calculated reductions for each lake.

4.8 2006 SHINGLE CREEK CHLORIDE TOTAL MAXIMUM DAILY LOAD (TMDL)

The Shingle Creek Chloride TMDL has been approved by the MPCA and an implementation plan has been completed. The TMDL analysis determined that the majority of chloride in the Shingle Creek watershed is derived from non-point sources including road deicing, commercial and industrial deicing, and fertilizer application, with the primary source being road salt and salt substitutes applied to the dense network of local roads and county and state highways in the watershed. The TMDL concluded that an overall 71% reduction in chloride load to Shingle Creek must be achieved to meet State chloride concentration standards. Aimed at reducing chloride loads to Shingle Creek, the implementation plan for this TMDL includes tables identifying the City's current activities and proposed BMPs or activities related to road deicing, grouped into the following categories:

- Protecting Deicer Stockpiles
- Operator Training
- Clean-up/Snow Stockpiling
- Ongoing Research Regarding Salt and Application Equipment Alternatives

4.9 2007 ELM CREEK CHANNEL STUDY

The ECWMC determined that stream bank stabilization and erosion control is a high priority issue in its 2003 Elm Creek Watershed Management Plan (**Section 4.1**) and therefore funded the Elm Creek Channel Study that commenced in 2005 and is completed. The ECWMC commissioned this study because there was a concern that the current level of rate controls required for new development may not be adequate to protect the stream channels in the watershed from current and future development pressure.

One of the goals of this study was to determine stable bankfull flow conditions for reaches of Elm, Rush, and Diamond Creeks, of which Elm and Rush Creeks are in the City of Maple Grove. Bankfull flow is defined as the maximum amount of discharge that a stream channel can carry without overflowing and is often the discharge that has the most impact on channel stability. A second goal of the study was to determine the actual rainfall events that create bankfull flow conditions. Based on this information, the study recommended changes to current rate control requirements that could provide a better level of protection for stream stability within the ECWMC and the City.

As a result of this study ECWMC developed an extended detention and/or runoff volume reduction requirement. This requirement is outlined in the copy of their rules attached in Appendix F and incorporated as a City policy in Section 7.

4.10 2005 SHINGLE CREEK CORRIDOR STUDY

While not directly in the City, a portion of Maple Grove is tributary to Shingle Creek which is listed as impaired by the MPCA. This study outlines projects to restore Shingle Creek through a capitol improvement plan and management methods. A detailed description of the water quality, habitat, biological characteristics and channel characteristics of the creek is provided.

4.11 2007 SHINGLE CREEK PHASE II CORRIDOR STUDY

This study was the second phase of the 2005 Shingle Creek Corridor Study and focused on the Bass, Eagle, Pike and Twin Creeks in the Shingle Creek watershed. (Note that a portion of Pike Creek is within Maple Grove on the southeast border through Pike and Eagle Lake). Stream conditions were quantified based on several elements including stream structure, habitat and channel condition. This serves as a baseline for evaluating future changes to the watershed and proposed improvements.

4.12 1999 EDWARD LAKE, PIKE LAKE, FISH LAKE, RICE LAKE, WEAVER LAKE, CEDAR ISLAND LAKE AND EAGLE LAKE MANAGEMENT PLANS

The City Water Quality Commission developed these plans for seven of the lakes within Maple Grove. The plans provide lake monitoring data, watershed and lake characteristics, lake goals, existing management methods and recommendations on mitigation measures to improve water quality. Summaries from each of these Lake Management Plans are provided in Appendix G and additional discussion is included in Section 6.3.

Section 5 – Water Resources Related Agreements

5.1 ELM CREEK WMC JOINT POWERS AGREEMENT

The ECWMC was formed in 1973 as a joint powers organization by the cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth and the Hennepin Conservation District. In 2004, Maple Grove became party to an amended and restated Joint Powers Agreement reestablishing the ECWMC with Champlin, Corcoran, Dayton Maple Grove, Plymouth, Rogers and Hassan Township. A copy of the Joint Powers Agreement (JPA) can be found in Appendix D.

5.2 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 Commission 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. A copy of the amended JPA can be found in Appendix D.

5.3 WEST MISSISSIPPI WMC JOINT POWERS AGREEMENT

Maple Grove was signatory to the 1984 Joint Powers Agreement (JPA), along with Brooklyn Center, Brooklyn Park, Champlin, and Osseo, which established the WM WMC. A copy of the JPA can be found in Appendix D.

Section 6 – System Assessment

6.1 REGULATORY STANDARDS ASSESSMENT

The City and a number of the regulatory agencies identified in **Section 3** of this Plan have a responsibility in regulating activities related to surface water management and protection within Maple Grove. **Table 6.1** summarizes the City’s and other agencies’ respective regulatory controls.

TABLE 6.1 REGULATORY CONTROL

Official Control	Responsibility*	Mechanism
Erosion and Sediment Control	City, WMC	Chapter 14, Article IV of the City Ordinances, Erosion and Sediment Control
Shoreland	City, WMC, DNR	Chapter 36, Article VII, Division 5, of the City Ordinances, Shoreland District
Floodplain	City, WMC, DNR	Chapter 36, Article VII, Division 4, of the City Ordinances, Floodplain District
Wetlands	DNR, COE, and TEP Members: City as LGU, HCD, & BWSR	Public Waters Rules (DNR). Section 404 of the Clean Water Act (COE). WCA (TEP Members). Chapter 36, Article VII, Division 7, of the City Ordinances, Wetland Systems District.
Illicit Discharge	City	Chapter 34, Article III, Divisions 106, 108, 111 and 117, of the City Ordinances, Utilities
Grading and Drainage	City, WMC	Chapter 30 of the City Ordinances, Subdivision Regulations. City grading permit. Site review - application of the requirements of this LSWMP and Design Standards (Appendix B).

*Acronym Definitions:

- BWSR - Minnesota Board of Water and Soil Resources
- COE - United States Army Corps of Engineers
- DNR - Minnesota Department of Natural Resources
- HCD - Hennepin Conservation District
- LGU - Local Government Unit (responsible for administering WCA)
- TEP - Technical Evaluation Panel (responsible for providing guidance to LGU)
- WCA - Wetland Conservation Act
- WMC - Watershed Management Commission

In addition to the regulations listed in **Table 6.1**, the City’s Parks and Recreation ordinance (City Code Chapter 22) contains the following regulations related to surface water management:

As listed in **Table 6.1**, the City is the Local Government Unit (LGU) for the Wetland Conservation Act. The City will continue to administer Wetland Conservation Act permits.

Development and redevelopment within Maple Grove is subject to review and approval from one of the three Watershed Management Commissions covering the City (**Figure A1.4**). Each watershed has established rules governing stormwater management and protection of natural resources. The City standards outlined in this LSWMP have been drafted to meet or exceed each of the most stringent rule’s intent of the three Watershed Management Commissions. The intent was to streamline the process by developing consistent requirements across the City, although any development or redevelopment will still be required to comply with City and the respective Watershed Management Commission depending on jurisdiction.

6.2 TMDLS

As previously discussed in Sections 4.7 and 4.8, two TMDL implementation plans have been completed for waters located within the City; the Cedar Island, Pike, and Eagle Lake Nutrient TMDL and the Shingle Creek Chloride TMDL. Rush Creek, Elm Creek, Cedar Island Lake, Eagle Lake, Fish Lake, Pike Lake and Weaver Lake are currently on the Minnesota Pollution Control Agency’s list of impaired waters; lakes and streams in the state that do not meet state water quality standards (**Figure A1.5**). For each water body on the list, the MPCA is required to conduct a study to determine the allowable Total Maximum Daily Load (TMDL) for each pollutant that exceeds the standards. Impaired waters within Maple Grove are summarized in **Table 6.2** below. The TMDL study for lakes with mercury impairments was completed by the MPCA. The TMDL Study for Cedar Island Lake, Pike Lake and Eagle Lake was completed by Shingle Creek Watershed Management Commission and is currently under review by the MPCA and EPA. The City will be required to update this surface water management plan to incorporate the findings of each completed TMDL study. The City must be involved in developing the implementation plan for all its impaired waterbodies.

TABLE 6.2 IMPAIRED WATERS IN MAPLE GROVE

Impaired Water	Affected Use	Pollutant/Stressor	Year Listed	TMDL Target	
				Start	Finish
Elm Creek	Aquatic life	Low Oxygen	2004	2006	2009
Rush Creek	Aquatic life	Fish IBI ¹	2002	2006	2009
Cedar Island Lake	Aquatic recreation	Excess nutrients	2004	2010	2014
Eagle Lake / Pike Lake	Aquatic consumption	Mercury FCA ²	1998	1999	2011
Fish Lake	Aquatic consumption	Mercury FCA ²	2006	2006	2021
Pike Lake	Aquatic recreation	Excess nutrients	2002	2008	2012
Weaver Lake	Aquatic consumption	Mercury FCA ²	1998	1999	2011
Eagle Lake	Aquatic recreation	Excess nutrients	2008	2012	2016
Shingle Creek	Aquatic Life	Chloride, dissolved oxygen, Aquatic macroinvertebrate IBI	2004	2007	2009

1-Fish Index of Biological Integrity 2-Mercury Fish Consumption Advisory / Source: Final MPCA 2006 303(d) List

The absence of a waterbody from the MPCA’s list of impaired waterbodies does not necessarily mean the waterbody is meeting its designated uses. It may be that it has either not been sampled or there is not enough data to make an impairment determination.

While not directly within the City, Maple Grove is tributary to Shingle Creek which is listed as impaired for Chloride, Invertebrate IBI, and Low Dissolved Oxygen. The recently completed Chloride TMDL Study and Implementation Plan does affect the City. Additional information regarding the Shingle Creek Chloride TMDL is presented in the **Section 4.8**. Also the Shingle Creek dissolved oxygen and biotic integrity TMDLs are currently underway by the SCWMWMC and draft TMDLs are expected in 2009.

6.3 LAKE WATER QUALITY

The Minnesota Pollution Control Agency (MPCA) has developed listing criteria for nutrient enriched lakes. The criteria are used for determination of aquatic recreation use support (swimming) based on ecoregion. Additionally, the MPCA has acknowledged that shallow lakes should not be assessed with the same criteria as deep lakes. Shallow lakes are different than deep lakes due to differences in ecological characteristics and internal nutrient cycling. The MPCA has defined shallow lakes as having a maximum depth less than 15 feet, or having greater than 80% of surface area as littoral (less than 15 feet deep). Table 6.3 outlines the MPCA water quality criteria based on June through September average data.

TABLE 6.3 MPCA IMPAIRMENT DESIGNATION THRESHOLDS FOR DETERMINING USE SUPPORT FOR LAKES

Parameter	Ecoregion			
	North Central Hardwood Forest		Western Corn Belt Plains	
	Shallow	Deep	Shallow	Deep
TP (µg/L)	60	40	90	65
Chlorophyll – a (µg/L)	20	14	60	22
Secchi disk transparency (m)	1.0	1.4	0.7	0.9

To be listed on the impaired waters list by the MPCA, in-lake monitoring data must show that TP and either Chlorophyll-a or Secchi depth were violated. If data show a lake is not meeting the support criteria for any one of the variables, it may be placed on a review list. The MPCA uses a weight of evidence approach to determine if a lake will be listed as impaired.

To be de-listed the lake must exceed the criteria. However, there is a provision for goal-setting flexibility. The listing criteria may not be realistically achievable for some lakes therefore an alternative goal may be proposed on a site specific basis.

Table 6.4 lists Maple Grove’s lake, the impairment status, ecoregion and lake type.

TABLE 6.4 CURRENT LAKE EUTROPHICATION CLASSIFICATION STATUS

Lake	Ecoregion	Lake Type	TP ¹ (ppb)	Chlorophyll-a ¹ (ppb)	Secchi Disk ¹ (m)	Lake Management Plan Water Quality Goal ²
Fish	NCHF	Deep	46	26.9	1.3	B
Rice	NCHF	Shallow	--	--	0.7	B
Weaver	NCHF	Deep	41	23.5	2.3	B
Cedar Island	NCHF	Shallow	194	94.9	0.5	B
Eagle	NCHF	Deep	44	27.1	1.8	B
Pike	NCHF	Shallow	86	52.2	4	B
Cook	NCHF	Shallow	19	5.5	2.4	

1) From DNR Lake Finder

2) From 1999 Lake Management Plan for associated lake

The City's 1999 Lake Management Plans developed water quality goals for each of the lake's studied. These goals were based on Met Council grading criteria using total phosphorus, chlorophyll-a and secchi disk readings and monitoring data. A "B" grade represents total phosphorus between 23-32 ppb, chlorophyll-a between 10-20 ppb and secchi disc depth of 2.4-3.3 meters. These grades slightly exceed the MPCA requirements for total phosphorus and secchi depth and are consistent with MPCA standards for chlorophyll-a for both shallow and deep lakes.

The existing values for Fish, Weaver, Cedar Island, and Eagle Lake do not meet the North Central Hardwood Forest (NCHF) deep lake criteria. The existing values for Pike Lake do not meet the NCHF shallow lake criteria. Cook Lake meets the NCHF shallow lake criteria. Mud Lake and Cedar Island Lake are actually classified as wetlands.

6.4 HYDROLOGIC AND HYDRAULIC MODEL

The preparation of this SWMP included a full review of the current surface water system in Maple Grove. The physical system was mapped to establish drainage areas and runoff paths. Grading plans, utility plans (including storm sewer information), aerial photos and 2-ft contour data were used to more accurately draw new or modify existing area and subwatershed boundaries and define directions of flow. This information was used to create a hydrologic model of the entire City for use in planning the future system. Map 1 shows Maple Grove's full-development system as it is currently envisioned. Each development proposal will modify this system such that the actual built system will look different from that presented on Map 1.

Drainage areas are named based on their subwatershed and numbered sequentially. Each drainage area drains to a pond, wetland, creek or lake. These storage areas are identified with a "P." For instance, in drainage area EC-A2 the pond is labeled EC-P2. There are five major watersheds in the City of Maple Grove, as originally identified in the 1996 Stormwater Management Plan. These major watersheds and their abbreviations are identified below:

Elm Creek (EC)

Shingle Creek (SC)

Fish Lake (FL)

Rush Creek (RC)

West Mississippi (WM)

Impervious percent for each minor watershed was determined using GIS and aerial photos. Appendix C provides a detailed breakdown of drainage areas and pond performance parameters for the 2, 10, and 100-year rainfall events based on output from the hydrologic model. The model establishes a framework that can be used as a starting point for more refined analyses within individual minor watersheds.

There are several locations where Maple Grove currently receives discharge, discharge to or proposes a discharge across its municipal boundary. These discharges are included in the hydrologic models and pond performance table in Appendix C. The discharge points are identified on the system map using an abbreviation for the adjacent community. For example, discharge from drainage area EC-A121 to Dayton is labeled as DTN-2.

6.5 ISSUES AND CORRECTIVE ACTIONS

The City has identified a number of specific issues and problems relating to surface water management and protection. Many of these issues have been identified through the self-assessments described previously in this plan and include an assessment of regulatory standards (Section 6.1), the Nondegradation Report (Section 4.6), an assessment of the City's wetland management program (Section 6.3), and an analysis of the City's hydrologic and hydraulic model (Section 6.4).

Other issues have been identified by the regulatory agencies having jurisdiction over surface water management within the City. These include issues identified within TMDL studies (Section 4.7 and 4.8) and WMC watershed management plans (Sections 4.4, and 4.5).

Table 6.5 lists all of the existing water quantity and quality issues, identified by the City and other regulatory agencies, and possible corrective actions for these issues within the City's system.

TABLE 6.5 ISSUES AND CORRECTIVE ACTIONS

Stormwater Issue	Stormwater Issue Category	Issue Identified by/in:	Possible Corrective Actions
Erosion in Maple Creek	Erosion and Sedimentation	City / Maple Creek Drainage Study	Follow the prescriptive actions determined in the Maple Creek Drainage Study, also incorporated into this LSWMP.
Standards that have prevented flooding potential as watershed developed should be continued or enhanced as development is completed	Water Quantity	SCWM WMC / SCWM WMP	Continue to maintain key flood storage areas, wetlands, and drainageways and maintain channel capacity.
Phosphorus loading is degrading lake water quality. Nutrient loading has resulted in Impaired Waters listings.	Water Quality	SCWM WMC / SCWM WMP	Work with residents and WMCs to develop management plans for water resources. Implement water quality standards identified in this LSWMP.

Water quality should be maintained or improved to assure safe swimming.	Water Quality	SCWM WMC / SCWM WMP	Work with residents and WMCs to develop management plans for water resources. Implement water quality standards identified in this LSWMP.
Polluted water should be cleaned up and further pollution should be prevented	Water Quality	SCWM WMC / SCWM WMP	Work with residents and WMCs to develop management plans for water resources. Implement water quality standards identified in this LSWMP.
Citizens should be educated more on what they can do to improve water quality and protect water resources, and to be more involved	Public Education	SCWM WMC / WCWM WMP	Work with residents and WMCs to develop management plans for water resources. Implement water quality standards identified in this LSWMP.
The water qualities of the following water bodies in Maple Grove were identified as a concern: Fish Lake, Rice Lake, Rush Creek and Elm Creek.	Water Quality	EC WMC / EC WMP	Implement the water quality standards identified in this LSWMP. Implement activities identified in future TMDL studies for Fish Lake and Elm Creek when they are completed.
Increased flows in Elm Creek have been identified.	Water Quantity	EC WMC / EC WMP	Implement the water quantity standards identified in this LSWMP.
Chloride levels in Shingle Creek	Water Quality	MPCA / Shingle Creek Chloride TMDL Report	Reduce salt use for deicing. Protect salt stockpiles from precipitation. Train snowplow operators. Reduce/eliminate snow stockpiling adjacent to the creek.
Erosion in Elm Creek, North Fork Rush Creek, and Rush Creek has been identified as a concern	Erosion and Sedimentation	EC WMC / EC WMP	The plan is still in progress. However, erosion will likely be controlled via volume and rate control requirements of new development.
Cedar Island, Pike and Eagle Lake draft TMDL	Water Quality	SCWM WMC/ Draft TMDL Report	Implement activities in TMDL when approved by the MPCA and EPA. Implement volume control and water quality requirements set in this LSWMP and Design Standards.

The City has begun to address several corrective actions listed in Table 6.5, above. The City has commenced with a program to reduce salt use and increase the efficiency of salt effectiveness. Some of the programs that have been implemented to reduce salt use include the:

- Purchase of pre-wetting equip and supporting tandem truck
- Protection of salt supplies prior to application
- Measurement of salt use utilizing GIS tracking methodologies
- Monitoring and tabulation of salt application rate changes
- Experimentation with alternative, high-efficiency salt applications (i.e. Clearlane®)
- Provision for training private and municipal salt applicators
- Public education

Annual monitoring of nutrients (phosphorous, chlorophyll a and secchi depth) in all lakes has also been an ongoing City project since 1995. This program has allowed the City to determine trends in nutrient concentrations and some of the potential reasons for annual fluctuations.

Inspection and reporting in accordance with the City's national pollution discharge and elimination system (NPDES) permit has been a regular occurrence since the inception of phase 2 of MPCA's program. Other regulatory programs such as TMDL and non-degradation have been integrated into the NPDES permit requirements in order to assure municipalities take an active participation identifying and complying with state and federal statutes for water quality.

Programs to reduce sediment discharge from developments, stabilize streambanks, prevent erosion and reduce pollutant runoff are also currently underway. A streambank stabilization program was initiated in 2001 when the City recognized the need to reduce property loss and inhibit sediment transport from streams to receiving waterbodies. Approximately 7 to 24 percent of the nutrient pollutants transported by the stream come from the banks of the stream itself. Therefore, a significant portion of the pollutant load carried by a stream can be reduced by stabilizing its banks. To this point, the City has stabilized a total of 14,760 linear feet (2.8 miles) of stream and about 665,000 square feet (15.3 acres) of stream bank. These projects have involved modification of the: stream cross-section, profile and meander; adjustment of tree canopies; re-vegetation of understories; and the bioengineering and/or armoring of particularly vulnerable areas of streambank.

Overall the City has effectively managed stormwater runoff so that localized flooding problems are not prevalent. In fact, most identified local flooding problems are so minor that they do not warrant it as a separate "issues".

6.6 WETLAND INVENTORY AND ASSESSMENT

The City of Maple Grove completed a wetland inventory and evaluation in 2007. The inventory and evaluation accounts for all wetlands and their respective management and protection goals.

6.6.1 WETLAND INVENTORY

The Maple Grove wetland inventory was compiled by City staff during field inspection in 2007 and by utilizing GIS and remote sensing technologies. The inventory was quite detailed in the westernmost one-half of the City, while the east half was abstracted from a previous inventory completed by the Hennepin County Environmental Services department.

6.6.2 WETLAND ASSESSMENT

All wetlands in the inventory have been assigned management criteria and protective priorities as follows:

1. Manage – Flexible: Wetlands that are considerably degraded as a result of either farming or development and qualify for "sequencing flexibility" under the jurisdiction of the Wetland Conservation Act are classified as "Manage – Flexible". These are typically type 1 wetlands that have been drained and recently cultivated. The vegetation is solely invasive. These are relatively small wetland areas (generally less than 1 acre) that are isolated from other natural habitats (i.e. wetland, forest, shrub, meadow).

2. Manage – Restore: Wetlands that may be somewhat degraded as a result of either farming or development are classified as “Manage – Restore”. Invasive species dominate these areas which are commonly larger than 0.5 acre. Typically, cultivation, grazing or changes in water level have encouraged the invasion of cattails and/or reed canary grass. However, these areas may be restored through intensive vegetative management and possible hydrologic adjustment.
3. Manage – Preserve: Wetlands that are integrated into lacustrine or riverine systems or that have a unique vegetative community or juxtaposition with other natural habitat (i.e. wetland, forest, shrub, meadow) are classified as “Manage – Preserve”. These wetlands serve to protect and enhance the value of the adjacent natural communities (streams, lakes, and forests). Preserving these wetlands is essential to maintaining the integrity and connectivity of a natural corridor. While preserve wetlands greater than 10 acres may contain a significant extent of invasive species (cattail, sandbar willow, box-elder, cottonwood), smaller areas (less than 10 acres) typically have a unique blend native species that must be preserved.
4. Protect: Large open water wetland areas (greater than 3 acres) that are managed under the jurisdiction of the Department of Natural Resources and are not integrated into a lacustrine or riverine system and are not afforded protection under the “Manage – Preserve” classification are classified as “Protect”. These wetlands assume the protection of “high quality wetlands” granted under the authority of section 375:111, subdivision 8.

For the purposes of wetland management and protection, all wetlands designated as either “Manage – Preserve” or “Protect” will be considered “High Priority” wetlands and therefore afforded special recognition as described in the Wetland Conservation Act section 8420.0350.

6.7 NPDES PERMITTING PROCESS

The MPCA has designated the City of Maple Grove as an NPDES Phase II MS4 community (MN Rules 7090). Maple Grove’s application for permit coverage is complete. The permit application outlined Maple Grove’s Stormwater Pollution Prevention Plan (SWPPP) to address the six minimum control measures:

- | | |
|--|---|
| 1) Public education | 4) Construction site runoff control |
| 2) Public involvement | 5) Post-construction runoff control |
| 3) Illicit discharge detection and elimination | 6) Pollution prevention in municipal operations |

The City’s SWPPP contains several best management practices within each of the listed control measures. These were identified using a self-evaluation process.

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

6.8 COMPARISON OF REGULATORY STANDARDS

Developing property within Maple Grove is subject to review and approval from one of the three Watershed Management Commissions (WMC) covering the City (**Figure A1.4**). Each WMC has established rules governing stormwater management and protection of natural resources. The standards outlined in this plan

have been designed to meet the most stringent of each of the WMC rules and apply those standards City-wide.

The *Minnesota Stormwater Manual* provides detailed guidance on stormwater management practices in the region. 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 stream banks, reduced nutrient loads to lakes and wetlands, and reduced thermal impacts to aquatic habitat.

The City is the Local Government Unit (LGU) for the Wetland Conservation Act. The City will continue to administer Wetland Conservation Act permits.

6.9 SUMMARY FINDINGS AND STATEMENT OF ISSUES

In the months and years ahead, the City will face multiple challenges in surface water management. Having applied for NPDES permit coverage, the City must now begin to implement new programs to address stormwater pollution. The governing WMC's within the City will continue to implement surface water standards that impact City reconstruction and development projects. The MPCA will continue to complete local TMDL studies that will lead to challenging implementation projects throughout the City. Growth in and around the City will put additional pressure on local surface water resources, while the aging infrastructure will require significant reconstruction and capital investment.

Surface water management issues within the City are primarily defined by the requirements of current or pending programs. The goals and policies outlined in this plan are grouped by their relationship to the key issues listed below:

- Section 7.2 Land Development and Redevelopment – Goals and policies to prevent flooding and adverse impacts to water resources from land disturbance and impervious surfaces.
- Section 7.3 Water Resource Management – Goals and policies for managing Maple Grove's wetlands, lakes, streams and groundwater, to preserve the functions and values of these resources.
- Section 7.4 Management of Floodplains, Shorelands and Natural Areas – Goals and policies for managing these areas, to preserve the functions and values of these resources.
- Section 7.5 Citywide Program Elements - Goals and policies for managing water resources and drainage systems on a city-wide scale, to effectively achieve surface water management goals.
- Section 7.6 Support of Other Agencies - Goals and policies to coordinate local surface water management with the work of Watershed Management Commissions and state agencies.

Section 7 – Goals and Policies

7.1 SUMMARY

The City has a strong interest in protecting and managing its valuable water and natural resources, recognizing the relationships between resource protection, land use management, development, redevelopment and fiscal responsibility.

This section outlines the goals and policies specific to surface water management in Maple Grove. Goals and policies are grouped by their relationship to the key issues listed below:

- Section 7.2 Land Development and Redevelopment
- Section 7.3 Water Resource Management
- Section 7.4 Management of Floodplains, Shorelands and Natural Areas
- Section 7.5 Citywide Program Elements
- Section 7.6 Support of Other Agencies

7.2 LAND DEVELOPMENT AND REDEVELOPMENT

Overall Goal: Manage land disturbance and increased impervious surfaces to prevent flooding and adverse impacts to water resources.

Overall Policy: The City will facilitate management of the rate of runoff, volume of runoff, nutrient loads and sediment loads from land development projects, through local codes, watershed standards and agency regulations.

Overall Policy: The City will manage redevelopment and reconstruction projects to reduce the impacts of prior changes in land use.

Overall Policy: Redevelopment projects shall meet Maple Grove’s requirements for new development to the extent practical. In all cases redevelopment project proposers will be expected to consider whether retrofitting full stormwater management controls to existing development areas can be accomplished. At a minimum, full stormwater controls will be provided for new impervious surfaces and attached pervious areas. Proposers of redevelopment activities may provide stormwater management controls for an equal area of existing impervious surface within the same minor watershed boundary in lieu of the required controls for new impervious surfaces, as allowed under the NPDES construction permit and watershed rules. Under no circumstances will the City allow redevelopment activities to increase downstream flooding risk or to degrade downstream impaired waters due to increases in runoff volume, total suspended solids, or total phosphorus.

7.2.1 RUNOFF RATE

Goal: Control the rate of stormwater runoff from development to reduce downstream flooding and erosion.

Policy: The City will enforce their stormwater management practices to ensure that the peak rate of runoff from regulated land development does not exceed the specified rates.

Policy: The City will review and update their stormwater management practices as necessary to ensure that peak control standards are consistent with current engineering practices and current regulations of local and state agencies having jurisdiction within the City, including Watershed Management Organizations.

Policy: The City will base all drainage system analyses and designs on proposed full development land use patterns.

Policy: The City will require that, in addition to the 10-year and 100-year ponded flow primary capacity, the conveyance system shall provide capacity in excess of the 100-year event, in the form of overland overflow routes or adequate surface storage volume in street low points, ditches, or other transient ponding areas.

Policy: The City will require that the maximum duration for rainfall critical event analysis shall be 24 hours, except in cases where basins are landlocked, where both a back to back 24-hour event and a 10-day 7.2-inch runoff event shall also be used. The City will require the use of the hydrograph method of analysis and the SCS Type II storm distribution.

Policy: The City will identify and implement opportunities to control the rate of stormwater runoff from redevelopment activities.

Policy: The City will continue to address interjurisdictional drainage issues and will require that the peak discharge rate to adjacent communities not exceed the specified rates and be in conformance with the City's Nondegradation Report.

Policy: The City will require that development and redevelopment within ECWMC shall conform with their extended detention requirement outlined in Appendix F of this plan and located at www.elmcreekwatershed.org/appfstandardsamendedfinal.pdf

7.2.2 RUNOFF VOLUME

Goal: Reduce pollutant loads and impacts to water bodies and encourage groundwater recharge by reducing the volume of stormwater runoff from development.

Policy: The City will enforce their stormwater management practices to ensure that suitable volume reduction practices are incorporated into regulated land development.

Policy: The City will review and update their stormwater management practices as necessary to ensure that volume control standards are consistent with current engineering practices and current regulations of local and state agencies having jurisdiction within the City, including Watershed Management Organizations. The following publications should be utilized as guides, Minnesota Pollution Control Agency Best Management Practices Handbook and Met Council's Minnesota Urban Small Sites BMP Manual.

Policy: The City will review and update the Zoning Ordinance as necessary to minimize the area of impervious surfaces allowed with development. The City will review and update the Subdivision Regulations and grading permit as necessary to meet water quality, quantity and volume goals set in this LSWMP.

Policy: The City will require infiltration of 0.5 inches of runoff from impervious surfaces, taking into consideration site limitations such as soil conditions, depth to groundwater, safety, snow removal, and maintenance issues.

Policy: Where feasible, the City will encourage infiltration of the 2-year rainfall event.

Policy: The City will require development and redevelopment to comply with ECWMC Water Management Plan total phosphorus requirements in compliance with nondegradation.

Goal: Reduce the volume of stormwater runoff from existing developed areas.

Policy: The City will minimize impervious surfaces where feasible when reconstructing streets and other paved surfaces.

Policy: The City will implement infiltration BMPs in redevelopment and improvement areas when feasible.

7.2.3 FLOOD PREVENTION

Goal: Provide adequate storage and conveyance of runoff to protect the public safety and minimize property damage.

Policy: The City will enforce their stormwater management practices to ensure that adequate drainage facilities and easements are provided with land development.

Policy: The City will enforce their stormwater management practices to ensure that new structures are adequately elevated above identified flood elevations.

Policy: The City will review and update their stormwater management practices as necessary to ensure that their flood standards are consistent with current engineering practices.

7.2.4 NUTRIENT AND SEDIMENT LOADING

Goal: Reduce the nutrient and sediment loads discharged from land development.

Policy: The City will enforce their stormwater management practices to ensure that suitable water quality treatment practices are incorporated into regulated land development.

Policy: The City will enforce their stormwater management practices to ensure that direct discharge of untreated stormwater runoff to water bodies is prohibited where feasible.

Policy: The City will review and update their stormwater management practices as necessary to ensure that water quality treatment standards are consistent with current engineering practices and current regulations of local and state agencies having jurisdiction within the City, including Watershed Management Organizations.

Policy: The City will require outlet skimming in all ponds. Skimming shall occur for up to the 10-year, 24-hour event.

7.2.5 EROSION AND SEDIMENT CONTROL

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

Policy: The City will enforce the Erosion and Sediment Control Ordinance as outlined in its NPDES permit.

Policy: The City will periodically review its Erosion and Sediment Control ordinance and make revisions as necessary.

Policy: The City will require that all land disturbing activities of one acre or more obtain an NPDES construction stormwater permit from the MPCA.

Policy: The City will require that erosion and sediment control conform to the standard practices contained in the Minnesota Stormwater Manual (2006 or most recent update), MPCA BMP Handbook, and Met Council's Minnesota Urban Small Sites BMP Manual.

Policy: The City will require that all erosion and sediment control measures specified in erosion control plans are installed prior to disturbing land, and removed after 75% of the vegetation has been established after construction.

Policy: The City will encourage temporary sedimentation basins when possible to prevent sediment from leaving construction areas.

Policy: The City will encourage preservation of natural vegetation to the greatest extent practical.

Policy: The City will require that the time that construction areas remain exposed is minimized by phasing construction activities and establishing temporary and permanent vegetation.

Policy: The City will require that sediment discharge is prevented by protecting existing storm drain inlets and conveyance systems, stockpiling soil in protected areas and constructing permanent sediment forebays upstream of basins and water bodies.

Policy: The City will require that stormwater inlets are designed to prevent debris from entering the conveyance system and impeding the flow path.

7.2.6 NONDEGRADATION

Goal: Improve the quality of the City's and region's surface water resources by, whenever possible, decreasing total phosphorus, total suspended solids and water volume discharge.

Policy: Development and redevelopment projects will be reviewed in the context of nondegradation and best management practices will be applied as necessary to maintain or reduce current TP, TSS and water volume loads.

Policy: The City will develop a monitoring program to verify that the assumptions used in The Nondegradation Report relative to pollutant loadings, removal efficiencies and infiltration rates are reasonable.

Policy: The City will work with the MPCA and the Watershed Districts as necessary in the future to address concerns regarding impaired water and will work to implement TMDL plans within the community to address these additional concerns as the plans are prepared.

7.3 WATER RESOURCE MANAGEMENT

Overall Goal: Protect the City's wetlands, lakes, streams and groundwater to preserve the functions and values of these resources for future generations.

Overall Policy: The City will protect water resources through implementation of lake management plans, stream corridor management plans, the Wetland Conservation Act, buffer standards, groundwater protection rules and TMDL studies.

Overall policy: The City will encourage the development of best management practices upstream of existing water bodies and will look to retrofit best management practices as opportunities arise.

7.3.1 WETLAND MANAGEMENT

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

Policy: The City will continue to administer WCA responsibilities within the City to ensure no net loss of wetland functions and values.

Policy: The City will require that, prior to development activities or public projects, a wetland delineation must be completed, including a field delineation and report detailing the findings of the delineation.

Policy: The City will require that a wetland assessment be prepared for any project that includes a wetland not already assessed. Minnesota Routine Assessment Methodology (current version) is the required method of assessment for evaluating wetland functions and values.

Policy: The City will identify and implement opportunities to enhance the functions and values of degraded wetlands within the City, as a part of park projects, infrastructure projects, or other projects.

Policy: The City will encourage natural buffer zones around ponds and wetlands. Buffer areas should not be mowed or fertilized, except that harvesting of vegetation may be performed to reduce nutrient inputs. A minimum of a 20 foot buffer and average 30 foot width is required around wetlands. A 10 foot buffer is required around new ponds. The City reserves the right to require wider buffer widths when warranted.

Policy: The City will require that runoff be pre-treated prior to discharge to wetlands.

Policy: Wetlands will be protected from development impacts according to their management class listed in Section 6.

7.3.2 LAKE MANAGEMENT

Goal: Manage lakes to improve water quality and protect resource values.

Policy: The City will continue to implement its lake management plans. Updates to the plans will be necessary following EPA approval of a final TMDL.

Policy: The City will encourage natural buffer zones around lakes. Buffer areas should not be mowed or fertilized, except that harvesting of vegetation may be performed to reduce nutrient inputs. A minimum 20 foot buffer is required around lakes.

Policy: The City will require that runoff be pre-treated prior to discharge to lakes.

7.3.3 STREAM MANAGEMENT

Goal: Improve water quality, provide wildlife habitat and protect the resource value of streams.

Policy: The City will manage stream watersheds to strive to meet existing conditions as much as feasible.

Policy: The City will identify eroding stream areas, prioritize stabilization projects, and identify funding sources for project implementation.

Policy: The City will continue to restore streams to their natural state when determined necessary and feasible.

Policy: The City will require a minimum of 50 foot buffer for Elm Creek and Rush Creek.

7.3.4 TMDL IMPLEMENTATION

Goal: Address target pollutants identified in TMDL studies to improve the quality of impaired waters.

Policy: The City will amend the stormwater management practices required to implement pollutant load reductions identified in TMDL studies for impaired lakes.

Policy: The City will continue to research salt alternatives for deicing in the Shingle Creek WMC and potentially City-wide.

Policy: The City will use the findings of the TMDL studies to guide development review.

7.3.5 GROUNDWATER RECHARGE AND PROTECTION

Goal: Protect groundwater resources and groundwater dependent resources.

Policy: The City will require pretreatment for infiltration practices based on their location, and discourage use of infiltration practices where the use of these practices is likely to cause the transport of contaminants into the groundwater.

Policy: The City will implement its Wellhead Protection Plan.

7.4 MANAGEMENT OF FLOODPLAINS, SHORELANDS AND NATURAL AREAS

Overall Goal: Manage the City's floodplains, shorelands, and natural areas to preserve the functions and values of these resources for future generations.

Overall Policy: The City will manage these areas through implementation of local zoning codes and agency regulations. The City has already completed management plans for key natural resource areas, and will develop overall goals and policies for natural areas within the Comprehensive Plan.

7.4.1 FLOODPLAIN MANAGEMENT

Goal: Control development in flood prone areas to protect the public safety and minimize property damage.

Policy: The City will 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: The City will update the Floodplain Overlay District Ordinance as required by FEMA and the Minnesota DNR, or as needed, to ensure adequate protection for structures and eligibility for flood insurance programs.

Policy: The City will modify its floodplain management ordinance to meet Elm Creek Watershed Management Commission requirement of compensatory storage at 1:1 ratio for floodplain fill and to meet subsequent updates to the ECWMC Watershed Management Plan.

7.4.2 SHORELAND MANAGEMENT

Goal: Conserve and protect the scenic and cultural resources of the City's shoreland and maintain a high standard of environmental quality consistent with Minnesota DNR Standards.

Policy: The City will regulate land development within the Shoreland Overlay District to minimize impacts as specified in the Zoning Ordinance and required by Minnesota Rules.

Goal: Protect the quality of surface waters, and preserve the economic and environmental values of shoreland.

Policy: The City will enforce the water quality policies and standards to help maintain the quality of its shorelands thereby preserving its economic and environmental values.

7.4.3 NATURAL AREA MANAGEMENT

Goal: Protect and enhance natural areas within the City to provide wildlife habitat and water resource benefits.

Policy: The City will review land use and development decisions with the intent to preserve natural resources, connect environmental corridors and provide buffers for streams, wetlands and lakes.

Policy: The City will support programs to maintain and restore the resource value of natural areas.

Policy: The City will continue to support programs, seek resources, and cooperate with others to maintain and restore the resource value of natural areas, and maintain connections among natural resource areas in the Maple Grove area.

7.4.4 RECREATION, FISH AND WILDLIFE

Goal: Protect recreational opportunities and fish and wildlife habitat for the benefit of its residents.

Policy: The City will protect threatened or endangered species or areas of significant natural communities as identified by the DNR and the City's 2005 Natural Resource Inventory.

Policy: The City will work to create wildlife corridors throughout the City.

Policy: The City will preserve wetlands that provide habitat for wildlife and spawning of fish.

Policy: The City will work with the appropriate agencies to control exotic/invasive species.

Policy: The City will plan trails and parks to provide controlled access to water resources and encourage recreational opportunities.

7.5 CITYWIDE PROGRAM ELEMENTS

Overall Goal: Manage water resources and drainage systems on a citywide scale.

Overall Policy: The citywide surface water management program will include monitoring and maintenance of drainage systems, targeted pollution prevention, public education, system reconstruction projects and equitable collection of supporting funds.

Overall Policy: The City will actively implement the NPDES Stormwater Pollution Prevention Plan as stated in the MS4 permit.

7.5.1 POLLUTION PREVENTION

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

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

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

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

7.5.2 MONITORING AND MAINTENANCE

Goal: Maintain the function and effectiveness of stormwater management structures through monitoring and maintenance.

Policy: The City will inspect and monitor the construction and installation of all new stormwater facilities and require that such facilities be surveyed to create as-built drawings.

Policy: The City will ensure that stormwater management facilities are properly installed, maintained and functioning.

Policy: The City will require that all stormwater management facilities, including outlet structures, drainageways, wetlands, ponds floodplains and other open water bodies will be included in a drainage, utility or flowage easement.

Policy: The City will develop a maintenance plan consistent with the requirements of the NPDES MS4 permit.

7.5.3 PUBLIC EDUCATION

Goal: Inform and educate residents about stormwater pollution, the effects of urban runoff and the need to protect natural resources.

Policy: The City will implement a public education and outreach program as identified in the City's NPDES permit.

Policy: The City will develop and maintain a public education program for landowners to promote reduction of nutrient and sediment loading to water bodies. The City will encourage residents and landowners to practice environmental friendly lawn care and to encourage the use of native plantings or natural landscapes, where practical.

Policy: The City will coordinate public education with the local Watershed Management Commissions.

Policy: The City will promote citizen and volunteer efforts to protect, restore and enhance local water and natural resources.

Policy: The City will use available opportunities to inform its residents about the value of local water resources, the effects of stormwater runoff, and opportunities for stewardship of water and natural resources.

7.5.4 FUNDING

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

Policy: The City will consider the creation and implementation of a stormwater utility.

Policy: The City will cost effectively manage the plan to balance surface water goals with available resources.

7.6 SUPPORT OF OTHER AGENCIES

Overall Goal: Coordinate local surface water management with the work of Watershed Management Commissions and state agencies.

Overall Policy: The City will cooperate and collaborate with the local water management organizations in their efforts to maintain and improve water quality in the city.

Goal: Facilitate WMC review of development projects and enforcement of watershed standards.

Policy: The City will coordinate development review activities with the WMC's.

Goal: Work cooperatively with local watershed commissions to manage stormwater facilities.

Goal: Cooperate with other organizations to complete management plans and studies for water resources in Maple Grove.

Policy: The City will work with local Watershed Management Commissions, 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.

Goal: Cooperate with other organizations working to protect groundwater resources.

Policy: The City will cooperate with the County and water management organizations to implement the recommendations of groundwater planning, to protect groundwater quality by reducing the potential for transport of stormwater pollutants into the groundwater, and maintaining the functions of groundwater recharge areas.

Policy: The City will support well-sealing programs developed by Hennepin County and the Minnesota Department of Health.

Section 8 – Implementation

8.1 OVERVIEW

The City has developed an implementation program based on the information developed in earlier sections of this Local Surface Water Management Plan. This program reflects the needs and concerns of many stakeholders including the City Council, City Staff, citizens, watershed management organizations, and funding capabilities. The implementation program consists of three parts: NPDES MS4 responsibility, plan activities, and ordinance updates. The planned activities are the water resources-related activities outlined in the City's Capital Improvement Plan (CIP) and have funding sources identified.

8.2 NPDES MS4 RESPONSIBILITY

The discussion below contains information on the City's Stormwater Pollution Prevention Program (SWPPP). The City's complete SWPPP as submitted to the MPCA (included in the appendices) includes strategies, goals, and timelines. Funding for the Best Management Practices listed under each Minimum Control Measure (MCM) is from the general fund.

IMPLEMENTATION ITEM MCM-1: PUBLIC EDUCATION AND OUTREACH

This MCM includes the development of an Education Activity Implementation Plan for each of the permit years that will determine the public's awareness, attitudes and behaviors on stormwater and environmental related issues based on specific components.

IMPLEMENTATION ITEM MCM-2: PUBLIC PARTICIPATION/INVOLVEMENT

This MCM includes compliance with public notice requirements, public meeting to solicit and consider input on SWPPP, continuation of stormwater drain stencil program, adopt a street and adopt a park clean up program, coordinate stakeholder meetings to address concerns regarding lake and stream water quality, stormwater website and hotline, support watershed administered public programs, participate in Wetland Health and Evaluation Program.

IMPLEMENTATION ITEM MCM-3: ILLICIT DISCHARGE DETECTION AND ELIMINATION

This MCM includes development of a storm sewer system map for all storm sewer outfalls, adoption of an ordinance to detect and eliminate non-stormwater discharge into the system, development of a program to inform the public of the hazards of illegal dumping and discharge, and identification of non stormwater discharges.

IMPLEMENTATION ITEM MCM-4: CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

This MCM includes adoption and enforcement of erosion and sediment control ordinance, implementation of erosion and sediment control BMPs, construction site and building construction site waste control,

grading and site plan review, a process for public non-compliance reporting and construction site inspection and reporting, and annual meeting on stormwater BMPs.

IMPLEMENTATION ITEM MCM-5: POST CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

This MCM includes development and implementation of structural and nonstructural BMPs, development of regulatory mechanisms to address runoff, operation and maintenance of BMPs and municipal operations and maintenance.

IMPLEMENTATION ITEM MCM-6: POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

This MCM includes development and implementation of municipal operations training program, a stormwater system inspection program, street and parking lot sweeping, road salt storage and application program and emergency spill response program.

IMPLEMENTATION ITEM MCM-7: NONDEGRADATION REQUIREMENTS

The MPCA is currently reviewing Maple Grove's Nondegradation Report submittal. Maple Grove has presented specific SWPPP modifications as part of this submittal. Implementation Item MC-7 serves as the implementation item for other requirements that may result from the MPCA review.

IMPLEMENTATION ITEM: SHINGLE CREEK CHLORIDE TMDL

Maple Grove will undertake specific implementation items as listed in the SWPPP addendum included in appendix E. Section 6.5 also includes some discussion of the items the City has begun to undertake to address this TMDL. The SWPPP addendum also lists budget needed to implement this BMP.

IMPLEMENTATION ITEM: SECTION 303(d) LISTINGS

This BMP Summary Sheet sets for the impaired waters review process that the City will follow. This process includes identifying the impaired waters that are impacted by the City's stormwater discharge, identifying all the potential discharge points to the impaired water and evaluating the hydrology, land use and other characteristics of the watershed area that might impact the impaired water.

IMPLEMENTATION ITEM: MAINTENANCE PLAN

City staff uses the results of the inspection and televising program from MCM-3 to perform maintenance activities as necessary and to fulfill the requirements of the NPDES MS4 permit. Maintenance activities include contractual pond dredging, sump manhole vacuuming, street sweeping, vegetation removal where necessary, and pond inspections.

8.3 FIVE-YEAR CAPITAL IMPROVEMENT PLAN

The City's current, overall capital improvement plan includes several activities that address issues identified in Section 6 and goals and policies identified in Section 7. A summary of those activities is provided in Table 8.1. The City will update the capital improvement plan on an annual basis.

TABLE 8.1 CAPITAL IMPROVEMENT PROJECTS

Implementation Priority	Total	2008	2009	2010	2011	2012
Shingle Creek TMDL Implementation	\$80,000		\$20,000	\$20,000	\$20,000	\$20,000
Pond Maintenance	\$400,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000
Street Sweeping	\$350,000	\$70,000	\$70,000	\$70,000	\$70,000	\$70,000
Trunk Storm for Street Construction	\$1,250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000
Ravine Stabilization / Stream Restoration	\$500,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
Wetland Restoration	\$250,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
Water Quality Retrofits	\$250,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
Cedar Island, Pike Lake, Eagle Lake TMDL Implementation	\$60,000			\$20,000	\$20,000	\$20,000
Rush Creek TMDL Implementation	\$80,000		\$20,000	\$20,000	\$20,000	\$20,000
Elm Creek TMDL Implementation	\$80,000		\$20,000	\$20,000	\$20,000	\$20,000
Fish Lake Impaired Water	\$10,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Rice Lake TMDL Implementation	\$10,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Weaver Lake TMDL Implementation	\$10,000	\$10,000	\$5,000	\$5,000	\$5,000	\$5,000
Total	\$3,550,000	\$650,000	\$705,000	\$725,000	\$725,000	\$725,000

The capital improvements listed in Table 8.1 are generally listed in order of priority. Maple Grove public finances these projects through several mechanisms including the general fund and special assessments. If funds are insufficient, the City will look for additional funding sources (refer to section 8.4.2) or medium priority projects will be funded less. As TMDLs are approved, this moves the project up to a higher priority on the list.

The City of Maple Grove also developed several CIP items at the headwaters of the Shingle Creek Watershed as a part of the Gravel Mining Area Stormwater Management Plan. These projects are intended

to improve water quality in the watershed by filtering stormwater, attenuating flows, and providing groundwater recharge. A summary of these items is included in Table 8.2.

TABLE 8.2 GRAVEL MINING AREA STORMWATER MANAGEMENT PLAN CIP

GMA Pond	Project Cost (\$)	SCWMWMC Cost Share (\$)	Year
P33	1,570,000	250,000	2009
P51	6,120,000	250,000	2007
P53	1,680,000	250,000	2010
P54	920,000	230,000	2011
P55	1,760,000	250,000	2009
P57	2,020,000	250,000	2008

8.4 OFFICIAL CONTROLS

Ordinances, policies and permits (official controls) are necessary tools to support implementation of this Local Surface Water Management Plan. Many of the goals and policies in this plan reference official controls that exist or need to be written or updated. The City’s NPDES MS4 permit also includes specific ordinances required to comply with permit requirements. The timeline for ordinance updates set by state statute is 180 days after final approval of this plan.

8.4.1 ORDINANCES

IMPLEMENTATION ITEM OC-1: DESIGN STANDARDS

The Design Standards included in this LSWMP in Appendix A are adequate to meet the requirements for water quantity, quality and runoff volume as well as nondegradation guidelines, (i.e. no increase in TP, TSS and water volume). These standards are not currently supported by a stormwater ordinance. The City will develop a stormwater ordinance consistent with the Design Standards developed as a part of this LSWMP. The ordinance will also be developed considering consistency with the watershed management organization rules and goals and policies since both SCWMWMC and ECWMC recently amended their rules.

IMPLEMENTATION ITEM OC-2: EROSION AND SEDIMENT CONTROL ORDINANCE

The MPCA recently approved a new Stormwater Construction Permit. The City of Maple Grove will review the revised permit and make changes, as appropriate, to its erosion and sediment control ordinance for consistency with the new permit.

IMPLEMENTATION ITEM OC-3: WETLAND ORDINANCE AND WETLAND MANAGEMENT PLAN

The City will review and update its wetland ordinance as necessary to conform to the wetland inventory and assessment completed by the City in 2007 and discussed in section 6. The City will complete and adopt a wetland management plan, incorporating the findings from the 2007 wetland inventory.

IMPLEMENTATION ITEM OC-4: ABSTRACTION/INFILTRATION REQUIREMENT UPDATE

The City will review and update its abstraction requirement to be consistent with local watershed requirements.

8.4.2 POLICIES

IMPLEMENTATION ITEM OC-5: EVALUATE FUNDING

Implementation of the proposed programs and improvements identified in this plan will affect City finances. To quantify this effect, a review of the ability of the City to fund these studies, programs and improvements is required.

Below is a listed of various sources of revenue that the City will attempt to utilize:

- Grant monies possibly secured from various agencies. This could include SCWMWMC, ECWMC, Hennepin County, MPCA, MnDOT, 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.
- Project funds could be obtained from watershed district levies as provided for in Minnesota Statutes Chapter 103D.905 for those projects being completed by or in cooperation with SCWMWMC and ECWMC.
- Potential implementation of a stormwater utility fee

The City's general fund is the primary source for the programs and improvements identified in this Plan. The City's general fund is sufficient to cover the proposed activities.

8.4.3 PERMITTING AND GUIDANCE

IMPLEMENTATION ITEM OC-6: REVISE NEW DEVELOPMENT PERMIT

The MPCA has recently revised the NPDES construction permit. Maple Grove will review its new development permit and update as appropriate based on the requirements in the new permit. Maple Grove will review the Erosion and Sediment Control Ordinance and Development Permit to make modifications so that consistency with the Construction Permit is obtained.

IMPLEMENTATION ITEM OC-7: UPDATE LAKE MANAGEMENT PLANS

Updates to the lake management plans will be necessary pending TMDL completion for specific lakes and approval by the EPA. At this time the City will incorporate the TMDL implementation items into their lake management plans. The City will also review and update its lake management plans for consistency with the recently approved MPCA shallow and deep lake standards and to incorporate the latest management activities the City currently undertakes.

The City's SWPPP, attached as appendix E, lists several activities that the City routinely undertakes in regards to lake management. The specific BMPs related to lake and wetland management are: 1a-4, 1c-1, 1c-2, 2d-4, 2d-7, 6b-7. The City also currently completes annual monitoring of Fish, Weaver, Rice, Edward, Cook, Eagle, Pike, the three Arbor Lakes and Cedar Island Lake. The sampling includes secchi disc, total phosphorus, and chlorophyll-a. The following is a list of several of the projects that are ongoing or slated

for several of the lakes: fish survey, algae control, buffer maintenance, aquatic plant surveys, annual aquatic macrophyte surveys, stormwater monitoring at outfalls and water level/temperature monitoring. The list is not all inclusive, but is representative of the numerous measures the City is currently engaged in for protecting and improving the water quality of the lakes.

Section 9 – Administration

9.1 REVIEW AND ADOPTION PROCESS

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

‘After consideration but before adoption by the governing body, each local government unit shall submit its water management plan to the Watershed Management Commission[s] for review for consistency with the watershed plan. The organization[s] shall have 60 days to complete its review.’

‘Concurrently with its submission of its local water management plan to the Watershed Management Commission, 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 Commission. The Metropolitan Council shall submit its comments to the Watershed Management Commission and shall send a copy of its comments to the local government unit.’

‘After approval of the local plan by the Watershed Management Commission[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 2008 Comprehensive Plan update and will be applicable until 2018, at which time an updated plan will be required. Periodic amendments may be required to incorporate changes in local practices. In particular, changes in the three applicable Watershed Management Plans may require revisions to this plan. Shingle Creek West Mississippi Watershed Management Commission is scheduled to prepare a third Generation Management Plan in 2010 for 2011 adoption. In accordance with state statute the City’s LSWMP must be revised within 2 years of this adoption. Plan amendments will be incorporated by following the review and adoption steps outlined above.

References

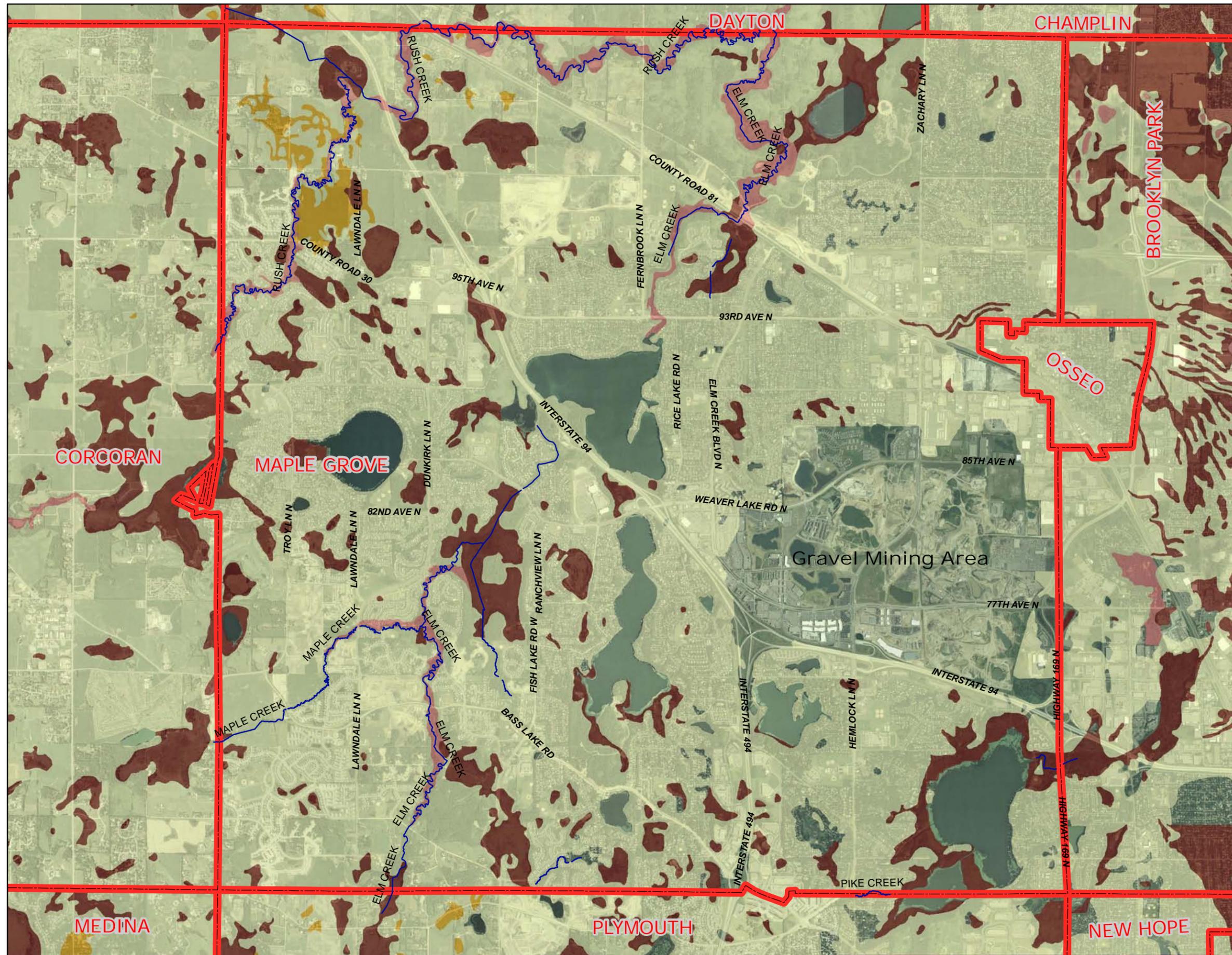
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- 1 Minnesota Board of Water & Soil Resources, web fact sheet, www.bwsr.state.mn.us/outreach/factsheets
 - 2 Metropolitan Council website, www.metrocouncil.org/about
 - 3 Metropolitan Council, Water Resources Management Policy Plan, 2005, p. 27
 - 4 Minnesota Board of Water & Soil Resources, website www.bwsr.state.mn.us/aboutbwsr/whatbwsr
 - 5 Minnesota Board of Water & Soil Resources, website www.bwsr.state.mn.us/aboutbwsr/bwsrhistory
 - 6 Minnesota Pollution Control Agency, *Guide to MPCA Programs*, 2007

Appendix A - Figures

Surface Water
Management Plan

Figure A1.1

Hydrologic
Soil Group
Classification



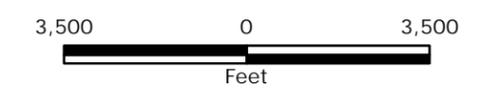
Municipal Boundaries

Creeks

Soil Classification

- A
- A/D
- B
- B/D
- C
- C/D
- D

Note: Descriptors of the Hydrologic Soil Group Classification can be found in section 2.3.

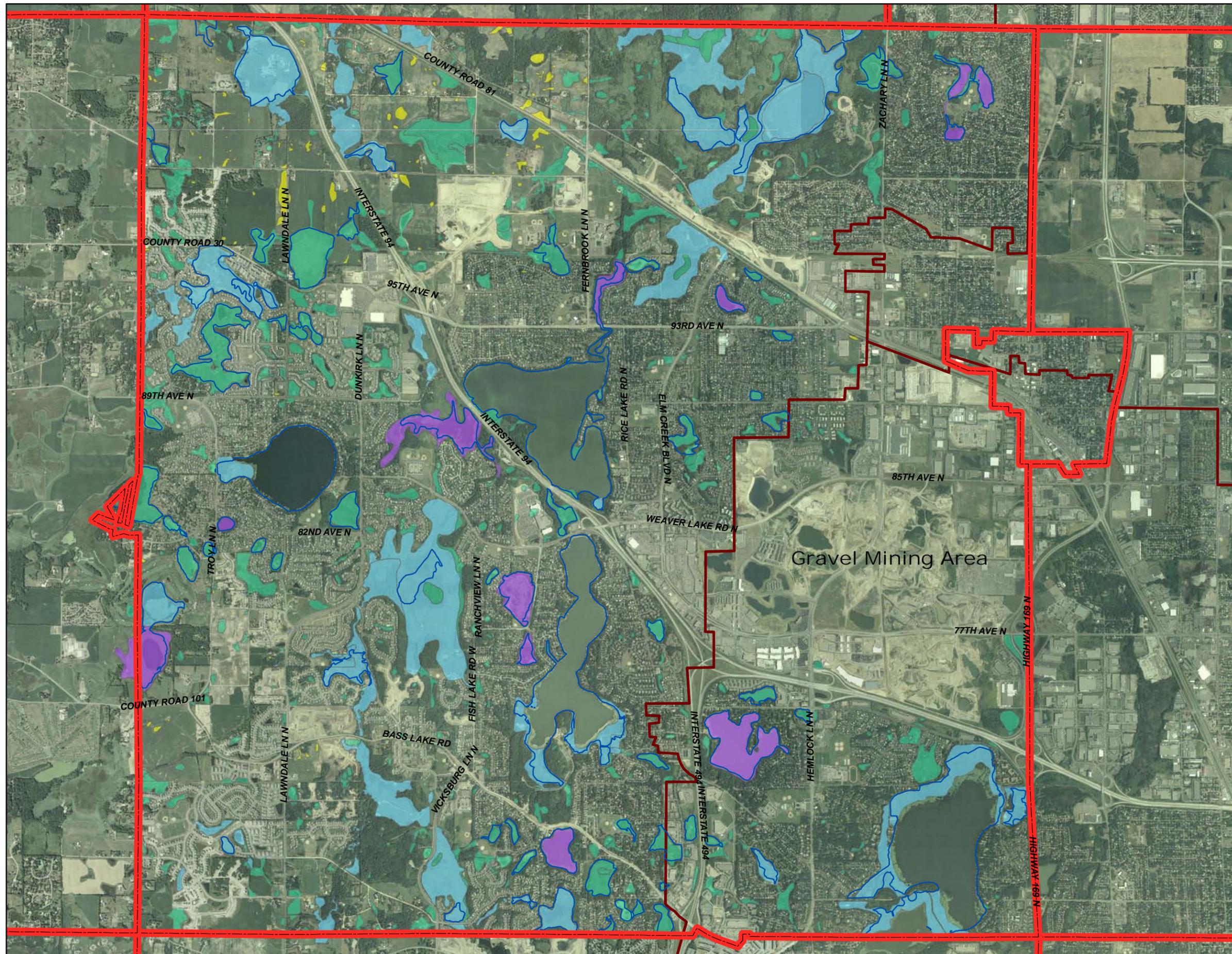


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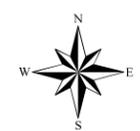


Figure A1.2

Wetland
Inventories
and Public Waters



-  City Boundaries
-  Public Waters Inventory
- 2007 City Wetland Inventory
 -  Manage - Preserve
 -  Manage - Restore
 -  Manage - Flexible
 -  Protect
 -  Other



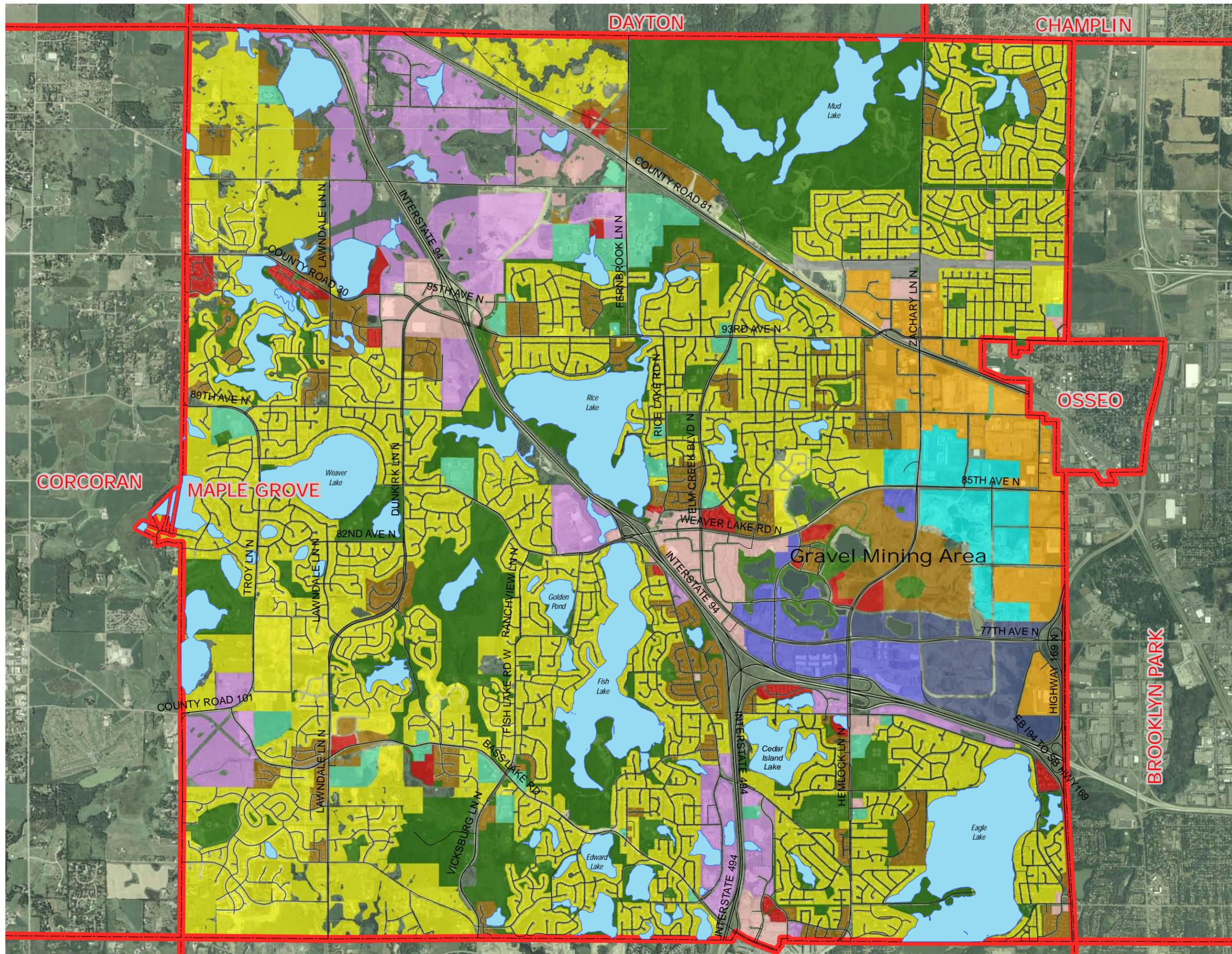
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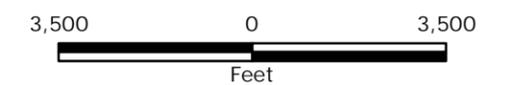
Surface Water
Management Plan

Figure A1.3

2030
Landuse



- Municipal Boundaries
- Public Waters
- Commercial
- High Density Residential
- Industrial
- Low-Medium Density Residential
- Mixed Density Residential
- Mixed Use
- Office/Warehouse
- Parks/Open Space
- Public
- Regional Mixed Use
- Regional Mixed Use-Office
- Right-of-Way

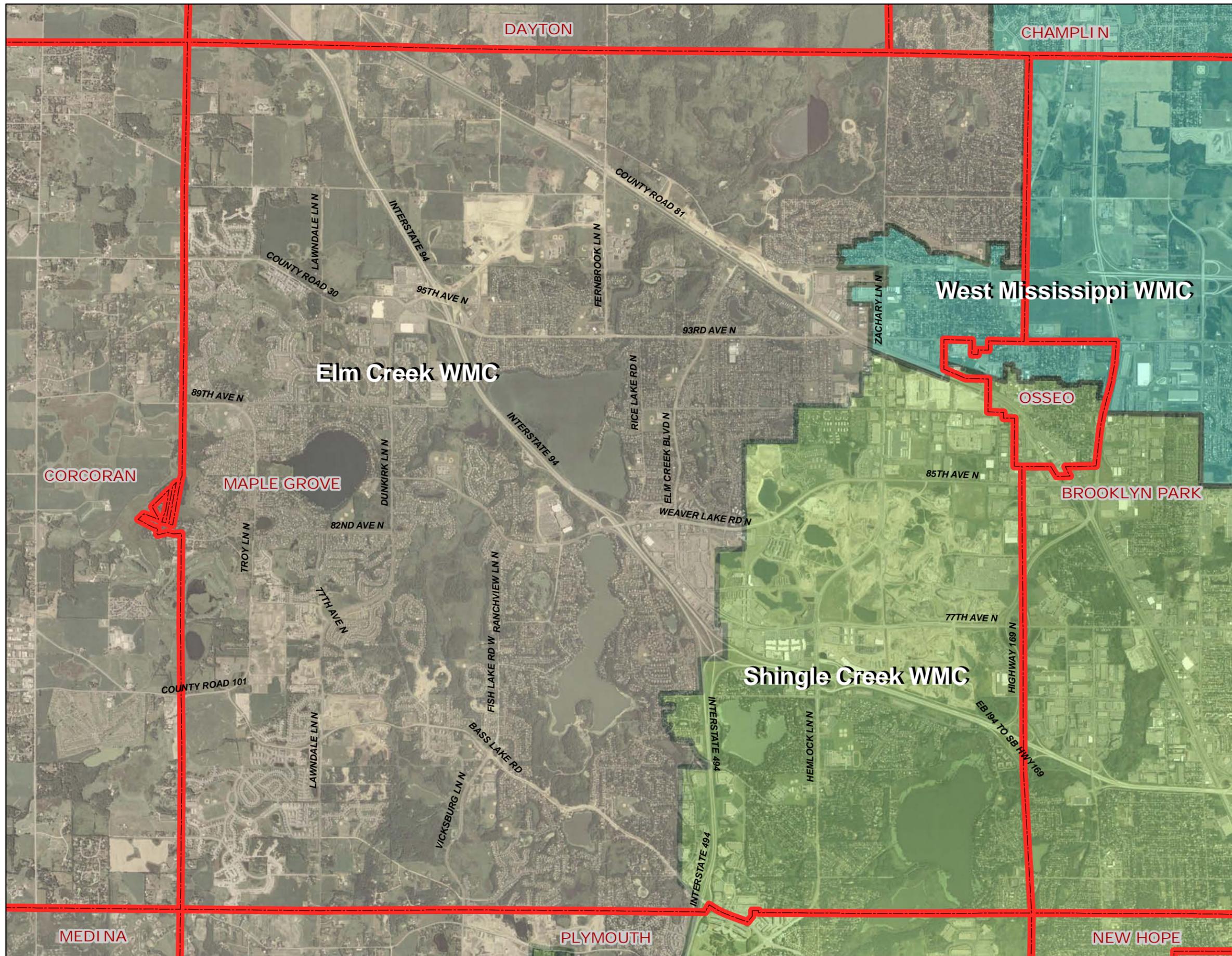


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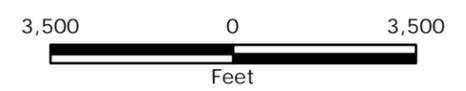
Surface Water
Management Plan

Figure A1.4

Water Management
Organizations



-  Municipal Boundaries
- Water Management Organizations
 -  Elm Creek WMC
 -  Shingle Creek WMC
 -  West Mississippi WMC

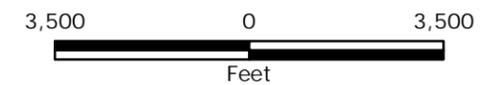


Surface Water
Management Plan

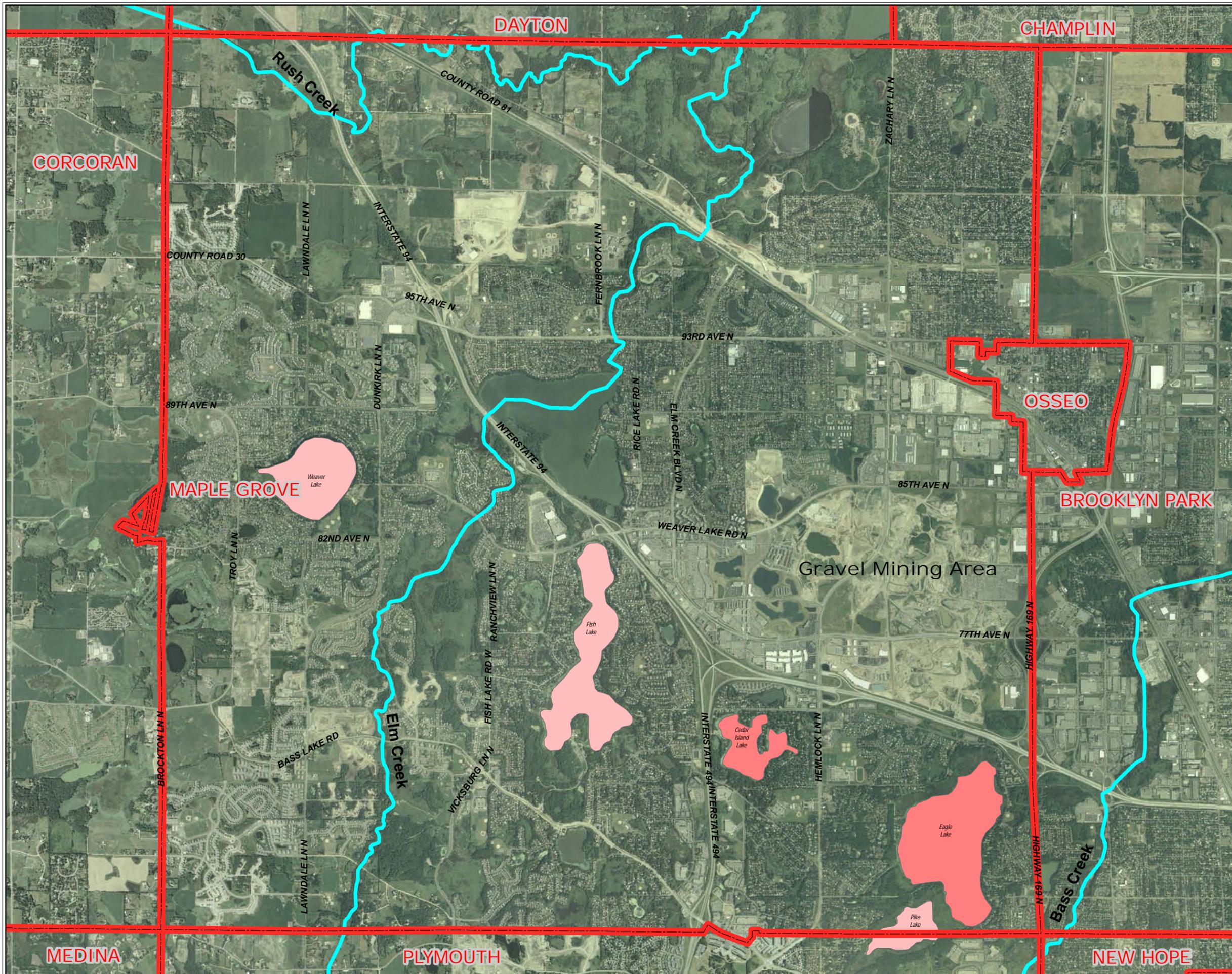
Figure A1.5

Impaired
Waters

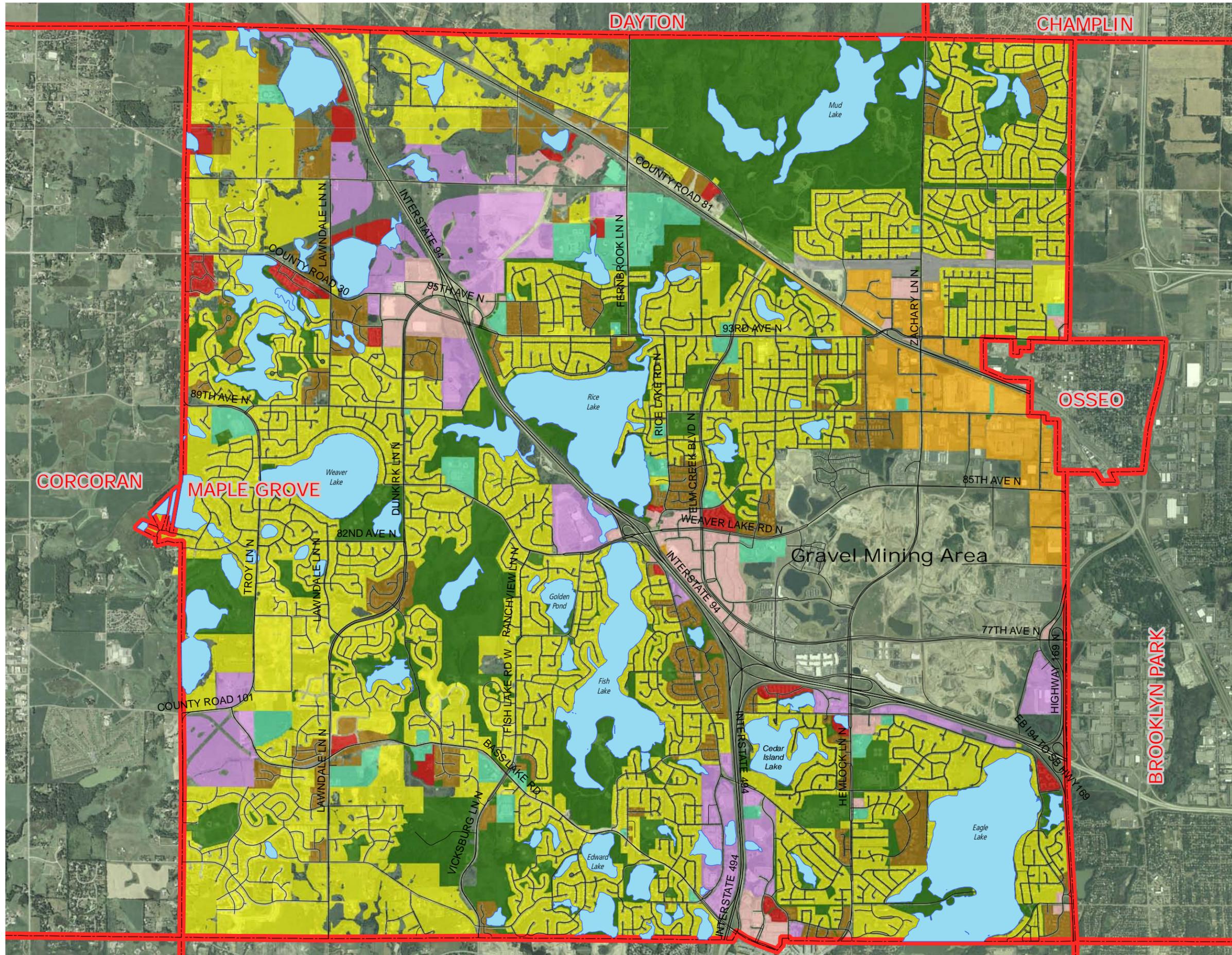
-  Municipal Boundaries
- Impaired Lakes**
 -  Aquatic Consumption
 -  Nutrients
-  Impaired Streams



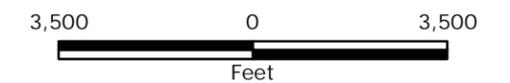
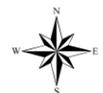
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Existing Conditions
Land Use



- Public Waters
- Municipal Boundaries
- Commercial
- High Density Residential
- Industrial
- Low-Medium Density Residential
- Mixed Density Residential
- Mixed Use
- Office/Warehouse
- Parks/Open Space
- Public
- Regional Mixed Use
- Regional Mixed Use-Office
- Right-of-Way



Appendix B - Development Guide (Submittal Requirements and City Design Standards)

Appendix B – Submittal Requirements

Appendix B – Design Standards

Stormwater Conveyance

1. All tributary areas must be accounted for in design calculations.
2. Storm sewer shall be designed utilizing the Rational Method. All calculations are subject to the City Engineer's approval.
3. All storm sewer shall be designed using 10-year return frequency storm intensities. 50-year return frequency storm intensities are required for areas that overland flow to erosion and/or flood-prone as determined by the City Engineer.
4. A Manning's "n" coefficient of 0.013 shall be used for the design of concrete and plastic sewer and a coefficient of 0.024 shall be used for corrugated metal pipe.
5. Provide for overflow routes to drain low points along streets or lot lines to ensure a minimum freeboard of 2 feet from the lowest adjacent (hydraulically connected) structure opening elevation. Some low points may be determined to act as ponding areas by the engineer and will require 2 feet of freeboard between the calculated 100-year HWL and lowest floor elevation. Design criteria verifying the adequacy of the overland drainage route capacity may also be required.
6. The maximum elevation difference between a street low point (gutter) and emergency overflow elevation is 18 inches.
7. Emergency overflows from all low points and stormwater basins must be clearly shown on plans with labeled elevations.
8. The maximum spacing between manholes is 400 feet.
9. To the greatest extent possible, manholes shall be placed in paved surfaces outside of wheel paths, (3 feet and 9 feet off centerline) or other readily accessible areas.
10. Minimum pipe size shall be 15 inches in diameter.
11. When possible, the inside top of pipe elevations between consecutive pipe segments must be designed to match.
12. Aprons or flared end sections shall be placed at all locations where the storm sewer outlets.
13. All inlet/outlet flared end sections shall be furnished with hot dipped galvanized trash guards. All trash guard installations will be subject to approval by the City Engineer.
14. The last three pipe joints from the flared end section shall be tied together.
15. Riprap and filter blanket shall be placed at all outlet flared end sections in accordance with the City's standard detail.
16. The invert elevations of the pond inlet flared end sections shall match the NWL of the pond. Submerged outlets will only be allowed at the discretion of the City Engineer.
17. If the storm sewer is to be installed less than 10 feet deep within private property, the easement shall be a minimum of 20 feet wide with the pipe centered in the easement. If the storm sewer is 10 feet deep or greater, then the easement shall be twice as wide as the depth or as required by the City.

18. Junction manholes should be designed to limit the hydraulic head increase by matching hydraulic flow lines and by providing smooth transition angles.
19. In the development of any subdivision or ponding area, the developer and/or property owner is responsible for the removal of all significant vegetation (trees, stumps, brush, debris, etc.) from any and all areas which would be inundated by the designated controlled normal water elevation (NWL) of any required ponding easement as well as the removal of all dead trees, vegetation, etc., to the High Water Level (HWL) of the pond.
20. Outlet control structures from ponding areas are required as directed by the City. Location and appearance of outlet structures shall be subject to City approval and may require landscape screening.
21. Inlets should be placed and located to eliminate overland flow in excess of 250 feet. Additionally, inlets should be located such that 3 cfs is the maximum flow at the inlet for the 10-year design storm.
22. Outlet velocities should be limited to 5 fps for the design storm.
23. Open channels should be designed with minimum longitudinal slopes of 2% or greater.
24. Open channel side slopes should be designed at 4:1 side slopes or flatter.
25. Riprap must be provided at points of juncture between two open channels.
26. Design velocities for open channels should be kept to a minimum for erosion prevention.
27. When high velocities are unavoidable, armament of the channel is required to prevent erosion.
28. Providing for maintenance access along open channels is required. A 12 feet wide area adjacent to the open channel should be provided at a maximum slope of 15%.

Stormwater Quantity

The term High Water Level (HWL), as used below, refers to the maximum water level generated by a Type II, 24-hour, 100-year rainfall event (5.9 inches of rain in 24 hours). For landlocked basins the HWL is determined based on the greater of the back to back 24-hour event and 10-day 7.2 inch runoff event.

1. All tributary area must be accounted for in design calculations.
2. Stormwater plans for development shall comply with this LSWMP and its updates.
3. Stormwater facilities shall be designed for a 100-year frequency storm for ponding detention basin design and trunk facilities.
4. An SCS 24-hour Type II storm distribution is to be used for stormwater basin and channel design.
5. Existing conditions must be met for the 2-year (2.8 inches in 24 hours), 10-year (4.2 inches in 24 hours), and 100-year storm events.
6. Stormwater basin designs must be checked to ensure that they can accommodate the 10-day 100-year snowmelt event without exceeding the calculated 100-year HWL.
7. CN values published by the Natural Resources Conservation Service (NRCS) shall be used for stormwater modeling. One exception is for agricultural land which shall be modeled using a CN value of 65 (assuming HSG "B" soils).
8. All impervious area directly connected to a storm sewer system directly connected to a pond must be modeled separately from the remaining area for proper stormwater basin sizing.
9. Deep ripping to a minimum of one foot of depth is required prior to lot development. When not met, the minimum topsoil depth will increase from 4" to 8".
10. Stormwater basin HWLs shall be modeled assuming conservative pipe head losses. Pipe head losses shall conversely be conservatively lowered when calculated peak flows.
11. Stormwater detention facilities constructed in the City of Maple Grove shall be designed according to the standards reflected in the MPCA publication Protecting Water Quality in Urban Areas, the Minnesota Stormwater Manual, MPCA Best Management Practices Handbook, Met Council Minnesota Small Sites BMP Manual and the design criteria from the National Urban Runoff Program.
12. Maximum allowed pond slopes are 6:1. When approved by the City Engineer, pond slopes steeper than 4:1 shall have erosion control blanket installed immediately after finish grading. In residential areas slopes no steeper than 4:1 shall be allowed. Maximum 3:1 slopes are allowed in "maintained" areas as approved by the City Engineer. Maximum 3:1 slopes are allowed for road fill sections adjacent to waterbodies.
13. A 12-foot wide maintenance access at a maximum grade of 15% to the normal water level of all basins must be provided. At a minimum, access must be provided to the basin outlet structure, all inlets to the basin, and to the first cell of a multi-cell basin.
14. Elevation separations of buildings with respect to ponds, lakes, streams, and stormwater features shall be designed as follows:

- a. The lowest floor elevation of homes and buildings must be a minimum of two feet above the calculated 100-year HWL or the lowest opening must be two feet above the EOF, whichever criteria leads to the higher elevation.
 - b. Landlocked lakes and wetlands require a three-foot separation between the lowest ground elevation adjacent to the building and the calculated basin HWL for back-to-back 100-year storms.
15. Maximum pond depth is 10 feet.
16. All ponds shall have outlet skimming for up to the 10-year event.
17. All ponds shall be graded to one-foot below design bottom elevation. This "hold down" allows sediment storage until such time as site restoration is complete.
18. The top berm elevation of ponds shall be a minimum of 1 foot above the 100-year pond HWL.
19. Grading shall not block or raise emergency overflows from adjoining properties unless some provision has been made for the runoff that may be blocked behind such an embankment.
20. Minimum grade for lot drainage swales and lot grading shall be 2% or greater.
21. Maximum length for drainage swales shall be the lesser of 250 feet or a total of four lots draining to a point, or as approved by the City Engineer.
22. Utilization of existing wetlands for stormwater management is subject to review by the appropriate regulatory agency in accordance with the Wetland Conservation Act.
23. Seeding around ponds should be MnDOT standard mix 28B (328) or BWSR equivalent.

Stormwater Quality

1. All tributary area must be accounted for in design calculations.
2. At a minimum, the permanent pool should be equivalent to the runoff from the 2.5-inch, 24-hour rainfall event or 60% total phosphorus reduction and 85% TSS reduction.
3. The distance between basin inlets and outlets should be maximized to the greatest extent feasible.
4. When modeling water quality ponds, the methodology laid out in the City's "Requirements of New Development" must be followed (attached at the end of this appendix).
5. Conformance with NURP recommendations.

Stormwater Abstraction

1. Infiltration shall be required for any site containing Hydrologic Soil Groups (HSG) A or B as identified in the Hennepin County Soil Survey.
2. When designing for infiltration, the following requirements shall apply:
 - a. Volume: The volume of runoff is calculated from the site impervious area (assuming 90% runoff) from a storm event of 0.5 inches.
 - b. Infiltration Rates: Actual measured rates by a double ring infiltrometer test (or an alternate test approved by the City engineer) are recommended for sizing infiltration basins. Where not available, the following soil infiltration rates are to be used for infiltration basin design.
 - HSG "A" = 0.38 in/hr
 - HSG "B" = 0.23 in/hr
 - HSG "C" = 0.10 in/hr
 - HSG "D" = 0.03 in/hr
 - c. Area: The area required for infiltration is calculated using the above volume and rates and a selected design infiltration period, not to exceed 48 hours. Vegetation shall be selected that tolerates the design inundation period and the area shall be large enough to limit maximum water depths to 2 feet for Type A soils, 1.4 feet for Type B soils, 0.6 feet for Type C soils, and 0.2 feet for Type D soils. Wet pond areas below the NWL are not to be used in satisfying infiltration requirements. Areas above the NWL can be used if infiltration through a separate outlet or discharge can be demonstrated.
 - d. Other: Pretreatment (sediment removal) is required for infiltration areas; groundwater separation, construction and maintenance shall meet NPDES requirements.
3. As an alternative to infiltration, capture and reuse should be considered and is suitable for all soil types. Similar to infiltration, the system should be designed to abstract a minimum of 0.5-inches of runoff from new impervious areas.
4. When infiltration and capture/reuse are determined to be infeasible, the inclusion of filtration/bioretention should be considered. The same design criteria outlined for infiltration areas should be used with the addition of draintile included under a sand layer to provide filtration.

Site Map and Grading Plan Requirements

The site map and grading plan shall contain all the following information. Specifications shall contain information covering construction and material requirements.

- 1) Existing and proposed topography of the site taken at a contour interval sufficiently detailed to define the topography over the entire site. Ninety percent of the contours shall be accurate within one-half contour interval of the true location.
- 2) Contour lines that extend a minimum of 100 feet off the site, or sufficient to show on- and off-site drainage.
- 3) The site's property lines shown in true location with respect to the plan's topographic information.
- 4) Spot elevations for proposed:
 - a) Lot corners;
 - b) Side yard critical break points where water flows to either front or back of property;
 - c) Arrows indicating direction of flow where slopes are flatter than 2.5%;
 - d) Emergency Overflows (EOFs) for:
 - i) Pond overflow;
 - ii) Street and cul-de-sac overflow;
 - iii) Landscaped basins (typically rear yard basins with a catch basin);
 - iv) Impounded swales that depend upon a storm conveyance system (i.e. pipe or sewer) for drainage;
 - e) Inverts for all points where surface water enters a storm conveyance system;
 - f) Grade elevations at the front and back of each residential structure;
- 5) Elevations of adjacent structures that may be affected by site EOFs and drainage;
- 6) Normal water level and 100-year water level for all ponds and wetlands;
- 7) Location and elevation of floodplains on or within 100 feet of the subject property boundaries;
- 8) Location of wetland delineations;
- 9) Location of wetland and mitigation area buffer signs;
- 10) Label percent slopes of all driveways with a grade of 8 percent or more;
- 11) Location and graphic representation of all existing and proposed natural and manmade drainage facilities.
- 12) Detailed plans of all surface and subsurface drainage devices, walls, cribbing, dams and other protective devices to be constructed with or as a part of the proposed work, together with a map showing the drainage area and the estimated runoff of the area served by any drain.
- 13) Location and graphic representation of proposed excavations and fills, of on-site storage of soil and other earth material, and of on-site disposal.
- 14) Location of proposed final surface runoff and erosion and sediment control measures.
- 15) Quantity of soil or earth material in cubic yards to be excavated, filled, stored or otherwise utilized on-site.
- 16) Outline of the methods to be used in clearing vegetation, and in storing and disposing of the cleared vegetative matter.

- 17) Proposed sequence and schedule of excavation, filling and other land disturbing and filling activities, and soil or earth material storage and disposal.
- 18) Location of any buildings or structures on the property where the work is to be performed and the location of any buildings or structures on land of adjacent owners which are within 50 feet of the property or those buildings or structures which may be affected by the proposed grading operations.
- 19) Locating of all best management practices (BMPs) including:
 - a) Silt fence;
 - b) Additional swale and slope breaks for controlling the energy of extended areas surface water flow;
 - c) Temporary sedimentation ponds;
 - d) Rock construction entrances with a note that acknowledges these features will be inspected daily and frequently maintained.
 - e) Catch basin inserts (both street and yard)

Minimum Specifications for All Residential Development Plans:

- 1) Maximum grade is 4:1 (H:V).
- 2) Minimum grade is a continuous 2% (not averaged over any length of 10 feet or more) and at least 6 inches of drop in grade within 25 feet of the foundation.
- 3) Critical side yard elevation must be at least 6 inches below the grade of the adjacent foundation.
- 4) Drainage paths should be aligned to property lines whenever possible, and must be located within drainage and utility easements.
- 5) Wetland and wetland buffers must be located within drainage and utility easements.
- 6) Emergency overflow locations must be situated at least two feet below the lowest opening of any residence within the localized basin and must be protected within a drainage and utility easement.

Minimum Specifications for All Non-Residential Development Plans:

- 1) Preferred maximum grade is 4:1 (H:V) although a maximum grade of 3:1 is permissible where erosion and sediment control plans show seeded, biodegradable blankets installed on all slopes exceeding the 4:1 grade.
- 2) Minimum grade is a continuous 2% (not averaged over any length of 10 feet or more).
- 3) Drainage paths should be aligned to property lines whenever possible, and must be located within drainage and utility easements.
- 4) Wetland and wetland buffers must be located within drainage and utility easements.

Appendix C - Modeling Data and Results

**APPENDIX C
WATERSHED SUBDISTRICT AREAS**

ELM CREEK	
DRAINAGE AREA	ACREAGE
EC-A1	15.7
EC-A2	51.3
EC-A3	52.7
EC-A4	8.5
EC-A5	118.8
EC-A6	46.7
EC-A7	103.2
EC-A8	57.3
EC-A9	95.7
EC-A10	11.0
EC-A11	166.2
EC-A13	18.1
EC-A14	78.2
EC-A15	68.2
EC-A16	45.6
EC-A17	71.9
EC-A18	40.5
EC-A19	47.4
EC-A20	52.4
EC-A22	218.8
EC-A23	20.5
EC-A24	46.7
EC-A25	30.3
EC-A26	28.6
EC-A27	30.5
EC-A29	387.9
EC-A30	355.9
EC-A31	8.1
EC-A33	44.8
EC-A34	53.4
EC-A35	20.4
EC-A36	33.0
EC-A37	48.1
EC-A38	7.8
EC-A39	6.1
EC-A40	11.5
EC-A42	39.7
EC-A43	135.0
EC-A44	36.6
EC-A45	76.1
EC-A46	35.4
EC-A47	73.7
EC-A48	12.7
EC-A49	363.0
EC-A50	85.8
EC-A51	90.0
EC-A52	41.3
EC-A53	616.0
EC-A54	57.9
EC-A55	13.6
EC-A56	35.6
EC-A57	10.6
EC-A58	13.0
EC-A59	4.9
EC-A60	14.0
EC-A61	18.7
EC-A62	37.8
EC-A63	17.9
EC-A64	53.5
EC-A65	131.0
EC-A66	11.9
EC-A67	55.6
EC-A68	29.0
EC-A69	32.7
EC-A70	7.8
EC-A71	111.2
EC-A72	191.7
EC-A73	12.7
EC-A74	16.2
EC-A75	71.2
EC-A76	8.6
EC-A77	28.4
EC-A78	170.0
EC-A79	387.1

ELM CREEK CONT'D	
DRAINAGE AREA	ACREAGE
EC-A80	18.8
EC-A81	104.8
EC-A82	14.8
EC-A83	11.4
EC-A84	41.4
EC-A85	40.2
EC-A86	65.9
EC-A87	97.7
EC-A88	7.9
EC-A89	857.7
EC-A90	45.3
EC-A91	220.7
EC-A92	45.1
EC-A93	45.7
EC-A94	68.1
EC-A95	31.8
EC-A96	23.6
EC-A97	21.9
EC-A98	176.4
EC-A99	52.1
EC-A100	159.0
EC-A101	247.1
EC-A102	155.1
EC-A103	8.2
EC-A104	80.8
EC-A105	10.2
EC-A106	37.9
EC-A107	312.0
EC-A108	50.8
EC-A109	29.7
EC-A110	64.6
EC-A111	13.6
EC-A112	148.1
EC-A113	21.5
EC-A114	207.2
EC-A115	32.0
EC-A116	25.6
EC-A117	120.7
EC-A118	165.1
EC-A121	382.7
EC-A122	110.8
EC-A124	61.6
EC-A125	305.0
EC-A126	143.9
EC-A127	9.8
EC-A129	195.7
EC-A131	56.9
EC-A133	86.2
EC-A134	68.7
EC-A135	90.2
EC-A136	20.4
EC-A137	135.3
SUBTOTAL	11,197.2

**APPENDIX C
WATERSHED SUBDISTRICT AREAS**

FISH LAKE

DRAINAGE AREA	ACREAGE
FL-A1	18.5
FL-A2	29.0
FL-A3	35.7
FL-A4	81.6
FL-A5	10.9
FL-A7	14.4
FL-A8	57.4
FL-A9	33.3
FL-A10	23.9
FL-A11	89.0
FL-A12	29.2
FL-A13	18.5
FL-A14	67.9
FL-A15	47.2
FL-A17	65.7
FL-A19	70.1
FL-A20	3.8
FL-A22	137.6
FL-A26	11.7
FL-A27	14.0
FL-A28	11.2
FL-A29	130.3
FL-A30	76.2
FL-A32	8.7
FL-A33	26.23
FL-A34	639.3
SUBTOTAL	1,751.4

RUSH CREEK

DRAINAGE AREA	ACREAGE
RC-A1	224.3
RC-A2	26.9
RC-A3	48.6
RC-A4	258.7
RC-A5	64.4
RC-A6	16.7
RC-A7	8.2
RC-A9	43.0
RC-A10	224.0
RC-A11	201.1
RC-A13	11.9
RC-A14	16.3
RC-A15	26.3
RC-A16	58.6
RC-A17	22.1
RC-A19	18.3
RC-A20	28.6
RC-A21	34.8
RC-A22	52.5
RC-A24	121.7
RC-A25	147.3
RC-A26	136.7
RC-A27	199.1
RC-A28	213.6
RC-A29	195.8
RC-A30	352.7
RC-A32	127.1
RC-A33	89.5
RC-A34	325.9
SUBTOTAL	3,294.7

SHINGLE CREEK

DRAINAGE AREA	ACREAGE
SC-A1	16.1
SC-A2	39.4
SC-A3	53.7
SC-A4	30.3
SC-A5	41.4
SC-A6	58.0
SC-A8	27.1
SC-A9	119.9
SC-A10	139.1
SC-A11	37.5
SC-A12	9.8
SC-A13	39.8
SC-A14	4.4
SC-A15	86.8
SC-A16	29.9
SC-A17	58.3
SC-A18	427.7
SC-A19	159.6
SC-A20	27.9
SC-A21	2.8
SC-A22	732.1
SC-A23	27.2
SC-A25	44.5
SC-A26	56.4
SC-A28	14.7
SC-A30	13.0
SC-A31	57.4
SC-A32	91.4
SC-A33	127.5
SC-A34	72.1
SC-A36	126.6
SC-A40	50.3
SC-A43	53.0
SC-A45	170
SC-A47	141.9
SC-A51	361.4
SC-A52.1	166.1
SC-A52.2	25
SC-A52.3	54.4
SC-A52.4	17.4
SC-A53	100.3
SC-A54	28.3
SC-A55	92.4
SC-A56	98.69
SC-A57	84.2
SC-A58	240.3
SC-A59	195.1
SC-A60	107.7
SC-A61	93.4
SC-A62	49.6
SC-A65	224.8
SC-A66	69.8
SC-A67	200
SUBTOTAL	5,396.4

WEST MISSISSIPPI

DRAINAGE AREA	ACREAGE
WM-A1	103.4
WM-A2	108.8
WM-A3	81.7
WM-A4	413.6
WM-A6	42.9
WM-A7	32.5
WM-A8	212.8
SUBTOTAL	995.7

**APPENDIX C
WATER QUANTITY MODELING RESULTS**

FROM	TO	TRIBUTARY AREA (AC)			WATER LEVEL (FT)		100-YR FLOOD STORAGE VOLUME (AC-FT)	PEAK FLOW (CFS)		
		DIRECT	ROUTED	TOTAL	NWL	100-YR HWL		2-YR	10-YR	100-YR
West Mississippi District										
CMP-1	WM-P1	69.3	0.0	69.3	not applicable ¹			27.6	76.0	146.7
WM-P1	BP-10	103.4	69.3	172.7	870.0	884.1	42.9	0.7	0.7	0.7
WM-P2	BP-8	108.8	0.0	108.8	873.4	880.3	16.4	7.1	14.1	19.9
WM-P3	BP-9	81.7	0.0	81.7	870.0	880.5	18.5	2.0	2.0	2.0
WM-P4	BP-7	413.6	0.0	413.6	900.0	915.7	64.4	26.8	34.8	40.0
WM-P6	WM-A7	42.9	0.0	42.9	887.0	891.8	8.9	0.5	0.7	0.9
WM-P7	WM-A8	32.5	42.9	75.4	883.0	887.0	6.6	1.8	10.0	17.9
WM-P8	BP-6	212.8	75.4	288.2	880.0	888.8	21.7	17.0	48.7	78.5
Shingle Creek District										
SC-P1	SC-P2	16.1	0.0	16.1	942.0	943.4	2.4	0.6	2.3	5.8
SC-P2	SC-P5	39.4	16.1	55.5	936.0	939.5	3.6	6.6	25.7	48.5
SC-P3	SC-P4	53.7	0.0	53.7	929.5	930.4	13.9	0.4	1.4	3.4
SC-P4	SC-P5	30.3	53.7	84.0	926.0	927.9	6.2	0.7	2.4	4.5
SC-P5	SC-P9	41.4	139.5	180.9	925.7	926.8	6.6	8.0	29.1	62.8
SC-P6	SC-P9	58.0	0.0	58.0	926.5	930.2	8.9	3.9	9.8	20.7
SC-P8	SC-P9	27.1	0.0	27.1	916.1	921.0	2.5	7.5	15.3	21.9
SC-P9	SC-A10	119.9	266.0	385.9	905.5	910.5	42.8	8.5	18.5	41.8
SC-A10	PLY-8	139.1	395.7	534.8	not applicable ²			48.4	128.8	249.3
SC-P11	SC-P18	37.5	0.0	37.5	924.5	928.0	3.1	3.5	14.1	24.1
SC-P12	SC-A10	9.8	0.0	9.8	896.0	897.1	1.5	0.3	1.3	2.9
SC-P13	SC-P22	39.8	0.0	39.8	881.0	882.2	4.4	0.8	7.8	29.2
SC-P14	SC-P15	4.4	0.0	4.4	909.1	909.8	0.6	0.1	0.4	1.1
SC-P15	SC-P18	86.8	4.4	91.2	904.6	907.0	22.0	2.6	6.9	9.8
SC-P16	SC-P17	29.9	0.0	29.9	906.0	908.3	3.1	5.2	19.3	34.4
SC-P17	SC-P18	58.3	29.9	88.2	906.0	909.5	17.7	2.9	8.1	10.7
SC-P18	SC-P19	427.7	216.9	644.6	901.5	913.2	156.1	6.0	6.0	6.0
SC-P19	SC-P22	159.6	644.6	804.2	914.0	920.3	38.9	6.2	7.0	7.6
SC-P20	SC-P22	27.9	0.0	27.9	909.0	913.7	2.7	3.7	10.8	14.5
SC-P21	SC-P22	2.8	0.0	2.8	920.0	920.8	0.2	0.2	0.9	2.2
PLY-9	SC-P22	278.8	534.8	813.6	not applicable ¹			56.3	154.3	299.1
SC-P22	SC-P26	732.1	813.6	1545.7	873.6	874.7	559.4	0.0	2.2	13.1
SC-P23	PLY-10	27.2	0.0	27.2	883.5	886.1	3.4	1.7	24.5	77.4
SC-P25	BP-1	44.5	0.0	44.5	885.0	890.2	4.4	10.0	22.6	33.5
SC-P26	BP-2	56.4	1545.7	1602.1	872.7	874.6	6.5	3.0	10.6	18.6
SC-P28	SC-P32	14.7	0.0	14.7	912.2	914.5	1.7	0.9	4.4	11.1
SC-P30	SC-P32	13.0	0.0	13.0	898.1	900.2	1.4	0.8	3.8	7.1
SC-P31	SC-P32	57.4	0.0	57.4	909.9	912.8	8.0	2.0	7.2	12.5
SC-P32	SC-P22	91.4	135.4	226.7	873.7	876.1	24.8	6.4	20.2	42.5
SC-P33	SC-P34	127.5	0.0	127.5	886.0	888.4	14.2	1.4	6.7	16.8
SC-P34	SC-P22	72.1	127.5	199.6	881.5	881.7	1.3	28.7	92.7	190.7
SC-P36	SC-P52.1	126.6	0.0	126.6	922.6	926.7	14.4	5.5	38.5	129.0
SC-P40	SC-P32	50.3	0.0	50.3	882.5	884.0	5.9	2.5	9.3	23.7
SC-P44	SC-P47	53.0	0.0	53.0	906.0	910.0	4.4	8.9	28.2	46.1
SC-P45	SC-P47	170.0	0.0	170.0	892.0	897.7	49.3	1.6	2.3	3.0
SC-P47	SC-P58	141.9	223.0	364.9	885.0	890.9	43.1	8.6	14.6	17.8
SC-P51	SC-P57	361.4	262.9	624.3	892.0	900.3	190.9	20.2	25.7	29.1
SC-P52.1	SC-P52.2	166.1	0.0	166.1	900.0	909.8	15.3	98.3	217.1	336.4
SC-P52.2	SC-P51	25.0	166.1	191.1	898.5	906.7	24.9	16.2	88.9	261.6
SC-P52.3	SC-P52.4	54.4	0.0	54.4	904.0	910.3	5.5	64.0	111.9	140.0
SC-P52.4	SC-P51	17.4	54.4	71.8	901.0	909.4	14.8	29.2	31.6	35.7
SC-P53	SC-P55	100.3	0.0	100.3	886.0	891.0	32.1	2.8	3.5	4.3
SC-P54	SC-P55	28.3	0.0	28.3	886.0	890.4	10.8	2.3	3.0	3.7
SC-P55	SC-P57	92.4	128.6	221.0	884.0	887.1	34.2	6.2	20.8	72.9
SC-P56	SC-P58	98.7	0.0	98.7	886.5	891.7	23.3	5.7	7.6	9.4
SC-P57	SC-P58	84.2	845.3	929.5	881.0	885.9	41.5	25.1	43.7	103.3
SC-P58	BP-5	240.3	1500.8	1741.1	878.9	888.4	72.7	59.6	98.5	152.1
SC-P59	SC-A61	195.1	0.0	195.1	888.0	892.3	7.2	17.1	86.5	189.8
SC-P60	SC-P58	107.7	0.0	107.7	878.5	888.0	27.6	23.0	23.0	23.0
SC-P61	BP-11	93.4	195.1	288.5	887.0	893.3	10.7	18.8	99.9	238.7
SC-P62	BP-4	49.6	0.0	49.6	904.0	908.6	4.1	18.5	52.0	78.1
SC-P65	SC-P67	224.8	0.0	224.8	896.3	902.0	80.2	4.5	6.7	9.1
SC-P66	SC-P67	69.8	0.0	69.8	not applicable ²					
SC-P67	BP-3	200.0	294.6	494.6	886.0	892.9	111.9	9.0	11.6	14.0

**APPENDIX C
WATER QUANTITY MODELING RESULTS**

FROM	TO	TRIBUTARY AREA (AC)			WATER LEVEL (FT)		100-YR FLOOD STORAGE VOLUME (AC-FT)	PEAK FLOW (CFS)		
		DIRECT	ROUTED	TOTAL	NWL	100-YR HWL		2-YR	10-YR	100-YR
Rush Creek District										
RC-P1	Landlocked	224.3	0.0	224.3	939.0	940.4	49.0	0.0	0.0	0.0
RC-P2	RC-P4	26.9	0.0	26.9	934.8	936.3	5.6	0.2	0.6	0.9
RC-P3	RC-P4	48.6	0.0	48.6	935.2	936.0	10.2	0.2	0.9	2.2
RC-P4	COR-4	258.7	75.5	334.2	931.0	932.6	76.3	56.0	173.7	359.1
RC-P5	COR-3	64.4	0.0	64.4	930.0	933.5	12.6	16.8	65.8	146.3
RC-P6	RC-P10	16.7	0.0	16.7	934.0	935.0	2.1	0.3	1.2	2.9
RC-P7	RC-A16	8.2	0.0	8.2	942.0	942.0	1.1	6.5	6.5	6.5
RC-P9	RC-P10	43.0	0.0	43.0	940.2	942.4	5.1	2.1	8.3	16.8
RC-P10	RC-P11	224.0	59.7	283.7	926.0	927.4	68.3	0.6	1.8	3.6
RC-P11	RC-A24	201.1	13877.3	14078.4	924.0	926.4	147.6	226.8	688.9	618.5
RC-P13	RC-P11	11.9	0.0	11.9	931.8	933.0	2.4	0.3	0.6	0.9
RC-P14	RC-P11	16.3	22.1	38.4	928.0	929.9	4.1	0.5	0.9	1.2
RC-P15	RC-A16	26.3	0.0	26.3	932.0	934.7	4.0	2.9	5.6	6.3
COR-2	RC-A16	13450.2	0.0	13450.2	not applicable ¹			248.1	525.1	884.4
RC-A16	RC-P11	58.6	13484.7	13543.3	not applicable ²			236.4	505.7	849.3
RC-P17	RC-P14	22.1	0.0	22.1	932.0	932.8	2.0	0.3	0.9	2.1
COR-1	RC-P19	15.0	0.0	15.0	not applicable ¹			0.3	0.8	1.5
RC-P19	RC-P20	18.3	15.0	33.3	not applicable ¹			0.5	1.0	1.4
RC-P20	RC-P21	28.6	33.3	61.9	not applicable ¹			0.8	2.5	3.3
RC-P21	RC-P22	34.8	61.9	96.7	not applicable ¹			1.6	3.8	5.0
RC-P22	RC-A24	52.5	96.7	149.2	not applicable ¹			2.3	5.9	11.7
RC-A24	RC-P28	121.7	14227.6	14349.3	not applicable ²			223.0	375.0	580.8
RC-P25	RC-P28	147.3	0.0	147.3	914.0	917.5	28.2	3.7	9.4	14.2
RC-P26	RC-P28	136.7	0.0	136.7	930.0	934.4	35.7	9.3	16.0	21.8
RC-P27	RC-P28	199.1	0.0	199.1	928.5	934.5	43.3	14.8	25.3	33.9
DTN-4	RC-P28	14757.1	0.0	14757.1	not applicable ¹			151.4	371.0	656.3
RC-P28	RC-A30	213.6	29589.5	29803.1	904.0	919.2	2063.7	255.4	491.3	780.5
RC-P29	RC-P30	195.8	0.0	195.8	910.0	910.8	52.7	10.0	11.0	11.5
RC-P30	RC-A34	352.7	195.8	548.5	904.0	910.5	140.8	2.6	3.1	3.7
RC-P32	RC-A33	127.1	0.0	127.1	907.4	909.3	22.6	0.6	1.5	2.4
RC-A33	RC-A34	89.5	30478.7	30568.2	not applicable ²			257.5	494.9	785.3
RC-A34	DTN-3	325.9	30568.2	30894.1	not applicable ²			257.5	494.9	785.3

Fish Lake District										
FL-P1	FL-P3	18.5	0.0	18.5	952.0	952.8	5.8	0.2	0.5	0.7
FL-P2	FL-P3	29.0	0.0	29.0	944.2	944.9	8.3	0.2	0.8	1.8
FL-P3	FL-P8	35.7	47.5	83.2	939.1	941.2	8.1	0.7	1.4	2.0
FL-P4	FL-P8	81.6	0.0	81.6	932.1	933.4	19.4	0.5	1.4	2.3
FL-P5	FL-P7	10.9	0.0	10.9	936.0	936.8	2.1	0.2	0.6	1.6
FL-P7	FL-P8	14.4	10.9	25.3	929.0	930.0	2.1	0.4	1.5	4.1
FL-P8	FL-P11	57.4	190.1	247.5	917.5	920.3	7.9	2.3	7.1	14.2
FL-P9	FL-P10	33.3	0.0	33.3	914.0	919.8	8.2	1.1	1.7	2.2
FL-P10	FL-P17	23.9	33.3	57.2	904.2	905.4	7.3	0.7	1.3	1.9
FL-P11	FL-P17	89.0	247.5	336.5	898.0	902.3	5.9	14.6	49.0	91.7
FL-P12	FL-P14	29.2	0.0	29.2	940.0	941.1	5.5	0.2	0.9	2.4
FL-P13	FL-P34	18.5	0.0	18.5	925.8	932.6	0.9	7.0	15.4	22.3
FL-P14	FL-P15	67.9	29.2	97.1	936.2	937.0	25.1	0.2	0.6	1.0
FL-P15	FL-P34	47.2	97.1	144.3	896.0	902.1	16.8	0.0	0.3	1.1
FL-P17	FL-P34	65.7	393.7	459.4	894.0	897.7	47.7	2.3	6.0	8.8
FL-P19	FL-P34	70.1	0.0	70.1	897.9	901.8	5.1	5.9	19.5	90.9
FL-P20	FL-P34	3.8	0.0	3.8	908.0	908.9	0.5	0.2	0.6	1.2
FL-P22	FL-P34	137.6	0.0	137.6	898.7	903.1	29.7	3.0	5.9	6.6
FL-P26	FL-P27	11.7	0.0	11.7	933.3	934.6	1.6	0.5	1.8	3.4
FL-P27	FL-P29	14.0	11.7	25.7	919.7	922.1	3.2	0.8	2.5	3.6
FL-P28	FL-P29	11.2	0.0	11.2	911.3	912.1	1.8	0.3	1.0	2.4
FL-P29	FL-P30	130.3	36.9	167.2	898.1	899.5	46.1	0.1	0.6	1.3
FL-P30	FL-P34	76.2	167.2	243.4	897.5	899.3	17.2	0.8	2.6	4.3
FL-P32	FL-P33	8.7	0.0	8.7	912.3	914.6	2.2	0.0	0.0	0.0
FL-P33	FL-P34	26.2	8.7	35.0	914.5	920.6	3.5	4.2	7.1	9.2
FL-P34	EC-A81	639.3	1112.1	1751.4	901.0	902.0	348.7	0.9	3.1	7.6

**APPENDIX C
WATER QUANTITY MODELING RESULTS**

FROM	TO	TRIBUTARY AREA (AC)			WATER LEVEL (FT)			100-YR FLOOD STORAGE VOLUME (AC-FT)	PEAK FLOW (CFS)		
		DIRECT	ROUTED	TOTAL	NWL	100-YR HWL	2-YR		10-YR	100-YR	
Elm Creek District											
COR-9	EC-A1	0.0	197.5	197.5	not applicable ¹			10.1	36.6	56.4	
EC-A1	PLY-1	1.8	197.5	199.3	not applicable ¹			10.2	36.9	60.6	
EC-P1	EC-P3	15.7	0.0	15.7	961.2	962.4	1.3	0.5	1.8	3.6	
COR-7	EC-P2	0.0	5.6	5.6	not applicable ¹			2.5	8.3	11.0	
COR-8	EC-P3	0.0	14.2	14.2	not applicable ¹			1.4	8.1	19.1	
EC-P2	EC-A3	51.3	5.6	56.9	966.5	968.4	1.7	1.9	5.4	14.8	
EC-P3	PLY-2	52.7	86.8	139.5	959.0	961.4	11.2	4.2	8.8	15.7	
EC-P4	EC-P5	8.5	0.0	8.5	975.1	975.6	1.9	0.1	0.3	0.5	
EC-P5	EC-P6	118.8	8.5	127.3	960.3	964.5	20.3	1.5	2.1	2.5	
EC-P6	EC-P8	46.7	127.3	174.0	952.5	953.7	3.3	1.4	2.3	3.2	
EC-P7	EC-P9	103.2	0.0	103.2	958.0	960.5	10.0	1.6	5.1	8.1	
EC-P8	EC-P9	57.3	174.0	231.3	929.5	932.7	0.3	5.7	13.8	30.0	
PLY-3	EC-P9	0.0	86.3	86.3	not applicable ¹			0.0	2.7	17.9	
EC-P9	EC-A11	95.7	420.8	516.5	919.0	922.7	1.0	12.0	36.8	67.8	
EC-P10	EC-A11	11.0	0.0	11.0	923.0	924.5	1.0	0.5	2.7	5.4	
PLY-4	EC-A11	6903.0	0.0	6903.0	not applicable ¹			198.0	509.1	987.3	
EC-A11	EC-P29	166.2	7430.5	7596.7	not applicable ²			203.7	524.4	1012.2	
EC-P13	EC-P15	18.1	0.0	18.1	944.5	946.2	1.3	1.4	6.4	32.7	
EC-P14	EC-P15	78.2	0.0	78.2	941.0	945.0	10.7	5.1	14.7	25.4	
EC-P15	EC-P16	68.2	96.3	164.5	930.0	934.8	9.5	6.3	17.9	50.7	
EC-A16	EC-P29	45.6	164.5	210.1	918.5	923.6	15.5	4.4	7.4	30.4	
PLY-7	EC-P17	207.0	0.0	207.0	not applicable ¹			0.6	2.7	5.7	
EC-P17	EC-P18	71.9	207.0	278.9	958.0	958.5	13.8	5.7	12.0	24.0	
EC-P18	EC-P19	40.5	278.9	319.4	956.0	956.5	1.9	14.4	41.8	87.3	
PLY-6	EC-P19	128.0	0.0	128.0	not applicable ¹			19.6	58.1	116.0	
EC-P19	EC-P22	47.4	447.4	494.8	916.0	919.8	7.1	13.4	41.5	81.3	
PLY-5	EC-P20	174.0	0.0	174.0	not applicable ¹			2.8	10.2	19.0	
EC-P20	EC-P22	52.4	174.0	226.4	926.0	927.2	5.0	0.9	4.5	13.5	
EC-P22	EC-P29	218.8	847.3	1066.1	912.0	913.8	113.3	1.0	5.4	16.2	
EC-P23	EC-P24	20.5	0.0	20.5	948.0	948.7	3.1	0.0	1.8	16.4	
EC-P24	EC-P22	46.7	20.5	67.2	938.0	939.4	7.3	0.4	5.4	23.8	
EC-P25	EC-P22	30.3	0.0	30.3	948.0	949.3	4.9	0.6	2.1	4.7	
EC-P26	EC-P22	28.6	0.0	28.6	924.0	926.1	5.2	0.0	0.0	4.7	
EC-P27	EC-P29	30.5	0.0	30.5	958.0	962.2	4.5	3.5	7.7	9.7	
EC-P29	EC-P30	387.9	8903.4	9291.3	910.0	916.4	539.9	149.9	421.4	847.0	
EC-P30	EC-P53	355.9	10640.8	10996.7	904.0	908.9	144.0	153.0	433.8	869.9	
EC-P31	EC-P30	8.1	0.0	8.1	909.0	911.4	1.4	1.3	3.0	5.8	
COR-6	EC-A33	0.0	26.9	26.9	not applicable ¹			3.0	13.3	21.5	
EC-P33	EC-A44	44.8	826.0	870.8	960.0	961.5	3.7	3.0	13.3	21.5	
EC-P34	EC-P44	53.4	0.0	53.4	970.0	975.1	17.4	2.0	2.9	3.7	
EC-P35	EC-A40	20.4	0.0	20.4	963.0	967.6	4.8	3.4	5.0	6.5	
EC-P36	EC-P30	33.0	1213.1	1246.1	918.2	920.9	0.7	24.5	49.3	105.1	
EC-P37	EC-P88	48.1	0.0	48.1	945.0	952.1	7.3	5.7	6.6	6.9	
EC-P38	EC-A108	7.8	0.0	7.8	920.5	924.1	0.8	2.1	4.6	6.6	
EC-P39	EC-A74	6.1	1006.3	1012.4	952.4	954.2	0.3	9.3	21.0	32.7	
EC-P40	EC-A39	11.5	994.8	1006.3	955.0	960.2	1.9	9.2	20.4	31.0	
EC-P42	EC-P43	39.7	0.0	39.7	934.0	936.3	7.7	1.2	3.2	3.6	
EC-P43	EC-P45	135.0	39.7	174.7	926.0	927.7	22.0	1.6	6.5	14.1	
EC-P44	EC-A40	36.6	924.2	960.8	958.0	961.1	6.3	4.4	13.6	26.3	
EC-P45	EC-P53	76.1	174.7	250.8	912.0	915.2	13.2	3.2	11.5	18.8	
EC-P46	EC-P47	35.4	0.0	35.4	931.6	932.9	6.9	0.7	2.3	4.7	
EC-P47	EC-P49	73.7	35.4	109.1	914.0	918.9	9.5	6.3	19.2	29.4	
EC-P48	EC-P49	12.7	14.0	26.7	934.0	936.2	1.5	1.5	4.8	7.4	
EC-P49	EC-P50	363.0	135.8	498.8	916.0	916.9	144.9	0.4	1.4	3.7	
EC-P50	EC-P53	85.8	498.8	584.6	904.1	905.5	14.0	1.1	4.3	11.0	
EC-P51	EC-P53	90.0	0.0	90.0	916.0	922.0	11.2	15.1	30.4	39.5	
EC-P52	EC-P53	41.3	0.0	41.3	930.0	934.7	4.8	3.3	9.2	14.5	
EC-P53	EC-P79	616.0	12056.9	12672.9	894.0	898.8	858.9	92.4	307.5	651.5	
EC-P54	EC-P53	57.9	0.0	57.9	896.5	897.9	11.4	0.5	1.9	4.6	
EC-P55	EC-A40	13.6	0.0	13.6	960.0	963.5	3.1	1.5	2.3	3.0	
EC-P56	EC-P53	35.6	0.0	35.6	906.0	908.1	5.5	1.4	4.4	7.2	
EC-P57	EC-A74	10.6	29.7	40.3	974.0	978.0	2.2	1.8	5.3	5.5	
EC-P58	EC-A74	13.0	0.0	13.0	961.0	964.7	2.3	1.5	2.3	3.1	
EC-P59	EC-A108	4.9	0.0	4.9	918.0	919.9	0.7	0.9	3.1	5.9	
EC-P60	EC-P48	14.0	0.0	14.0	935.7	936.5	2.6	0.3	0.7	1.3	
EC-P61	EC-P62	18.7	0.0	18.7	937.0	938.6	2.9	1.0	3.3	6.0	
EC-P62	EC-P67	37.8	18.7	56.5	929.6	931.1	11.3	0.7	1.7	2.6	
EC-P63	EC-P67	17.9	0.0	17.9	932.0	933.2	3.5	0.3	1.0	1.6	
EC-P64	EC-P65	53.5	0.0	53.5	924.0	925.2	10.5	0.3	0.6	0.8	
EC-P65	EC-P71	131.0	269.8	400.8	921.4	922.5	59.6	0.4	1.5	3.0	
EC-P66	EC-P65	11.9	0.0	11.9	928.8	929.5	2.7	0.1	0.4	0.8	
EC-P67	EC-P68	55.6	119.8	175.4	927.8	929.4	21.3	0.7	2.6	4.6	
EC-P68	EC-P65	29.0	175.4	204.4	926.0	927.0	8.3	0.7	2.5	4.7	

**APPENDIX C
WATER QUANTITY MODELING RESULTS**

FROM	TO	TRIBUTARY AREA (AC)			WATER LEVEL (FT)		100-YR FLOOD STORAGE VOLUME (AC-FT)	PEAK FLOW (CFS)		
		DIRECT	ROUTED	TOTAL	NWL	100-YR HWL		2-YR	10-YR	100-YR
EC-P69	EC-P67	32.7	0.0	32.7	930.0	931.1	6.0	0.4	1.7	4.5
EC-P70	EC-A36	7.8	0.0	7.8	930.0	933.1	1.5	0.7	1.2	1.6
EC-P71	EC-P72	111.2	400.8	512.0	922.0	924.1	36.1	0.0	2.3	4.2
EC-P72	EC-P78	191.7	512.0	703.7	906.0	909.3	12.7	3.5	22.5	59.2
EC-P73	EC-P67	12.7	0.0	12.7	936.0	937.6	3.9	0.0	0.0	0.0
EC-A74	EC-A105	16.2	1065.7	1081.9	not applicable ²			12.7	28.1	50.8
EC-P75	EC-P78	71.2	0.0	71.2	901.3	904.5	8.1	10.1	32.7	51.3
EC-P76	EC-P77	8.6	0.0	8.6	937.0	938.2	1.1	0.2	0.6	0.8
EC-P77	EC-P78	28.4	8.6	37.0	932.0	933.0	4.1	1.9	2.1	2.4
EC-P78	EC-P79	170.0	811.9	981.9	902.0	906.3	114.0	3.4	5.5	7.3
EC-P79	EC-P89	387.1	13654.8	14041.9	892.0	894.2	106.4	93.9	311.0	656.4
EC-P80	EC-P82	18.8	0.0	18.8	976.0	980.4	3.9	1.6	2.5	3.4
EC-P81	EC-P89	104.8	1762.7	1867.5	893.0	893.5	6.9	26.5	81.9	172.3
EC-P82	EC-A105	14.8	18.8	33.6	946.0	950.1	3.1	1.9	4.4	6.6
EC-P83	EC-P81	11.4	0.0	11.4	892.0	893.0	1.1	0.2	1.2	3.6
EC-P84	EC-P87	41.4	65.9	107.3	936.0	938.2	10.9	0.0	3.0	10.9
EC-P85	EC-P89	40.2	0.0	40.2	909.0	915.8	7.4	4.9	7.4	9.5
EC-P86	EC-P84	65.9	0.0	65.9	937.0	939.2	11.2	1.4	4.5	7.4
EC-P87	EC-P104	97.7	107.3	205.0	932.0	934.1	29.8	0.8	2.8	6.2
EC-P88	EC-A105	7.9	48.1	56.0	936.0	939.2	1.5	0.7	1.2	1.6
EC-P89	EC-P92	857.7	15949.6	16807.3	891.0	892.7	631.5	99.2	232.6	532.8
EC-P90	EC-P98	45.3	0.0	45.3	920.7	923.8	7.0	1.3	4.3	6.5
EC-P91	EC-P92	220.7	0.0	220.7	923.0	924.9	45.8	2.2	7.6	16.5
EC-P92	EC-P117	45.1	17065.9	17111.0	892.0	895.6	56.0	110.4	234.7	537.3
EC-P93	EC-P117	45.7	0.0	45.7	904.0	907.5	4.1	4.2	53.1	140.1
EC-P94	EC-P117	68.1	0.0	68.1	not applicable ²			3.9	22.6	61.8
EC-P95	EC-P108	31.8	0.0	31.8	947.0	951.7	6.8	1.5	2.5	3.5
EC-P96	EC-A105	23.6	0.0	23.6	950.0	955.1	4.5	1.7	2.7	3.7
EC-P97	EC-P100	21.9	0.0	21.9	917.0	918.7	4.2	0.4	0.8	1.1
EC-P98	EC-P100	176.4	45.3	221.7	906.0	911.1	37.0	1.4	2.6	3.4
EC-P99	EC-P101	52.1	0.0	52.1	911.0	911.9	11.4	0.1	0.5	0.9
EC-P100	EC-P101	159.0	243.6	402.6	900.0	902.8	26.6	1.5	4.3	5.7
EC-P101	EC-A102	247.1	454.7	701.8	890.0	895.7	18.9	11.4	34.8	50.1
EC-P102	EC-A118	155.1	19165.8	19320.9	not applicable ²			181.2	344.9	620.9
EC-P103	EC-P104	8.2	0.0	8.2	928.0	929.7	0.9	0.4	1.9	4.4
EC-P104	EC-P107	80.8	213.2	294.0	915.0	918.4	10.1	5.7	19.2	42.2
EC-P105	EC-A36	10.2	1195.1	1205.3	not applicable ²			0.8	7.0	19.4
EC-P106	EC-P92	37.9	0.0	37.9	887.3	888.8	7.5	1.1	3.2	5.6
EC-P107	EC-P117	312.0	294.0	606.0	884.0	884.5	10.5	67.9	192.5	380.2
EC-P108	EC-A36	50.8	1290.6	1341.4	920.8	926.5	6.0	2.0	2.9	7.1
EC-P109	EC-P57	29.7	0.0	29.7	980.0	981.5	4.4	0.6	1.9	3.1
EC-P110	EC-P111	64.6	0.0	64.6	919.1	921.1	16.9	0.3	0.6	0.8
EC-P111	EC-P112	13.6	64.6	78.2	916.1	917.1	2.7	0.4	1.1	2.5
EC-P112	EC-P114	148.1	78.2	226.3	902.0	906.9	19.1	8.6	25.6	34.5
EC-P113	EC-A102	21.5	0.0	21.5	918.3	920.7	3.2	0.7	2.1	3.5
EC-P114	EC-P115	207.2	226.3	433.5	886.0	893.0	22.9	33.7	63.4	138.8
EC-P115	EC-P117	32.0	433.5	465.5	884.0	889.5	23.5	22.8	49.4	81.0
EC-P116	EC-P117	25.6	0.0	25.6	907.5	908.1	6.7	0.2	0.8	1.7
EC-P117	EC-A102	120.7	18321.8	18442.5	876.0	877.2	19.6	185.6	356.9	640.1
EC-P118	EC-A121	165.1	19320.9	19486.0	not applicable ²			183.2	349.3	631.0
EC-P121	DTN-2	382.7	20614.8	20997.5	not applicable ²			194.5	388.9	727.9
EC-P122	EC-P135	110.8	0.0	110.8	911.5	915.2	14.5	2.8	6.9	37.9
EC-P124	EC-P125	61.6	0.0	61.6	882.0	882.9	4.1	2.9	17.0	53.2
EC-P125	EC-A121	305.0	823.8	1128.8	869.0	869.6	49.1	8.5	28.4	72.6
EC-P126	EC-P129	143.9	0.0	143.9	880.0	884.8	12.6	32.0	44.6	44.6
EC-P127	EC-P129	9.8	0.0	9.8	894.0	895.1	1.7	0.0	0.0	2.2
EC-P129	EC-P133	195.7	153.7	349.4	892.0	894.1	80.9	0.9	4.2	7.6
EC-P131	EC-P133	56.9	0.0	56.9	894.7	900.8	25.5	2.2	3.8	5.4
EC-P133	EC-P134	86.2	406.3	492.5	878.0	881.3	14.7	3.6	10.4	18.3
EC-P134	EC-P125	68.7	492.5	561.2	876.0	883.9	154.3	0.0	0.0	0.0
EC-P135	EC-P125	90.2	110.8	201.0	878.5	882.4	13.7	0.0	0.0	6.5
EC-P136	DTN-1	20.4	0.0	20.4	874.0	874.1	4.9	18.9	46.4	85.4
EC-P137	EC-P78	135.3	0.0	135.3	902.0	906.3	45.6	32.0	44.0	49.5

¹ For interjurisdictional flows from modeled pond and reaches, only discharge rates are reported.

² Drainage areas without storm ponds were modeled as reaches; therefore only discharge rates are reported.

Appendix D - Joint Powers Agreements

AMENDED AND RESTATED
JOINT POWERS AGREEMENT ESTABLISHING
THE ELM CREEK WATERSHED MANAGEMENT COMMISSION

RECITALS

WHEREAS, on May 12, 1993, pursuant to statutory authority, the Cities of Champlin, Corcoran, Dayton, Greenfield, Maple Grove, Medina, Plymouth and Rogers, the Town of Hassan, and the Hennepin Conservation District adopted a "Joint Powers Agreement for the Establishment of the Elm Creek Watershed Management Commission to Plan, Protect and Manage the Elm Creek Watershed and Adjacent Minor Watersheds" (the "Joint Powers Agreement"); and

WHEREAS, in 2001 the City of Greenfield withdrew from the Agreement; and

WHEREAS, the Cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth and Rogers, and the Town of Hassan, wish to amend and restate the Agreement's terms in this document.

NOW, THEREFORE, pursuant to the authority conferred upon the parties by Minn. Stat §§ 471.59 and 103B.201, et seq., the parties to this Agreement do mutually agree as follows:

SECTION ONE
DEFINITIONS

For purposes of this Agreement, each of the following terms, when used herein with an initial capital letter, will have the meaning ascribed to it as follows:

"Agreement" means the Joint Powers Agreement, as amended and restated in this document.

"Board" means the Board of Commissioners of the Commission.

"BWSR" means the Minnesota Board of Water and Soil Resources.

"Commissioner" means an individual appointed by a governmental unit to serve on the Board. The term Commissioner shall include both the representative and alternate representative appointed to serve on the Board.

"Elm Creek Watershed" or "Watershed" means the area within the mapped area delineated on the map filed with BWSR, as may be amended. A complete legal description defining the boundary of the Elm Creek Watershed is attached hereto and made apart hereof.

"Governmental Unit" means any signatory city or township.

"Member" means a governmental unit that enters into this Agreement.

"Watershed Management Organization ("WMO") means the organization created by this Agreement, the full name of which is "Elm Creek Watershed Management Commission." The Commission shall be a public agency of its respective governmental units.

SECTION TWO
ESTABLISHMENT

The parties create and establish the Elm Creek Watershed Management Commission. The Commission membership shall include the Cities of Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth and Rogers, and the Town of Hassan. In addition to other powers identified in this Agreement, the Commission shall have all of the authority for a joint powers watershed management organization identified in Minn. Stat. § 103B.211.

SECTION THREE
PURPOSE STATEMENT

The purpose of this Agreement is to establish an organization within the Elm Creek Watershed to (a) protect, preserve, and use natural surface and groundwater storage and retention systems, (b) minimize public capital expenditures needed to correct flooding and water quality problems, (c) identify and plan for means to effectively protect and improve surface and groundwater quality, (d) establish more uniform local policies and official controls for surface and groundwater management, (e) prevent erosion of soil into surface water systems, (f) promote groundwater recharge, (g) protect and enhance fish and wildlife habitat and water recreational facilities, and (h) secure the other benefits associated with the proper management of surface and ground water, as identified in Minn. Stat. § 103B.201, including but not limited to aesthetic values when owned by the public or constituting public resources, as defined in Minn. Stat. Ch. 116B.

The Commission's Members agree to (a) provide a forum for exchanging information in the management of land use and land use techniques and control, (b) provide a forum for resolution of intergovernmental disputes relating to management and protection of the Elm Creek Watershed; and (c) cooperate on a united basis on behalf of all units of government within the Elm Creek Watershed with all other levels of government for the purpose of facilitating natural resource protection and management in the Watershed.

SECTION FOUR
BOARD OF COMMISSIONERS

4.1. Appointment. The governing body of the Commission shall be its Board. Each Member shall be entitled to appoint one representative to serve on the Board and one alternate who may sit when the representative is not in attendance, and said representative or alternative representative shall be called a "Commissioner."

4.2. Term. Each Member shall determine the term length for its Commissioner's appointment to the Board. Each Member agrees that it will not remove from the Board its appointed Commissioner before the expiration of his/her term except for just cause. The Commission and its Members shall fill all Board vacancies pursuant to Minn. Stat. §

103B.227, subd. 1 and 2, as may be amended from time to time.

4.3. Compensation. Commissioners shall serve without compensation from the Commission, but this shall not prevent a Member from providing compensation to its Commissioner for serving on the Board.

4.4. Officers. By the first meeting in March of each year, the Commission shall elect from its membership a chairperson, a vice-chairperson, a treasurer and a secretary and such other officers as it deems necessary to reasonably carry out the purposes of this Agreement. Except for the position of chairperson, any Commissioner may be elected to more than one office. All officers shall hold office for terms of one year and until their successors have been elected by the Commission, An officer may be reelected to the same office for unlimited terms. A vacancy in an office shall be filled from the Board membership by election for the remainder of the unexpired term of such office. The officers' duties include the following:

- A. Chairperson. The Chairperson shall preside at all Board meetings and shall have all the same privileges of discussion, making motions and voting, as do other Commissioners. The Chairperson may delegate certain responsibilities to the Executive Secretary as necessary to carry out the duties of the office.
- B. Vice-Chairperson. The Vice-Chairperson shall, in the absence or disability of the Chairperson, perform the duties and exercise the powers of the Chairperson.
- C. Treasurer. The Treasurer shall have the custody of the funds and securities of the Commission and shall keep full and accurate accounts of receipts and disbursements in books belonging to the Commission and shall deposit all monies and other valuable effects in the name and to the credit of the Commission in such depository as may be designated by the Commission. He/she shall disburse funds of the Commission as approved by the Commission and shall render to the Commission at regular meetings, or as the Board may request, an account of all his/her transactions as Treasurer and of the financial condition of the Commission. The Treasurer may delegate certain duties to the Executive Secretary as necessary to carry out the duties of the office.
- D. Secretary. The Secretary shall attend all Board meetings, shall act as clerk of such meetings, and shall record all votes and the minutes of all proceedings. He/she shall give notice of all Board meetings. The Secretary may delegate certain duties to the Executive Secretary as necessary to carry out the duties of the office.
- E. Executive Secretary. The Commission may appoint an Executive Secretary to coordinate activities of the Commission, accept delegated duties by the Commission officers, and accept business duties not assigned to officers. All notices to the Commission shall be delivered or served at the office of the Executive Secretary.

4.5. Quorum and Voting. A minimum of four (4) Commissioners with voting privileges shall constitute a quorum. Once a quorum is present, a majority vote is required for approval on an action, unless as provided otherwise in this Agreement.

4.6. Meetings. The Board shall schedule meetings at least quarterly (every three months) on a uniform day and place selected by the Commission. Written notice of the location and time of all Commission meetings shall

be sent to all Commission representatives and alternate representatives and to the Clerk of each Member. Special meetings may be held at the call of the Chairperson or by any three Commissioners by giving not less than 72 hours written notice of the time, place and purpose of such meeting.

SECTION FIVE
COMMISSION POWERS AND DUTIES

5.1. Watershed Management Plan. The Commission shall develop a watershed management plan including a capital improvement program in conformance with Minn. Stat. § 103B.231. The Commission shall adopt the plan within 120 days after BWSR's approval of the plan. After adoption, the Commission shall implement the watershed management plan and enforce the regulations set out in the plan. A copy of the adopted plan shall be filed with the clerk of each Member governmental unit,

5.2. Local Water Management Plans. The Commission shall review Members' local water management plans as required by Minn. Stat. § 103B.235, subd. 3.

5.3. Review Services.

- A. Where the Commission is authorized or requested to review and make recommendations on any matter, the Commission shall act on such matter in compliance with Minn. Stat. § 15.99,
- B. The Commission may charge a reasonable fee for such review services. The Commission's standard fee schedule, as amended from time to time, will be a part of the Commission's Rules.
- C. The Commission may charge an additional fee when it determines that a particular project will require extraordinary and substantial review services. Before undertaking such review services, the Commission shall provide the party to be charged the additional fee with written notice of the services to be performed and the additional fee therefor. Unless said party objects within 5 business days of receipt of such written notice to the amount of the additional fee to be charged, such review services shall be performed and the party shall be responsible for the cost thereof. If said party objects to the proposed additional fee for such services within 5 business days and the party and the Commission are unable to agree on a reasonable alternative amount for review services, such extraordinary and substantial review services shall not be undertaken by the Commission.
- D. Upon request of any Member, the Commission shall review and evaluate any dispute between the Member and other unit(s) of government regarding land use and natural resource protection and management.
- E. Where the Commission makes recommendations on any matter to a Member, a Member not acting in accordance with such recommendation shall submit a written statement of its reasons for doing otherwise to the

Commission within ten days of its decision to act contrary to the Commission's recommendation. The Commission shall review the written statement and, if determined insufficient by the Commission, request written clarification within an additional ten days.

5.4 Public Participation.

A. Technical Advisory Committee. A Technical Advisory Committee ("TAC") to the Commission is hereby created, TAC members and one or more alternate members shall be appointed by the governing body of each Member. TAC members may be, but need not be, Commissioners. TAC members shall serve at the pleasure of the governing body of each Member which appoints them and are not required to meet statutory qualifications for Commissioners. TAC members may attend and participate in all meetings of the Commission. TAC members shall not have the authority to make motions or vote on matters before the Commission, but shall otherwise have the rights of a Commissioner to question, discuss, debate and comment on all matters before the Commission.

B. Citizen Advisory Committee. If a need is determined by the Commission, the Commission will establish a Citizen Advisory Committee to the Commission,

5.5. Rules. The Commission shall adopt rules for (a) conducting its business, including but not limited to additional duties of the Commission's officers, (b) the scope of responsibilities of the Technical Advisory Committee and the Citizen Advisory Committee, if one is established, and (c) preparing the annual work plan.

5.6. Contracts. The Commission may make such contracts, and enter into any such agreements, as it deems necessary to make effective any power granted to it by this Agreement. No Commissioner shall receive a direct financial benefit from any contract made by the Commission. Every contract for the purchase or sale of merchandise, materials or equipment by the Commission shall be let in accordance with the Uniform Municipal Contracting Law (Minn. Stat. § 471.345) and the Joint Exercise of Powers statute (Minn. Stat. § 471.59). In accordance with Minn. Stat. § 471.59, subd. 3, contracts let and purchases made under this Agreement shall conform to the statutory requirements applicable to the Member cities with a population over 2,500.

5.7. Employment. The Commission may contract for services, may use staff of other governmental agencies, may use staff of the Members and may employ such other persons as it deems necessary. Where staff services of a Member are utilized, such services shall not reduce the financial contribution of such Member to the Commission's operating fund unless utilization of staff service is substantial and the Commission so authorizes.

5.8. Public/Private Organizations. The Commission may cooperate or contract with the State of Minnesota or any subdivision thereof or federal agency or private or public organization to accomplish the purposes for which it

is organized.

5.9. Annual Financial, Activity and Audit Reports; Newsletter. The Commission shall submit to its Members and BWSR a financial report, an activity report and an audit report for the preceding fiscal year, in compliance with state law. The Commission shall publish and distribute an annual newsletter in compliance with state law, The Commission shall transmit to the clerk of each Member copies of the reports/newsletter in a format ready for publication. Each Member shall publish/distribute the reports/newsletter as it deems necessary. All of the Commission's books, reports and records shall be available for and open to examination by any Member at all reasonable times.

5.10. Gifts, Grant, Loans. The Commission may, within the scope of this Agreement, accept gifts, apply for and use grants or loans of money or other property from the United States, the State of Minnesota, a unit of government or other governmental unit or organization, or any person or entity for the purposes described herein; may enter into any reasonable agreement required in connection therewith; may comply with any laws or regulations applicable thereto; and may hold, use and dispose of such money or property in accordance with the terms of the gift, grant, loan or agreement relating thereto.

5.11. Boundary Change in the Elm Creek Watershed.

A. Enlargement. Proceedings for the enlargement of the Elm Creek Watershed shall be initiated by a request from affected Member(s) to the Commission, or as mandated by law. Such request should include a map and legal description of the affected area. In reviewing such a request, the Commission should consider, among other things, (a) whether the affected area is contiguous to the existing Elm Creek Watershed, (b) whether the affected area can be feasibly administered by the Commission; and (c) the reasons why it would be conducive to the public health and welfare to add the area to the existing Elm Creek Watershed. Upon deliberation, if it appears to the Commission that the enlargement of the Watershed as requested would be for the public welfare and public interest and the purpose of resource management would be served, or that in fact the enlargement is mandated by law, the Commission shall by its findings and order enlarge the Elm Creek Watershed and file a copy of said findings and order with the appropriate governmental offices.

B. Transfer of Territory. Proceedings to transfer territory that is within the Elm Creek Watershed to the jurisdiction of another watershed management organization or a watershed district shall be initiated by a request from affected Member(s) to the Commission, or as mandated by law. Such request should include a map and legal description of the affected area. Upon deliberation, if it appears to the Commission that the transfer of territory as requested would be for the public welfare and public interest and the purpose of resource management would be

served, the Commission shall by its findings and order change the Elm Creek Watershed boundaries accordingly and file a copy of said findings and order with the appropriate governmental offices.

5.12. Subdistricts. The Commission may define and designate drainage subdistricts within the Watershed and shall have authority to separate the Watershed into such different subdistricts and to allocate capital improvement costs to a subdistrict area if that subdistrict is the only area that materially benefits from the capital improvement.

5.13. Monitor Water Quality. The Commission will continue to monitor waterbodies and streams, to evaluate the success of its program to control non-point sources of pollution, and use the results of the water quality monitoring program to determine the progress towards these goals.

5.14. Ratification. The Commission may, and where required by this Agreement shall, refer matters to the governing bodies of the Members for ratification. Within 60 days, the governing bodies of the Members shall take action upon any matter referred for ratification.

5.15. Statutory Powers. The Commission may exercise all other powers necessary and incidental to the implementation of the purposes and powers set forth herein and as outlined and authorized by Minn, Stat. §§ 103B.201, et seq.

SECTION SIX FINANCIAL MATTERS

6.1. Depositories/Disbursements. The Commission may collect and receive money and services subject to the provisions of this Agreement from the parties and from any other sources approved by the Commission and it may incur expenses and make expenditures and disbursements necessary and incidental to the effectuation of the purposes of this Agreement. The Board shall designate a national, state, or private bank or banks as a depository of Commission funds. Funds may be expended by the Commission in accordance with procedures established herein. Orders, checks and drafts shall be signed by two officers,

6.2. General Administration. Each voting Member agrees to contribute each year to a general fund to be used for general administration purposes including, but not limited to, salaries, rent, supplies, development on an overall plan, insurance, bonds, and to purchase and maintain devices to measure hydrological and water quality data. The funds may also be used for normal maintenance of facilities and capital improvements. The annual contribution by each voting Member shall be based on its share of the taxable market value of all real property within the Watershed to the total area in the Watershed.

6.3. Budget Approval and Appeal Process. On or before June 15 of each year, the Board shall adopt an operating budget for the following calendar year for the purpose of providing funds to operate the Commission's

business in accordance with its annual work plan. The operating budget shall never be greater than the equivalent of 0.02418% of total market value on all real property within the Watershed. Budget approval shall require a majority vote of all Commissioners eligible to vote. The Commission shall certify the budget on or before July 1 to the clerk of each Member governmental unit together with a statement of the proportion of the budget to be provided by each Member. The schedule of payments by the Members shall be determined by the Board in such a manner as to provide for an orderly collection of the funds needed.

The governing body of each Member agrees to review the budget, and the Board shall upon notice from any Member received prior to August 15, hear objections to the budget, and may, upon notice to all Members and after a hearing, modify or amend the budget (except the fee due cannot be increased), and then give notice to the Members of any and all modifications or amendments. Each Member agrees to provide the funds required by the budget and said determination shall be conclusive if no Member enters objections in writing on or before August 15. If objections are submitted to the Board, each Member agrees to provide the funds approved by the Board, after the Board has conducted the aforementioned hearing. Modifications or amendments to the original budget require a favorable vote by a majority of all Commissioners eligible to vote.

6.4. Supplemental Budget. Upon notice and hearing, the Board by a majority vote of all Commissioners eligible to vote may adopt a supplemental budget requiring additional payments by the Members within 60 days of its adoption. The operating budget, including any supplemental budget, shall never be greater than the equivalent of 0.02418% of total market value on all real property within the Watershed.

SECTION SEVEN CAPITAL IMPROVEMENT PROGRAM

7.1. Assessments. If a capital improvement ordered by the Commission may result in payment from any Member, or if a capital improvement ordered by the Commission may result in a levy by a Member against privately or publicly owned land within the Watershed, said capital improvement shall follow the statutory procedure outlined in Minn. Stat. Ch. 429, except as herein modified.

7.2. Preliminary Reports/Public Hearings. For those improvements initiated by the Commission or so designated in the Commission's watershed management plan to be constructed by the Board, the Board shall secure from its engineers or some other competent person a preliminary report advising it whether the proposed improvement is feasible and as to whether it shall best be made as proposed or in connection with some other improvement and the estimated cost of the improvement as recommended,

The Board shall then hold a public hearing on the proposed improvement after mailed notice to the clerk of each Member governmental unit within the Watershed. The Commission shall not be required to mail or publish notice except by said notice to the clerk. Said notice shall be mailed not less than 45 days before the hearing, shall state the time and place of the hearing, the general nature of the improvement, the estimated total cost and the estimated cost to each Member governmental unit. The Board may adjourn said hearing to obtain further information, may continue said hearing pending action of the Member governmental units or may take such other action as it deems necessary to carry out the purpose of this Commission.

A resolution setting forth the order for a capital improvement project shall require a favorable vote by at least two-thirds of all Commissioners eligible to vote. In all cases other than to order a capital improvement project, a majority vote of all Commissioners eligible to vote shall be sufficient to adopt an action. The order shall describe the improvement, shall allocate in percentages the cost between the Member governmental units, shall designate the engineers to prepare plans and specifications, and shall designate the Member who will contract for the improvement.

After the Board has ordered the improvement or if the hearing is continued while the Member governmental units act on said proposal, it shall forward said preliminary report to all Member governmental units with an estimated time schedule for the construction of said improvement. The Board shall allow an adequate amount of time, and in no event less than 45 days, for each Member governmental unit to conduct hearings, in accordance with the provisions of the aforesaid Chapter 429 or the charter requirements of any Member city, or to ascertain the method of financing which said Member governmental unit will utilize to pay its proportionate share of the costs of the improvement, Each Member governmental unit shall ascertain within a period of 90 days the method it shall use to pay its proportionate share of the costs.

If the Commission proposes to use Hennepin County's bonding authority as set forth in Minn. Stat. § 103B.251, or if the Commission proposes to certify all or any part of a capital improvement to Hennepin County for payment, then and in that event all proceedings shall be carried out in accordance with the provisions set forth in said Section 103B.251.

The Board shall not order and no engineer shall prepare plans and specifications before the Board has adopted a resolution ordering the improvement. The Board may direct one of its Members to prepare plans and specifications and order the advertising for bids upon receipt of notice from each Member governmental unit who will be assessed that it has completed its hearing or determined its method of payment or upon expiration of 90 days after the mailing of the preliminary report to the Members.

7.3. Appeals/Arbitration. Any Member governmental unit being aggrieved by the Board's determination as to the cost allocation of said capital improvement shall have 30 days after the Commission resolution ordering the improvement to appeal said determination. Said appeal shall be in writing and shall be addressed to the Board asking for arbitration. The determination of the Member's appeal shall be referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons; one to be appointed by the Board of Commissioners, one to be appointed by the appealing Member governmental unit, and the third to be appointed by the two so selected. In the event the two persons so selected do not appoint the third person within 15 days after their appointment, then the Chief Judge of the Hennepin County District Court shall have jurisdiction to appoint, upon application of either or both of the two earlier selected, the third person to the Board of Arbitration. The third person selected shall not be a resident of any Member governmental unit and if appointed by the Chief Judge said person shall be a person knowledgeable in the subject matter. The arbitrators' expenses and fees, together with the other expenses, not including attorney fees, incurred in the conduct of the arbitration shall be divided equally between the Commission and the appealing Member. Arbitration shall be conducted in accordance with the Uniform Arbitration Act, Minn. Stat. Ch. 572.

7.4. Contracts for Capital Improvements. All contracts which are to be let as a result of the Board ordering a capital improvement, and for which two or more Member governmental units shall be responsible for the costs, shall be let in accordance with the provisions of Minn. Stat. § 429.041. The bidding and contracting of said work shall be let by any one of the Member governmental units, as ordered by the Board, after compliance with the statutory requirements. Contracts and bidding procedures shall comply with the legal requirements applicable to statutory cities.

The Commission shall not have the authority to contract in its own name for any improvement work for which a special assessment will be levied against any private or public property under the provisions of Chapter 429 or under the provisions of any Member city charter. These contracts shall be awarded by action of the governing body of a Member and shall be in the name of a Member governmental unit. This section does not preclude the Commission from proceeding under Minn. Stat. § 103B.251.

7.5. Contracts with Other Governmental Bodies. The Commission may exercise the powers set forth in Section 7.4 but said contracts for a capital improvement shall require a majority vote of all Commissioners eligible to vote,

7.6. Supervision. All improvement contracts shall be supervised by the entity awarding the contract. The Commission staff shall also be authorized to observe and review the work in progress and the Members agree to cooperate with the Commission staff in accomplishing its purposes. Representatives of the WMO shall have the right to enter upon the place or places where the improvement work is in progress for the purpose of making reasonable tests

and inspections. The Commission staff shall report and advise and recommend to the Board on the progress of the work.

7.7. Land Acquisition. The Commission shall not have the power of eminent domain. The Member governmental units agree that any and all easements or interests in land which are necessary will be negotiated or condemned in accordance with Minn. Stat. Ch. 117 by the unit wherein said lands are located, and each Member agrees to acquire the necessary easements or right-of-way or partial or complete interest in land upon order of the Board of Commissioners to accomplish the purposes of the improvement. All reasonable costs of said acquisition shall be considered as a cost of the improvement. If a Member government unit determines it is in the best interests of that Member to acquire additional lands, in conjunction with the taking of lands for storm and surface drainage or storage, or some other purpose, the costs of said acquisition will not be included in the improvement costs of the ordered project. The Board in determining the amount of the improvement costs to be assessed to each Member governmental unit may take into consideration the land use for which the additional lands are being acquired and may credit the acquiring municipality for said land acquisition to the extent that it benefits the other Members to this Agreement. Any credits may be applied to the cost allocation of the improvement project under consideration or the Board if feasible and necessary may defer said credits to a future project.

If any Member unit refuses to negotiate or condemn lands as ordered by the Board, any other Member may negotiate or condemn outside its corporate limits in accordance with Minn. Stat. Ch. 117. All Members agree that they will not condemn or negotiate for land acquisition to pond or drain storm and surface waters within another Member's corporate boundaries within the Watershed except upon order of the Board of Commissioners.

7.8. Capital Improvement Fund.

A. The Commission shall establish an improvement fund for each capital improvement project. Each Member agrees to contribute to said fund its proportionate share of the engineering, construction, legal and administrative costs as determined by the amount to be assessed against each Member as a cost of the improvement. The Board shall submit in writing a statement to each Member, setting forth in detail the expenses incurred by the Commission for each project,

Each Member agrees to pay its proportionate share of the cost of the improvement in accordance with the determination of the Board under Section 7.2. The Board, in its discretion, may require Members to make advance payments based upon estimated costs, subject to adjustment to reflect actual costs, or may bill the Members as costs are actually incurred. Members agree to pay billings within 30 days of receipt. The Board or the Member awarding the

contract shall advise other contributing Members of the tentative time schedule of the work and the estimated times when the contribution shall be necessary.

B. Notwithstanding the provisions of Section 7,8.A., the Commission may fund all or part of the cost of a capital improvement contained in the capital improvement program of the plan in accordance with Minn. Stat. § 103B.251, The Commission and Hennepin County may establish a maintenance fund to be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Hennepin County pursuant to Minn. Stat. § 103B.251. The levy and collection of an ad valorem tax levy for an improvement, payment of bonds, or maintenance shall be by Hennepin County based upon a tax levy resolution adopted by a majority vote of all eligible Members of the Board and remitted to the County on or before the date prescribed by law each year. If it is determined to levy for maintenance, the Commission shall be required to follow the hearing process established by Minn. Stat. Ch. 103D. Mailed notice shall also be sent to the clerk of each Member governmental unit at least 30 days before the hearing.

7.9. Capital Improvement Cost Allocation.

A. All costs of improvements designated in the Board's adopted watershed management plan for construction by the Board, which the Board determines will benefit only one Member, shall be paid for entirely by that Member.

B. All costs of improvements designated in the Board's adopted watershed management plan for construction by the Board, which the Board determines benefit more than one Member, shall be apportioned by the Board by the following bases:

- (1) A negotiated amount to be arrived at by the Members who have lands in the subdistrict responsible for the capital improvement.
- OR
- (2) Based on each Member's share of the taxable market value of all real property within the Watershed to the total area within the Watershed.
- OR
- (3) Capital costs allocated under option (2) above may be varied by the Commission by a favorable vote by at least two-thirds of all Commissioners eligible to vote if (a) any Member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or (b) the capital improvement provides a direct benefit to one or more Members which benefit is so disproportionate as to require in a sense of fairness a modification in the formula,

C. If the project is constructed and financed pursuant to Minn, Stat, § 103B.251, the Members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

D. Credits to any Member for lands acquired by said Member to pond or store storm and surface

water shall be allowed against costs as set forth in Section 7.7.

SECTION EIGHT WITHDRAWAL FROM AGREEMENT

Withdrawal of any Member may be accomplished by filing written notice with the Commission and the other Members 60 days before the effective date of withdrawal. No Member may withdraw from this Agreement until the withdrawing Member has met its full financial obligations for the year of withdrawal and prior years,

SECTION NINE DISSOLUTION OF COMMISSION

9.1. This Agreement may be terminated upon the unanimous consent of the parties. If the Agreement is to be terminated, a notice of the intent to dissolve the Commission shall be sent to Hennepin County and BWSR, at least 90 days before the date of dissolution,

9.2. In addition to the manner provided in Section 9.1 for termination, any Member may petition the Commission's Board to dissolve the Commission. Upon 90 days notice in writing to the clerk of each member governmental unit and to Hennepin County and BWSR, the Board shall hold a hearing and upon a majority vote of all Commissioners eligible to vote, the Board may by Resolution recommend that the Commission be dissolved, Said Resolution shall be submitted to each Member governmental unit and if ratified by three-fourths of the governing bodies of all eligible Members within 60 days, said Board shall dissolve the Commission allowing a reasonable time to complete work in progress and to dispose of personal property owned by the Commission.

9.3. Winding Up. Upon dissolution, all personal property of the Commission shall be sold and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the Members, Such distribution of Commission assets shall be made in approximate proportion to the total contributions to the Commission for such costs made by each Member. All payments due and owing for operating costs under Section 6.2, or other unfilled financial obligations, shall continue to be the lawful obligation of the Members. In no event may this Agreement be terminated until all of the planning and plan implementation provisions of the Act, which are required of a watershed management organization, have been completed.

SECTION TEN MISCELLANEOUS PROVISIONS

10.1. Eminent Domain. The Commission shall not have the power of eminent domain and shall not own any interest in real property. All interests in lands shall be held in the name of the Member wherein said lands are located.

10.2. Special Assessments. The Commission shall not have the power to levy a special assessment upon any privately or publicly owned land. All such assessments shall be levied by the Member wherein said lands are located. The Commission shall have the power to require any Member to contribute the costs allocated or assessed according to the other provisions of this agreement.

10.3. Member's Construction Projects that Will Affect Elm Creek. Each Member agrees that it will not directly or indirectly collect or divert any additional surface water to or from Elm Creek or its tributaries without approval from the Commission. Such approval may be granted by the Commission for a Member to proceed with the construction or reconstruction of improvements within the individual corporate Member's boundaries and at said Member's sole cost upon a finding (a) that there is an adequate outlet, (b) that said construction is in conformance with the overall plan, and (c) that the construction will not adversely affect other Members.

10.4. Member Vote Suspension for Failure to Contribute. Any Member who is more than 60 days in default in contributing its proportionate share to the general fund shall have the vote of its Board representative suspended pending the payment of its proportionate share. Any Member who is more than 60 days in default in contributing its proportionate share of the cost of any improvement to the contracting Member shall upon request of the contracting Member have the vote of its Board representative suspended, pending the payment of its proportionate share. Any Member whose Board representative vote is under suspension shall not be considered as an eligible Member as such membership affects the number of votes required to proceed on any matter under consideration by the Board.

10.5. Amendment. The Commission may recommend changes and amendments to this Agreement to the Members. Amendments shall be acted upon by the Members within 90 days of referral. Amendments shall be evidenced by appropriate resolutions of the Members filed with the Commission and shall, if no effective date is contained in the amendment, become effective as of the date all such filings have been completed.

10.6. Termination of Prior Agreement. By executing this document, the parties hereby agree to terminate the prior joint powers agreement, adopted May 12, 1993.

10.7. Counterparts. This Agreement and any amendment may be executed in several counterparts and all so executed shall constitute one Agreement or amendment, binding on all of the parties hereto notwithstanding that all of the parties are not signatory to the original or the same counterpart.

10.8. Effective Date. This Agreement shall be in full force and effect when all governmental units delineated in Section 2 have executed this Agreement. All Members need not sign the same copy.

10.9. Duration. This agreement shall have an unlimited duration.

10.10. Statutory References. All statutory references include all future amendments.

Dated: 11/10/2003

CITY OF CHAMPLIN

By: Jim E. Bryant
Its Mayor

Attest: John M. Brown
Its City Clerk

Dated: November 13, 2003

CITY OF CORCORAN

By: Kenneth L. Swartz
Its Mayor

Attest: Kary Silmann
Its City Clerk

Dated: 4-14-04

CITY OF DAYTON

By: James J. Johnson
Its Mayor

Attest: Andre Gordus com
Its City Clerk

Dated: Dec. 15th, 2003

CITY OF MAPLE GROVE

By: [Signature]
Its Mayor

Attest: [Signature]
Its City Clerk

Dated: 11-18-2003

CITY OF MEDINA

By: [Signature]
Its Mayor

Attest: Chad M. Adams
Its City Clerk

11-25-03
Dated:

CITY OF PLYMOUTH

By: Judith Pearson
Its Mayor
Attest: Sandra Paulson
Its City Clerk

5-25-04
Dated:

CITY OF ROGERS

By: Dee Stanley
Its Mayor
Attest: Stan Bobrowski
Its City Clerk

Dated: Dec. 7, 2003

TOWN OF HASSAN

By: COOP F.
Chair of Town Board
Attest: [Signature]
Its Town Clerk

10.9. Duration. This Agreement shall have an unlimited duration.

10.10. Statutory References. All statutory references include all future amendments.

Dated: 11/16/2003

CITY OF CHAMPLIN
By: [Signature]
Its Mayor
Attest: [Signature]
Its City Clerk

Dated:

CITY OF CORCORAN
By: _____
Its Mayor
Attest: _____
Its City Clerk

Dated:

CITY OF DAYTON
By: _____
Its Mayor
Attest: _____
Its City Clerk

Dated:

CITY OF MAPLE GROVE
By: _____
Its Mayor
Attest: _____
Its City Clerk

Dated:

CITY OF MEDINA
By: _____
Its Mayor
Attest: _____
Its City Clerk

10.9. Duration. This Agreement shall have an unlimited duration.

10.10. Statutory References. All statutory references include all future amendments.

CITY OF CHAMPLIN

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF CORCORAN

By: Thomas L. Guenther
Its Mayor

Dated:

November 13, 2003

Attest: Kary Silmann
Its City Clerk

CITY OF DAYTON

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF MAPLE GROVE

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF MEDINA

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

10.9. Duration. This Agreement shall have an unlimited duration.

10.10. Statutory References. All statutory references include all future amendments.

CITY OF CHAMPLIN

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF CORCORAN

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

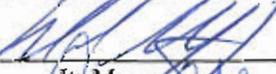
CITY OF DAYTON

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF MAPLE GROVE

By:  _____
Its Mayor

Dated: Dec 15th, 2003

Attest:  _____
Its City Clerk

CITY OF MEDINA

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

10.9. Duration. This Agreement shall have an unlimited duration.

10.10. Statutory References. All statutory references include all future amendments.

CITY OF CHAMPLIN

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF CORCORAN

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF DAYTON

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF MAPLE GROVE

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk

CITY OF MEDINA

By: [Signature]
Its Mayor

Dated: 11-18-2003

Attest: [Signature]
Its City Clerk

CITY OF PLYMOUTH

By: Jedey A. Johnson
Its Mayor

Attest: [Signature]
Its City Clerk

Dated: 11-25-03

CITY OF ROGERS

By: _____
Its Mayor

Attest: _____
Its City Clerk

Dated:

TOWN OF HASSAN

By: _____
Chair of Town Board

Attest: _____
Its Town Clerk

Dated:

CITY OF PLYMOUTH

By: _____
Its Mayor

Dated:

Attest: _____
Its City Clerk _____

CITY OF ROGERS

By: Leigh J. Stanley
Its Mayor

Dated: 5-25-04

Attest: Jacy Robinson
Its City Clerk

TOWN OF HASSAN

By: _____
Chair of Town Board

Dated:

Attest: _____
Its Town Clerk

**AMENDMENT TO AMENDED JOINT AND COOPERATIVE AGREEMENT
ESTABLISHING THE SHINGLE CREEK WATERSHED MANAGEMENT COMMISSION
TO PLAN, CONTROL AND PROVIDE FOR THE DEVELOPMENT
OF THE SHINGLE CREEK WATERSHED**

THIS AGREEMENT is made by and between the cities of Brooklyn Center, Brooklyn Park, Crystal, Maple Grove, Minneapolis, New Hope, Osseo, Plymouth, and Robbinsdale, all of which are Minnesota municipal corporations (the "Member Cities").

WITNESSETH:

WHEREAS, the Member Cities are parties to a joint powers agreement forming the Shingle Creek Watershed Management Commission entitled the AMENDED JOINT AND COOPERATIVE AGREEMENT ESTABLISHING THE SHINGLE CREEK WATERSHED MANAGEMENT COMMISSION TO PLAN, CONTROL AND PROVIDE FOR THE DEVELOPMENT OF THE SHINGLE CREEK WATERSHED (the "Joint Powers Agreement"), the effective date of which was May 1, 1994; and

WHEREAS, the Member Cities wish to amend the Joint Powers Agreement as hereinafter provided;

NOW, THEREFORE, on the basis of the premises and the mutual covenants and agreements contained in the Joint Powers Agreement as hereinafter amended, the parties agree to amend the Joint Powers Agreement as follows:

1. Article VIII. FINANCES is amended to read as follows:

Subdivision 1. The Commission funds may be expended by the Board in accordance with this agreement and in accordance with the procedures as established by law and in the manner as may be determined by the Board. The Board shall designate one or more national or state bank or trust companies, authorized by Chapters 118 and 427 of the Minnesota Statutes to receive deposits of public moneys and to act as depositories for the Commission funds. In no event shall there be a disbursement of Commission funds without the signature of at least two Board members, one of whom shall be the Treasurer or the Treasurer's Authorized Deputy Treasurer. The Treasurer shall be required to file with the Secretary of the Board a bond in the sum of at least \$10,000 or such higher amount as shall be determined by the Board. The Commission shall pay the premium on said bond.

Subdivision 2. Each member agrees to contribute each year to a general fund, said fund to be used for general administration purposes including, but not limited to: salaries, rent, supplies, development of an overall plan, engineering and legal expenses, insurance, and bonds, and to purchase and maintain devices to measure hydrological and water quality data. Said funds may also be used for

normal maintenance of the facilities, but any extraordinary maintenance or repair expense shall be treated as an improvement cost and processed in accordance with Subdivision 5 of this Article. The annual contribution by each member shall be based fifty percent (50%) on the net tax capacity of all property within the Watershed and fifty percent (50%) on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the Shingle Creek Watershed.

Subdivision 3.

(a) An improvement fund shall be established for each improvement project instituted under Article VII, Subdivision 3. Each member agrees to contribute to said fund its proportionate share of the engineering, legal and administrative costs as determined by the Commission as the amount to be assessed against each member as a cost of the improvement. The Board shall submit in writing a statement to each member, setting forth in detail the expenses incurred by the Commission for each project.

Each member further agrees to pay to or contract with the member governmental unit awarding said contract for the improvement, its proportionate share of the cost of the improvement in accordance with the determination of the Board under Article VII, Subdivision 4. The member awarding the contract shall submit in writing copies of the engineer's certificate authorizing payment during construction and the member being billed agrees to pay its proportionate share of said improvement costs within 30 days after receipt of the statement. The member awarding the contract shall advise other contributing members of the tentative time schedule of the work and the estimated times when the contributions shall be necessary.

(b) Notwithstanding the provisions of paragraph (a) of this subdivision, the Commission may by a vote of 2/3rds of all eligible votes of the then existing members of the Commission decide to proceed to fund all or any part of the cost of a capital improvement contained in the capital improvement program of the plan pursuant to the authority and subject to the provisions set forth in Minnesota Statutes, Section 103B.251. It is expressed as a goal of this Agreement that cost sharing of capital improvement costs be assigned and agreed to by members pursuant to Article VIII, Subdivision 7, Subsections 1 and 2 of this Agreement. Without such agreement, all improvements will be constructed pursuant to Minnesota Statutes, Section 103B.251. The Commission and Hennepin County may establish a maintenance fund to

be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Hennepin County pursuant to Minnesota Statutes, Section 103B.251. The levy and collection of an ad valorem tax levy for maintenance shall be by Hennepin County based upon a tax levy resolution adopted by a majority vote of all eligible members of the Commission and remitted to the County on or before the date prescribed by law each year. If it is determined to levy for maintenance, the Commission shall be required to follow the hearing process established by Minnesota Statutes, Sections 103D.915 and 103D.921 and acts amendatory thereof and in addition thereto. Mailed notice shall be sent to the Clerk of each member municipality at least 30 days prior to the hearing.

Subdivision 4. On or before July 1 of each year, the Board shall adopt a detailed budget for the ensuing year and decide upon the total amount necessary for the general fund. Budget approval shall require a favorable vote by a majority of all eligible votes of the then existing members of the Board.

The secretary of the Board shall certify the budget on or before July 1 to the clerk of each member governmental unit together with a statement of the proportion of the budget to be provided by each member.

The Council of each member agrees to review the budget, and the Board shall upon written notice from any member received prior to August 1, hear objections to the budget, and may, upon notice to all members and after a hearing, modify or amend the budget, and then give notice to the members of any and all modifications or amendments.

Subject to the limitations of Subdivision 5 below, each member agrees to provide the funds required by the budget. If no objections are submitted to the Board, each member agrees to provide the funds approved by the Board, after the Board has conducted the aforementioned hearing. Modifications or amendments to the original budget require a favorable vote by a majority of all eligible voters of then existing members of the Board.

The schedule of payments by the members shall be determined by the Board in such a manner as to provide for an orderly collection of the funds needed.

Subject to the limitations of Subdivision 6 below, upon notice and hearing, the Board by a favorable vote of a majority of all eligible votes of then existing members may adopt a supplemental budget requiring

additional payments by the members within 60 days of its adoption but in no event shall the budget require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed or within any member's corporate boundaries in any one calendar year.

Members' attention is drawn to Minnesota Statutes, Section 103B.245, which authorizes a Watershed Management Tax District to be created within each member City to pay the costs of planning and for the purpose of paying capital costs and/or normal and routine maintenance of facilities.

Subdivision 5. Assessments levied against Member Cities for general fund purposes are subject to all of the following limitations:

1. Assessment Cap.

A. Definition. For purposes of this subdivision, the term "Assessment Cap" means the total amount that the Commission may levy against Member Cities for general fund purposes in any year without the consent of a majority of Member Cities. The Assessment Cap for 2004 is \$262,750. Thereafter, the Assessment Cap will increase or decrease each year based, pro rata, on the annual change in the consumer price index (U.S. City Average, All Items, All Urban Consumer) to the end of the second quarter of the preceding year. (For example, the Assessment Cap for 2005 will be adjusted on the basis of the change in the CPI from the end of the second quarter of 2003 to the end of the second quarter of 2004.)

B. Limitation and City Consent. The Commission may levy an amount for general fund purposes in excess of the Assessment Cap only with the consent of a majority of Member Cities expressed by resolutions duly adopted by the city councils before September 1st of the preceding year. The Commission may request authority to exceed the Assessment Cap for one or more years.

If a majority of Member Cities do not consent to the levy of an assessment in excess of the Assessment Cap, the Commission may levy an amount up to the Assessment Cap and the Commission will make necessary changes to the budget.

2. Limitation on Increase of Assessment. The Commission may not assess a total levy against Member Cities for general fund purposes in any year in an amount that exceeds 120% of the

previous years' assessment without the consent of a majority of the Member Cities given in the same manner as described in paragraph 1B above.

3. Limitation Based on Tax Capacity. The Commission may not assess a levy or combination of levy and supplemental levies against the Member Cities for general fund purposes in any one year that requires any member to contribute an amount in excess of one-half of one percent of the net tax capacity of that portion of the city lying within the Watershed.

Subdivision 6. Supplemental Budget and Limit on Assessment. The Board may adopt a supplemental budget in accordance with Subdivision 4. However, the amount assessed against the Member Cities for general fund purposes, when added together with other assessments for general fund purposes for the same year, may not exceed the limitations on assessments set forth in Subdivision 5 without the consent of the Member Cities. The consent of the Member Cities shall be secured in the same manner as is provided in Subdivision 5, except that the September 1 deadline for Member City approval does not apply.

Subdivision 7. Cost Allocation for Capital Projects. The Commission shall apportion to the respective members on either (1), (2) or (3) of the following bases:

- (1) A negotiated amount to be arrived at by the members who have lands in the subdistrict responsible for the capital improvement.
- (2)
 - (a) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the net tax capacity of each member within the boundaries of the watershed to the total net tax capacity in the Shingle Creek Watershed area governed by this Agreement.
 - (b) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the Shingle Creek Watershed governed by this Agreement.
 - (c) Capital costs allocated under the 50% area/50% net tax capacity formula herein set forth may be varied by the Commission by a 2/3rds vote if:

- (1) any member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or
 - (2) the capital improvement provides a direct benefit to one or more members which benefit is so disproportionate as to require in a sense of fairness a modification in the 50/50 formula.
- (d) Credits to any member for lands acquired by said member to pond or store storm and surface water shall be allowed against costs set forth in Subsections (a), (b) and (c) of this Section.
- (3) If agreement is not reached to proceed as set forth in Subsection 1 or 2 of this Subdivision and if the project is constructed and financed pursuant to Minnesota Statutes, Section 103B.251, the members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

Section 2. This amendment shall be in full force and effect upon the filing of a certified copy of a resolution approving said amendment by all nine Member Cities. Said resolutions shall be filed with the Chair of the Shingle Creek Watershed Commission, who shall certify the effective date of the amendment in writing to all Member Cities. The effective date of the amendment shall be when approved by all of the Member Cities and when the mayor and other authorized city representatives have executed the amended agreement.

IN WITNESS WHEREOF, the undersigned government units, by action of their governing bodies, have caused this Agreement to be executed in accordance with the authority of Minnesota Statutes, Sections 103B.201 through 103B.255 and Section 471.59.

Dated: 2/23/04

CITY OF BROOKLYN CENTER
 By: Robert D. Papp
 Its: Mayor Stephen
 And by: [Signature]
 Its: City Manager

Dated: 11-21-05

CITY OF BROOKLYN PARK

By: [Signature]
Its MAYOR

And by: [Signature]
Its CITY MANAGER

Dated: March 1, 2004

CITY OF CRYSTAL

By: [Signature]
Its Mayor

And by: [Signature]
Its City Manager

Dated: _____

CITY OF MAPLE GROVE

By: [Signature]
Its MAYOR

And by: [Signature]
Its CITY ADMINISTRATOR

Dated: 3/21/06

CITY OF MINNEAPOLIS

By: [Signature]
Its March 21 '06

And by: [Signature]
Its PWD

[Signature]
Finance Officer's Designee

Dated: 2/23/04

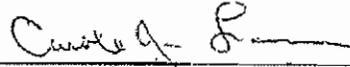
CITY OF NEW HOPE

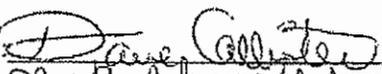
By: [Signature]
Its Mayor

And by: [Signature]
Its City Manager

Dated: 5-27-04

CITY OF OSSEO

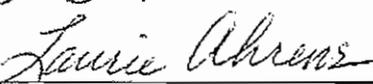
By: 
Its MAYOR

And by: 
Its Clerk Administrator

Dated: _____

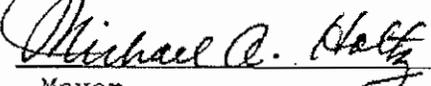
CITY OF PLYMOUTH

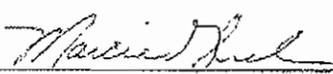
By: 
Its Mayor

And by: 
Its City Manager

Dated: 3/1/2004

CITY OF ROBBINSDALE

By: 
Its Mayor

And by: 
Its City Manager

J:\CLIENTS\SS\SHINGLEC\JPA\021304 Memo to Mgrs\Amendment to SC Joint & Cooperative Agt.doc

AMENDMENT TO
AMENDED JOINT AND COOPERATIVE AGREEMENT ESTABLISHING THE WEST MISSISSIPPI
WATERSHED MANAGEMENT COMMISSION TO PLAN, CONTROL AND PROVIDE FOR THE
DEVELOPMENT OF THE WEST MISSISSIPPI WATERSHED

THIS AGREEMENT is made by and between the cities of Champlin, Brooklyn Center, Brooklyn Park, Maple Grove, Minneapolis and Osseo, all of which are Minnesota municipal corporations (the "Member Cities").

WITNESSETH:

WHEREAS, the Member Cities are parties to a joint powers agreement forming the West Mississippi Watershed Management Commission entitled the AMENDED JOINT AND COOPERATIVE AGREEMENT ESTABLISHING THE WEST MISSISSIPPI WATERSHED MANAGEMENT COMMISSION TO PLAN, CONTROL AND PROVIDE FOR THE DEVELOPMENT OF THE WEST MISSISSIPPI WATERSHED (the "Joint Powers Agreement"), the effective date of which was January 31, 1994; and

WHEREAS, the Member Cities wish to amend the Joint Powers Agreement as hereinafter provided;

NOW, THEREFORE, on the basis of the premises and the mutual covenants and agreements contained in the Joint Powers Agreement as hereinafter amended, the parties agree to amend the Joint Powers Agreement as follows:

1. Article VIII. FINANCES is amended to read as follows:

Subdivision 1. The Commission funds may be expended by the Board in accordance with this agreement and in accordance with the procedures as established by law and in the manner as may be determined by the Board. The Board shall designate one or more national or state bank or trust companies, authorized by Chapters 118 and 427 of the Minnesota Statutes to receive deposits of public moneys and to act as depositories for the Commission funds. In no event shall there be a disbursement of Commission funds without the signature of at least two Board members, one of whom shall be the Treasurer or the Treasurer's Authorized Deputy Treasurer. The Treasurer shall be required to file with the Secretary of the Board a bond in the sum of at least \$10,000 or such higher amount as shall be determined by the Board. The Commission shall pay the premium on said bond.

Subdivision 2. Each member agrees to contribute each year to a general fund, said fund to be used for general administration purposes including, but not limited to: salaries, rent, supplies, development of an overall plan, engineering and legal expenses, insurance, and bonds, and to purchase and maintain devices to measure hydrological and water quality data. Said funds may also be used for normal maintenance of the facilities, but any extraordinary maintenance or repair expense shall be treated as an improvement cost and processed in accordance with Subdivision 5 of this Article. The annual contribution by each member shall be based fifty percent (50%) on the net tax capacity of all property within the Watershed and fifty percent (50%) on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the West Mississippi Watershed governed by this Agreement.

Subdivision 3.

(a) An improvement fund shall be established for each improvement project instituted under Article VII, Subdivision 3. Each member agrees to contribute to said fund its proportionate share of the engineering, legal and administrative costs as determined by the Commission as the amount to be assessed against each member as a cost of the improvement. The Board shall submit in writing a statement to each member, setting forth in detail the expenses incurred by the Commission for each project.

Each member further agrees to pay to or contract with the member governmental unit awarding said contract for the improvement, its proportionate share of the cost of the improvement in accordance with the determination of the Board under Article VII, Subdivision 4. The member awarding the contract shall submit in writing copies of the engineer's certificate authorizing payment during construction and the member being billed agrees to pay its proportionate share of said improvement costs within 30 days after receipt of the statement. The member awarding the contract shall advise other contributing members of the tentative time schedule of the work and the estimated times when the contributions shall be necessary.

(b) Notwithstanding the provisions of paragraph (a) of this subdivision, the Commission may by a vote of 2/3rds of all eligible votes of the then existing members of the Commission decide to proceed to fund all or any part of the cost of a capital improvement contained in the capital improvement program of the plan pursuant to the authority and subject to the provisions set forth in Minnesota Statutes, Section 103B.251. It is expressed as a goal of this Agreement that cost sharing of capital improvement costs be assigned and agreed to by members pursuant to Article VIII, Subdivision 7, Subsections 1 and 2 of this Agreement. Without such agreement, all improvements will be constructed pursuant to Minnesota Statutes, Section 103B.251. The Commission and Hennepin County may establish a maintenance fund to be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Hennepin County pursuant to Minnesota Statutes, Section 103B.251. The levy and collection of an ad valorem tax levy for maintenance shall be by Hennepin County based upon a tax levy resolution adopted by a majority vote of all eligible members of the Commission and remitted to the County on or before October 10th of the date prescribed by law each year. If it is determined to levy for maintenance, the Commission shall be required to follow the hearing process established by Minnesota Statutes, Sections 103D.915 and 103D.921 and acts amendatory thereof and in addition thereto. Mailed notice shall be sent to the Clerk of each member municipality at least 30 days prior to the hearing.

Subdivision 4. On or before July 1 of each year, the Board shall adopt a detailed budget for the ensuing year and decide upon the total amount necessary for the general fund. Budget approval shall require a favorable vote by a majority of all eligible votes of the then existing members of the Board.

The secretary of the Board shall certify the budget on or before July 1 to the clerk of each member governmental unit together with a statement of the proportion of the budget to be provided by each member.

The Council of each member agrees to review the budget, and the Board shall upon written notice from any member received prior to August 1, hear objections to the budget, and may, upon notice to all members and after a hearing, modify or amend the budget, and then give notice to the members of any and all modifications or amendments.

Subject to the limitations of Subdivision 5 below, each member agrees to provide the funds required by the budget. If no objections are submitted to the Board, each member agrees to provide the funds approved by the Board, after the Board has conducted the aforementioned hearing. Modifications or amendments to the original budget require a favorable vote by a majority of all eligible voters of then existing members of the Board.

The schedule of payments by the members shall be determined by the Board in such a manner as to provide for an orderly collection of the funds needed.

Subject to the limitations of Subdivision 6 below, upon notice and hearing, the Board by a favorable vote of a majority of all eligible votes of then existing members may adopt a supplemental budget requiring additional payments by the members within 60 days of its adoption but in no event shall the budget require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed or within any member's corporate boundaries in any one calendar year.

Members' attention is drawn to Minnesota Statutes, Section 103B.245, which authorizes a Watershed Management Tax District to be created within each member City to pay the costs of planning and for the purpose of paying capital costs and/or normal and routine maintenance of facilities.

Subdivision 5. Assessments levied against Member Cities for general fund purposes are subject to all of the following limitations:

1. Assessment Cap.

A. Definition. For purposes of this subdivision, the term "Assessment Cap" means the total amount that the Commission may levy against Member Cities for general fund purposes in any year without the consent of a majority of Member Cities. The Assessment Cap for 2004 is \$119,450. Thereafter, the Assessment Cap will increase or decrease each year based, pro rata, on the annual change in the consumer price index (U.S. City Average, All Items, All Urban Consumer) to the end of the second quarter of the preceding year. (For example, the Assessment Cap for 2005 will be adjusted on the basis of the change in the CPI from the end of the second quarter of 2003 to the end of the second quarter of 2004.)

B. Limitation and City Consent. The Commission may levy an amount for general fund purposes in excess of the Assessment Cap only with the consent of a majority of Member Cities expressed by resolutions duly adopted by the city councils before September 1st of the preceding year. The Commission may request authority to exceed the Assessment Cap for one or more years.

If a majority of Member Cities do not consent to the levy of an assessment in excess of the Assessment Cap, the Commission may levy an amount up to the Assessment Cap and the Commission will make necessary changes to the budget.

2. Limitation on Increase of Assessment. The Commission may not assess a total levy against Member Cities for general fund purposes in any year in an amount that exceeds 120% of the previous years' assessment without the consent of a majority of the Member Cities given in the same manner as described in paragraph 1B above.

3. Limitation Based on Tax Capacity. The Commission may not assess a levy or combination of levy and supplemental levies against the Member Cities for general fund purposes in any one year that requires any member to contribute an amount in excess of one-half of one percent of the net tax capacity of that portion of the city lying within the Watershed.

Subdivision 6. Supplemental Budget and Limit on Assessment. The Board may adopt a supplemental budget in accordance with Subdivision 4. However, the amount assessed against the Member Cities for general fund purposes, when added together with other assessments for general fund purposes for the same year, may not exceed the limitations on assessments set forth in Subdivision 5 without the consent of the Member Cities. The consent of the Member Cities shall be secured in the same manner as is provided in Subdivision 5, except that the September 1 deadline for Member City approval does not apply.

Subdivision 7. Cost Allocation for Capital Projects. The Commission shall apportion to the respective members on either (1), (2) or (3) of the following bases:

- (1) A negotiated amount to be arrived at by the members who have lands in the subdistrict. It is anticipated that most capital improvements will be made under this provision; or
- (2) (a) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the net tax capacity of each member within the boundaries of the watershed each year to the total net tax capacity in the West Mississippi Watershed area governed by this Agreement.

- (b) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the West Mississippi Watershed governed by this Agreement.
 - (c) Capital costs allocated under the 50% area - 50% net tax capacity formula herein set forth may be varied by the Commission by a 2/3rd vote of all eligible members if:
 - (1) any member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or
 - (2) the capital improvement provides a direct benefit to one or more members which benefit is so disproportionate as to require in a sense of fairness a modification in the 50/50 formula.
 - (d) Credits to any member for lands acquired by said member to pond or store storm and surface water shall be allowed against costs set forth in Subsections (a), (b) and (c) of this Section.
- (3) If agreement is not reached to proceed as set forth in Subsection 1 or 2 of this Subdivision and if the project is constructed and financed pursuant to Minnesota Statutes, Section 103B.251, the members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

Section 2. This amendment shall be in full force and effect upon the filing of a certified copy of a resolution approving said amendment by all nine Member Cities. Said resolutions shall be filed with the Chair of the West Mississippi Watershed Commission, who shall certify the effective date of the amendment in writing to all Member Cities. The effective date of the amendment shall be when approved by all of the Member Cities and when the mayor and other authorized city representatives have executed the amended agreement.

IN WITNESS WHEREOF, the undersigned government units, by action of their governing bodies, have caused this Agreement to be executed in accordance with the authority of Minnesota Statutes, Sections 103B.201 through 103B.255 and Section 471.59.

Dated: _____

CITY OF BROOKLYN CENTER

By: _____
Its _____

And by: _____
Its _____

Dated: _____

CITY OF BROOKLYN PARK

By: _____
Its _____

And by: _____
Its _____

Dated: _____

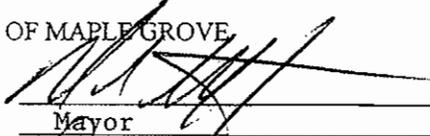
CITY OF CHAMPLIN

By: _____
Its _____

And by: _____
Its _____

Dated: _____

CITY OF MAPLE GROVE

By: 
Its Mayor

And by: 
Its City Clerk

Dated: _____

CITY OF OSSEO

By: _____
Its _____

And by: _____
Its _____

Appendix E - SWPPP

BMP Summary Sheet

MS4 Name: Maple Grove

Permit Condition: IV.D Section 303(d) listings

Unique BMP Identification Number: IV.D – 1

BMP Title: Impaired Waters Review Process

BMP Description:

The city of Maple Grove will review the potential impacts of its MS4 operation on all impaired waters, as defined by the current 303(d) list within the City and intersecting watersheds.

In this review, Maple Grove will:

- Identify the impaired waters that are likely to be impacted by the MS4's stormwater discharge; and
- Use a combination of storm sewer, drainage and watershed maps and elevation models to identify all potential stormwater discharges to impaired waters; and
- Evaluate the hydrology, land use and other characteristics of the watershed areas that may impact the impaired water as a result of a stormwater discharge from the operation of City's MS4.

The City will determine if any changes to the existing stormwater system or BMPs are needed to minimize the impact of discharges from its MS4 to the impaired waters. If such modifications are deemed necessary, Maple Grove will modify our SWPPP and submit those modifications to the MPCA with the current year's annual report. The City will consider timing and long and short term costs and justify the conclusions on whether or not SWPPP revisions are necessary.

Measurable Goals:

- Determine what BMPs are currently implemented to meet and improve water quality in all known impaired waters whether or not they are identified on the 303(d) list; and
- Prepare an inventory of all impaired waters within the City as well as those receiving stormwater discharge from the City
- Prepare a map that includes all impaired waters within the City and those which may be impacted by the City's storm sewer system
- Justify conclusions for the modification of BMPs to meet water quality standards relative to the impaired waters
- Prepare a schedule and timeline to BMPs added to the SWPPP

Timeline/Implementation Schedule:

Updated with Annual SWPPP/NPDES Report: Identify what steps, if any, have already been taken by Maple Grove to meet the requirements of section IV.D. of the MS4 General Permit.

Currently Up to Date and Every Two Years Subsequent to New 303(d) List: Identify impaired waters receiving likely impacts from stormwater discharges from MS4 and locate discharges

Currently Up to Date and Every Two Years Subsequent to New 303(d) List: Delineate watersheds contributing runoff to impaired waters

Currently Up to Date and Updated as As-builts Become Available: Develop a map of discharges

Completed as a Result of Non-Degradation Study: Complete an Evaluation of hydrology, land use, etc.

Updated with Annual SWPPP/NPDES Report: Include in Annual Report to MPCA the overview of the impaired waters review and any changes to the SWPPP that have been deemed necessary through this review process.

Specific Components and Notes:

This process is to be reassessed annually over the course of the permit cycle. As new 303(d) lists with additional impaired waters listed are published in the future, Maple Grove will review changes to the list and conduct the necessary review of additional listed waters likely to be impacted by the MS4's stormwater discharges.

When an USEPA approved TMDL is finalized, Maple Grove intends to fully comply with all limits and requirements set forth in the TMDL in accordance with the schedule(s) outlined in the TMDL and the MS4 Permit.

Responsible Party for this BMP:

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6361

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1a-1

***BMP Title:** Distribute educational materials

***BMP Description:**

The City currently employs the resources of the City newsletter and watershed organizations to distribute educational materials to residents and local businesses. On occasion, the City will also put educational materials on display at the City offices for distribution or viewing.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP. See SWPPP Interagency Coordination Section regarding coordinated efforts by the watershed to fulfill efforts for public education and participation.

***Measurable Goals:**

The City will distribute an informative newsletter to virtually all of the residents households, four times per year. The City will also support the education and public outreach committee of the watershed for the distribution of at least two educational publications annually.

***Timeline/Implementation Schedule:**

This program is currently active with ongoing development.

Specific Components and Notes:

- 1.) A quarterly informative newsletter containing information and resources for water quality improvement and/or maintenance.
- 2.) Support the development by distributing at least two publications annually.

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1a-2

<p>*BMP Title: Water Resource Staff</p>
<p>*BMP Description:</p> <p>The City of Maple Grove has two full-time water resource staff specifically designated to address storm water issues with the public, builders, developers, designers and engineers. These staff members are also responsible for facilitating public participation and involvement in maintaining storm water quality.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Track the number of personnel contacts per month.</p>
<p>*Timeline/Implementation Schedule:</p> <p>This process is currently active with ongoing improvements.</p>
<p>Specific Components and Notes:</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1a-3

***BMP Title:** Storm Water Information Web page

***BMP Description:**

The City of Maple Grove will develop a Web page within the current City web location to discuss the specific components listed below. The web page will allow the public and businesses to view the Maple Grove SWPPP and see how the City is intending to fulfill those commitments.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Web page developed and posted for public access.
- 2.) Number of web page “hits” from counter

***Timeline/Implementation Schedule:**

- 1.) Years 1 – 5: Developed web page layout and coordinate updating schedule
- 2.) Years 1 – 5: Implemented website and links to specific components below

Specific Components and Notes:

1. Education Activity Implementation Program
2. Storm Water Pollution Prevention Plan hyperlink
3. Watershed Commission hyperlinks
4. Lake association hyperlinks
5. Current public meetings and presentations

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1a-4

<p>*BMP Title: Presentation and Advisory to the Lake Quality Commission</p>
<p>*BMP Description:</p> <p>The City of Maple Grove will conduct a meeting with the Lake Quality Commission for the purpose of educating lake and city representatives about storm water related issues, reviewing current programs, understanding educational challenges unique to Maple Grove, and introducing new material listed in the specific components below.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Track the number of meetings conducted2.) Track the number of attendees
<p>*Timeline/Implementation Schedule:</p> <p>Currently ongoing schedule, usually meeting once per month.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Maple Grove Storm Water Pollution Prevention Program2.) Maple Grove watershed maps3.) Volunteer programs
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1a-5

<p>*BMP Title: NPDES Training for City Staff</p>
<p>*BMP Description:</p> <p>The City of Maple Grove will conduct training for the City Staff on a yearly basis to explain the specific components listed below. This presentation will increase staff awareness of storm water runoff issues and justify the importance of implementing the Maple Grove SWPPP provisions.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Completed training.</p>
<p>*Timeline/Implementation Schedule:</p> <p>Years 1 – 5 Annual training each year of permit cycle.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) NPDES regulations2.) Urban storm water impacts to water bodies3.) Maple Grove SWPPP provisions4.) Current Maple Grove SWPPP status and challenges5.) Responsible departments for BMPs
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1a-6

<p>*BMP Title: Provide technical advisory staff to the Elm Creek, Shingle Creek and West Mississippi Watershed Management Commissions</p>
<p>*BMP Description:</p> <p>The City staff will attend and advise the watershed commissioners on issues related to all six MCMs in the City's SWPPP.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Track the number of meetings attended by City staff</p>
<p>*Timeline/Implementation Schedule:</p> <p>Continue with existing program to attend one meeting each month for each watershed.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Shingle Creek Watershed Management Commission2.) West Mississippi Watershed Management Commission3.) Elm Creek Watershed Management Commission4.) Education activity implementation program
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1b-1

<p>*BMP Title: Implement an Education Program</p>
<p>*BMP Description:</p> <p>The City has an Education Activity Implementation program ongoing. A portion of the City Staff time and resources is dedicated to implementing the educational program. Staff time is dedicated for residential, business and developer contacts; participation in public education and outreach development committees through the watershed; developments of City educational materials and resources; and cooperative participation with the Lake Quality Commission, Arbor Committee and various civic groups (i.e. scouting and home owner associations.)</p> <p>Location(s) in SWPPP of detailed information relating to this BMP:</p> <p>The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Dedication of at least 10% of the City's water resource budget and time for implementation of the education program.</p>
<p>*Timeline/Implementation Schedule:</p> <p>The program is currently being implemented and re-evaluated annually prior to submission of the Annual MS4 Permit.</p>
<p>Specific Components and Notes:</p> <p>Identify 10% of the annual water resource budget for implementation of the education program.</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 - Public Education and Outreach

Unique BMP Identification Number: 1c-1

***BMP Title:** Education Program: Public Education and Outreach

***BMP Description:**

Increase public awareness and understanding of stormwater issues within the community. Inform and educate the public about the impacts of stormwater runoff on water quality.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

- 1.) Highlight storm water issues through City sponsored community events and programs that focus on public participation.
 - Volunteer community cleanup days
 - Volunteer river, stream, and pond cleanup program
 - Volunteer native tree/seedling planting program
 - Volunteer storm drain stencil program
- 2.) Stormwater hotline for citizens to report illegal dumping.
- 3.) Articles in the community newsletter that highlight seasonal stormwater issues and stormwater related community events and programs.
- 4.) Stormwater information on the City web site.
- 5.) Stormwater educational materials provided at public places
 - Stormwater poster display and educational guides at the City Administrative offices.
 - Signage in public places (e.g. post signs of high water and no wake at public boat launches, post pet waste cleanup signs at City parks and trails)
- 6a.) Support the public education and outreach program administered by the local watersheds.
- 6b.) Staff provide educational and advisory information on the use and function of storm drains and the stormwater conveyance systems system; limitation and use of salt and fertilizers; and disposal of yard waste.

***Timeline/Implementation Schedule:**

Activity #1

Years 1-5) Continuation of the plan for sponsoring and implementing the volunteer public participation events and programs.

Years 1-5) Community cleanup day held bi-annually in the spring and in the fall.

Years 1-5) River, stream, and pond cleanup events held annually in the spring.

Years 1-5) Tree/sapling planting events held annually in the spring to coincide with Arbor Day.

Years 1-5) Provide materials annually for a storm drain stenciling program.

Activity #2

Years 1-5) Maintain a stormwater hotline.

Years 1-5) Track number and location of illegal dumping incidents reported.

Activity #3

Years 1-5) Publish stormwater articles quarterly in the community newsletter.

Activity #4

Years 1-5) Update stormwater page quarterly as needed.

Activity #5

Years 1-5) Research what educational materials are available; have materials in place for the public to view each year of the reporting cycle.

Activity #6

Years 1-5) Support for the development of educational publications or presentations for the public.

Years 1-5) Provide education and advisory support during City operational hours all year.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1c-2

*BMP Title: Education Program: Public Participation
*BMP Description: <ol style="list-style-type: none">1.) Increase public awareness and understanding of stormwater issues within the community.2.) Inform and educate the public about the impacts of stormwater runoff on water quality and what they can do to actively protect local lakes and streams from polluted stormwater runoff.3.) Inform and educate the public about how the City manages stormwater runoff through its' stormwater pollution prevention program (SWPPP). Location(s) in SWPPP of detailed information relating to this BMP:
*Measurable Goals: <ol style="list-style-type: none">1.) The City will report in the community newsletter and/or website on activities related to managing stormwater and implementing the SWPPP. Topics for the newsletter may include information about the water quality of our City lakes and streams; events and programs the public can participate in to raise their awareness about stormwater impacts; and specific stormwater management activities the City is implementing.2.) The City will sponsor a city park cleanup day.3.) The City will hold a public information meeting (in addition to the annual meeting on the SWPPP) to update citizens on the City's progress toward implementing the SWPPP, and to provide information on stormwater related budget/fee issues. A special recognition event will be held at the public information meeting to recognize citizens who participated in the park cleanup day.
*Timeline/Implementation Schedule: Activity #1 Years 1-5) Publish articles on stormwater management and the SWPPP quarterly in the community newsletter. Activity #2 Years 1-5) City park cleanup day Activity #3 Years 1-5) Hold one combined public information meeting/recognition event annually. Provide notice of the meeting in the community newsletter, on the City web site and the City offices.
Specific Components and Notes:
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1c-3

*BMP Title: Education Program: Illicit Discharge Detection and Elimination
*BMP Description: <ol style="list-style-type: none">1.) Increase public and business understanding of the types and prevention of illicit discharges to the City's stormwater conveyance system.2.) Inform and educate the public and businesses regarding the impacts of illicit discharges and what they can do to prevent them.3.) Inform and educate the public on how the City manages inspections for illicit discharges. <p>Location(s) in SWPPP of detailed information relating to this BMP:</p>
*Measurable Goals: <ol style="list-style-type: none">1.) The City will revise it's website with the information necessary for residents to make their own personal inspections to detect illicit discharge.2.) The City will post ordinances regarding illicit discharge within the City's stormwater website and at the City's administrative offices.3.) Staff will provide one on one informational contacts for individuals and businesses requesting knowledge of illicit discharges and detection.
*Timeline/Implementation Schedule: Years 1-5) Post information regarding illicit discharge detection and elimination on the community website. Years 1-5) Update and maintain posted ordinances on the City website and the offices biannually. Years 1-5) Provide City staff as an informational resource during City operational hours.
Specific Components and Notes:
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1c-4

<p>*BMP Title: Education Program: Construction Site Run-off Control</p>
<p>*BMP Description:</p> <ol style="list-style-type: none">1.) Increase public and business (builders/developers) understanding of construction site run-off control practices.2.) Inform and educate the public and businesses regarding city policy and requirements for construction site stormwater inspection, maintenance and best management practices (BMPs).3.) Inform and educate the Public and Business about how the City manages construction site stormwater through its Stormwater Pollution Prevention Plan (SWPPP). <p>Location(s) in SWPPP of detailed information relating to this BMP:</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) The City will update and maintain its website with the most current stormwater maintenance and best management practices.2.) Utilize City staff contact with residents and business to communicate the justification and details of City specified BMPs.
<p>*Timeline/Implementation Schedule:</p> <p>Years 1-5) Post and update information on the Community website regarding construction site run-off control. Years 1-5) Provide City staff as an informational resource during City operational hours.</p>
<p>Specific Components and Notes:</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1c-5

*BMP Title: Education Program: Post-Construction Stormwater Management in New Development and Redevelopment
*BMP Description: 1.) Increase the public and business awareness of post-construction stormwater management techniques and goals. 2.) Inform and educate the public and business regarding city policy and requirements for post-construction stormwater management practices. Location(s) in SWPPP of detailed information relating to this BMP:
*Measurable Goals: 1.) The City will update and maintain its website with the most current post-construction stormwater management practices. 2.) City staff will serve as a contact for residents and businesses to communicate post-construction stormwater management practices.
*Timeline/Implementation Schedule: Years 1-5) Post and update information on the community website regarding post-construction stormwater management. Years 1-5) Make City staff available as an informational resource during City operational hours.
Specific Components and Notes:
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 1c-6

*BMP Title: Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations
*BMP Description: <ol style="list-style-type: none">1.) Increase the public and business awareness of the City's pollution prevention and good housekeeping practices.2.) Inform and educate the public and businesses regarding pollution prevention and good housekeeping practices. <p>Location(s) in SWPPP of detailed information relating to this BMP:</p>
*Measurable Goals: <ol style="list-style-type: none">1.) The City will update and maintain its website with the most current standards for pollution prevention and good housekeeping practices.2.) City staff will serve as a contact for residents and businesses to communicate pollution prevention and good housekeeping practices.3.) Training courses designed to teach businesses and municipal employees how to manage pollutants.
*Timeline/Implementation Schedule: Years 1-5) Post and track (website hits) public interest generated by the City's stormwater website for pollution prevention and good housekeeping practices. Years 1-5) Make City staff available as an informational resource during City operational hours. Year 1) Develop a cooperative plan with the watershed to train businesses and municipal employees on pollution prevention and good housekeeping practices.
Specific Components and Notes:
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-1

<p>*BMP Title: Coordination of Education Program</p>
<p>*BMP Description:</p> <p>The City of Maple Grove fully supports the education and outreach programs administered by all three of the City's Watershed Management Commissions through the end of the permit cycle.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP:</p> <p>The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Increased awareness and understanding2.) Increased participation and involvement.
<p>*Timeline/Implementation Schedule:</p>
<p>Specific Components and Notes:</p> <p>See the section on Interagency Coordinaton</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1e-1

<p>*BMP Title: Annual Public Meeting</p>
<p>*BMP Description:</p> <p>Conduct an annual public meeting to receive public opinion on the adequacy and effectiveness of the Maple Grove SWPP program components. At this meeting, City staff will summarize the methods employed to meet each of the MCMs. The public will be encouraged to question and to further understand the implementation and goal of each MCM.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Completed public meetings and noted attendance.2.) Collect and summarize written and oral comments.3.) Number of questions addressed.
<p>*Timeline/Implementation Schedule:</p> <p>Year 1 - First annual meeting. The specific components listed below will be considered when developing and implementing the meeting agenda. Years 2 - 5 Annual meeting in each year of the permit cycle.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Establish meeting procedures and processes for speakers and written materials.2.) Consider timely, relevant written materials submitted by the public.3.) Encourage comments and questions in regards to each MCM.4.) Allow interested persons time to make oral statements on the Maple Grove SWPPP.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 2 – Public Participation/Involvement

Unique BMP Identification Number: 2a-1

***BMP Title:** Comply with Public Notice Requirements

***BMP Description:**

The City of Maple Grove currently provides a notice of public informational meeting at least 30 days prior to the meeting. The City will continue this practice for the annual stormwater meeting or any subsequent meetings to discuss the provisions of the Maple Grove SWPPP, its effectiveness, or amendments there to. Include all components listed below and distribute public notices in areas to best notify a diverse group of citizens with the City of Maple Grove.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Complete a public notice, at least 30 days prior to the meeting each year of the permit cycle.
- 2.) Revise methods each year if necessary to increase public awareness of meeting.

***Timeline/Implementation Schedule:**

The first 30-day public notice will be for the 2007 annual public meeting and continued on an annual interval. If periodic meetings become necessary, additional 30-day public notices will be implemented.

Specific Components and Notes:

- 1.) Date
- 2.) Time
- 3.) Location
- 4.) Description of how the meeting will be conducted.
- 5.) Location of the Maple Grove SWPPP for review prior to the meeting.
- 6.) Locations of notice
(City Website and Local Newspaper)

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 2 – Public Participation/Involvement

Unique BMP Identification Number: 2b-1

<p>*BMP Title: Solicit Public Input and opinion on the adequacy of the SWPPP</p>
<p>*BMP Description:</p> <p>The City will advertise the publication of the SWPPP along with the legal notice for the public meeting on the City's stormwater website and during the public meeting held annually. Each notice for the SWPPP will be accompanied by a request for comments which will permit at least 30 days for public comment.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Years 1-5) Solicit for public input in at least forms communication (website, local newspaper and annual meeting) each year. Years 1-5) Consider all timely and relevant written materials submitted by the public. Years 1-5) Summarize all timely and relevant comments collected.</p>
<p>*Timeline/Implementation Schedule:</p> <p>Years 1-5) Solicitation for public comments will commence at least 30 days prior to the City's annual NPDES meeting. Years 1-5) All timely and relevant written comments will be considered and summarized within 45 days following the NPDES annual public meeting.</p>
<p>Specific Components and Notes:</p> <ul style="list-style-type: none">- Consider the timely and relevant written comments submitted by the public- Summarize all timely and relevant comments submitted by the public.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 2 – Public Participation/Involvement

Unique BMP Identification Number: 2c-1

*BMP Title: Consider Public Input
*BMP Description: Analyze the comments and written material and adjust the SWPPP where appropriate. Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.
*Measurable Goals: Record revisions made to SWPPP
*Timeline/Implementation Schedule: Annually ongoing with a note of the documented changes made prior to the annual reporting deadline.
Specific Components and Notes: 1.) Consider timely, relevant written materials submitted by the public. 2.) Summarize comments collected at the meetings.
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 2d-1

<p>*BMP Title: Volunteer Storm Drain Stenciling Program</p>
<p>*BMP Description:</p> <p>The City of Maple Grove has established a volunteer storm drain stenciling program in which any volunteer group may pick up supplies and equipment for storm drain stenciling free of charge. The stenciling of storm sewers will provide the public with the awareness that material that enters the storm drain system is discharged directly into the lakes and streams within the City. It will also provide for public education and participation.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Number of volunteers participating in the program.2.) Number of storm drains stenciled each year.
<p>*Timeline/Implementation Schedule:</p> <p>Years 1 – 5) The City will announce the availability of the storm drain stencils and supplies at civic group meetings annually in the spring.</p> <p>Year 1) The City will update its stormwater web page with information regarding the stenciling program.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Storm sewer inlet map2.) Volunteer list3.) Targeted storm drains from illicit discharge inspection program
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 2d-2

***BMP Title:** Adopt-a-Street Program

***BMP Description:**

The City of Maple Grove has established a volunteer street clean-up program in which any volunteer group may participate. The program will provide the public with the awareness of the amount of trash and debris that may accumulate and enter into the community's storm drain system. It will also provide for public education.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Number of volunteers participating in the program each year.
- 2.) Number of blocks cleaned each year.

***Timeline/Implementation Schedule:**

The City will coordinate the program three times each year.

Specific Components and Notes:

- 1.) Volunteer list
- 2.) Targeted streets in the program

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 2d-3

*BMP Title: Adopt-a-Park Program
*BMP Description: <p>The City of Maple Grove has a volunteer park clean-up program in which any citizen group may participate. The program will provide the awareness of the amount of trash and debris that may accumulate and enter into the MS4. This program is advertised in the City's quarterly newsletter.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
*Measurable Goals: <ul style="list-style-type: none">- Track the number of park areas cleaned annually- Track the annual number of volunteer participants
*Timeline/Implementation Schedule: <ul style="list-style-type: none">- Existing annually
Specific Components and Notes: City quarterly newsletter
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 2d-4

<p>*BMP Title: Resident Stakeholder Meetings</p>
<p>*BMP Description:</p> <p>In addition to the annual meeting required by the MS4 general permit, the City has coordinated individual stakeholder meetings (e.g. Lake Quality Commission) to address areas of concern in regards to our lake and stream water quality.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Track the number of citizen representatives participating in the program each year.2.) Track the number of projects initiated as a result of the meetings.
<p>*Timeline/Implementation Schedule:</p> <p>The City will coordinate approximately one meeting per month</p>
<p>Specific Components and Notes:</p> <p>List of citizen and at-large representatives</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 2d-5

***BMP Title:** Storm water website and hotline documentation procedures.

***BMP Description:**

The City will develop a storm water website and hotline for residents to report illicit storm water discharges, provide comments to the Maple Grove SWPPP, and report construction site sedimentation and erosion violations. Also, the City will incorporate their complaint procedures and filing system to post and document messages.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Track the number of e-mails and calls received at the community website and hotline.
- 2.) Completed website hyperlink.
- 3.) Post hotline phone number on the website.

***Timeline/Implementation Schedule:**

Year 1) The website and hotline documenting procedure will be completed.

Years 1 – 5) Make public aware of website and hotline

Specific Components and Notes:

- 1.) Increase public participation
- 2.) Facilitate citizen reports on illicit discharge detection.
- 3.) Facilitate citizen reports on construction site erosion violations
- 4.) City complaint receipt program.

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 2 – Public Participation/Involvement

Unique BMP Identification Number: 2d-6

***BMP Title:** Public Education and Outreach Programs Administered by the Local Watersheds

***BMP Description:**

The City of Maple Grove fully supports the public participation and involvement programs administered by all three of the City's watershed management commissions.

- Elm Creek Watershed Management Organization
- Shingle Creek Watershed Management Organization
- West Mississippi Watershed Management Organization

The City support involves all methods of lake management including financial, technical, advisory and developmental means.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Increased awareness and understanding.
- 2.) Increased participation and involvement.

***Timeline/Implementation Schedule:**

- See the SWPPP Interagency coordination Section
- Current and ongoing

Specific Components and Notes:

- Watershed management commissions

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 2d-7

<p>*BMP Title: Participation in the Wetland Health and Evaluation Program (WHEP)</p>
<p>*BMP Description:</p> <p>The City of Maple Grove is one of the largest municipal sponsors of the Wetland Health and Evaluation Program in the Twin City metropolitan area. This program assures the proper evaluation of wetland mitigation areas for the City of Maple Grove. Since wetlands play such a vital role in stormwater management and the preservation of natural resources, it is imperative that these resources are preserved, maintained and properly mitigated. This program will serve to promote both public education and participation within the community.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP:</p> <p>The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Years 1-5) Track & map the number of wetlands monitored.</p>
<p>*Timeline/Implementation Schedule:</p> <p>Current and annually ongoing</p>
<p>Specific Components and Notes:</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 3 – Illicit Discharge Detection and Elimination

Unique BMP Identification Number: 3a-1

<p>*BMP Title: Storm Sewer System Map</p>
<p>*BMP Description:</p> <p>The City of Maple Grove currently has a complete storm sewer system map in a GIS (ArcView) format. The City will continue to update the system map and components listed below on an annual schedule.</p> <p>This map shows all storm sewer inlets (catch basins and manholes), outlets, outfalls and surface water bodies.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Updated storm sewer system map2.) Posted storm sewer system map on web site
<p>*Timeline/Implementation Schedule:</p> <p>Years 1 - 5) At the end of each reporting year the storm sewer map will be updated to reflect any structural changes to the to the system and components listed below.</p> <p>Years 1 - 5) post and maintain the storm sewer map on the community website</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Ponds, streams, lakes, and wetlands2.) Structural pollution control devices3.) All pipes of all sizes4.) All outfalls5.) Community web site
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 3 – Illicit Discharge Detection and Elimination

Unique BMP Identification Number: 3b-1

*BMP Title: Regulatory Control Program
*BMP Description: The City of Maple Grove will continue to administer the existing city ordinance and other regulatory codes to prohibit non-storm water discharge into the storm sewer system. During the first 3 years, the City will review the current ordinance and revise it according to regulatory agency requirements Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.
*Measurable Goals: Number of overall regulatory mechanisms in place
*Timeline/Implementation Schedule: Year 1 - Review current regulatory language and mechanisms; review external examples Year 2 - Identify ordinance revisions if necessary Year 4 - Adopt ordinance revisions if applicable
Specific Components and Notes: 1.) Code requiring septic system inspection at time of property transfer 2.) Code requiring post-construction inspections of septic systems 3.) Codes to prevent illicit connections 4.) Ordinance to prevent illegal dumping
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 3 – Illicit Discharge Detection and Elimination

Unique BMP Identification Number: 3c-1

***BMP Title:** Illicit Discharge Detection and Elimination Plan

***BMP Description:**

The City of Maple Grove has a program to detect and eliminate illegal and/or improper connections to storm drainage systems and receiving waters. The specific components of the program are listed below.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Complete an annual list of information on illicit connection test performed within the City.
- 2.) Length of storm sewer inspected.
- 3.) Maintain a public hotline.

***Timeline/Implementation Schedule:**

Years 1 - 5) Annually gather information on illicit connection tests performed to date within the City.
Years 1 - 5) Annually conduct field tests of storm sewer system lines where illicit connections are suspected.

Specific Components and Notes:

- 1.) Dye tests
- 2.) Physical inspections
- 3.) Camera tests
- 4.) Individual property or building inspections
- 5.) Community hotline and documentation procedures.

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6376

E-mail: rkeller@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 3 – Illicit Discharge Detection and Elimination

Unique BMP Identification Number: 3d-1

***BMP Title:** Public and Employee Illicit Discharge Information Program

***BMP Description:**

Develop a strategy to inform public employees, businesses, and the general public of water quality hazards associated with illegal discharges and improper disposal of waste.

The City will use the education efforts outlined on BMP Summary Sheet 1c-3 (Education Program: Illicit Discharge Detection and Elimination) for providing information to the general public concerning the hazards associated with illegal discharges and the improper disposal of wastes. The City has developed a separate effort to provide training to City employees. This training will focus on those City employees that are involved in activities out in the community (e.g. Public Works/Engineering and Parks Department field staff) which may impact stormwater quality including; road salt and sand application, landscaping, and other activities. The City provides employees with broad based training followed by annual retraining which will focus on specific, yet to be determined issues. A community website will help serve to disseminate illicit discharge information to the public.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1) See BMP Summary Sheet 1c-3 for measurable goals concerning public education efforts regarding Illicit Discharge Detection and Elimination.
- 2) Maintain a training program for educating City employees about the hazards associated with illegal discharges and the improper disposal of wastes which relate to their work activities.
- 3) Train City employees who are involved in activities which could possibly result in illicit discharges to stormwater.
- 4) Implement annual retraining and focused training efforts.

***Timeline/Implementation Schedule:**

See BMP Summary Sheet 1c-3 for Timeline/Implementation Schedule concerning public education efforts regarding Illicit Discharge Detection and Elimination.

Years 1-5 - Maintain a training program for educating City employees about the hazards associated with illegal discharges and the improper disposal of wastes which relate to their work activities.

Years 1-5 - Train City employees who are involved in activities which could possibly result in illicit discharges to stormwater.

Years 1-5 - Implement annual retraining and focused training efforts.

Specific Components and Notes:

City training program regarding illicit discharges.
Community hotline and website documentation procedures.

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 3d-2

***BMP Title:** Inform Public Employees, Businesses, and the General Public of Water Quality Hazards Associated with Illegal Discharges and Improper Disposal of Waste

***BMP Description:**

The City of Maple Grove has an existing program to inform public employees, businesses, and the general public of water quality hazards associated with illegal discharges and improper disposal of waste. Expansion of this program will help eliminate misconceptions, change behavior and increase awareness of the problems.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Record of inquiries at website and from hotline.
- 2.) Record of businesses contacted.
- 3.) Number of educational materials developed.

***Timeline/Implementation Schedule:**

- 1.) Conduct existing program.
- 2.) Year 1 – Develop a hotline and website.
- 3.) Year 2 – Post educational materials on web site.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 3 – Illicit Discharge Detection and Elimination

Unique BMP Identification Number: 3d-3

*BMP Title: Information public meeting on the hazards associated with illegal discharges and dumping into the MS4.
*BMP Description: City staff will conduct one meeting each year that coincides with the SWPPP Annual Report meeting. The goal is to inform the general public and business owners on the infrastructure of the City storm sewer system and how they can participate in the maintenance and operation of the system. Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.
*Measurable Goals: 1.) Number of attendance. 2.) Number of questions answered.
*Timeline/Implementation Schedule: Annually ongoing
Specific Components and Notes: 1.) Annual public meeting 2.) Public education program
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 3 – Illicit Discharge Detection and Elimination

Unique BMP Identification Number: 3e-1

***BMP Title:** Identification of Non-Stormwater Discharges and Flows

***BMP Description:**

The City will determine whether any of the following categories of non-stormwater discharges or flows are significant contributors of pollutants to our MS4:

water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, street wash water, and discharges or flows from fire fighting activities.

For any non-stormwater discharges or flows which the City finds to be a significant contributor of pollutants to the MS4 the City will develop an action plan to evaluate and address the impact the discharge is having on stormwater quality.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this BMP summary sheet is intended to meet all of the SWPPP requirements for this BMP.

***Measurable Goals:**

- 1) Evaluate the potential for the non-stormwater discharges identified in permit Part V.G.3.e (see above) to be significant contributors of pollutants to our MS4.
- 2) Conduct investigation and evaluation of non-stormwater discharges and flows.
- 3) For those non-stormwater discharges or flows identified as significant contributors of pollutants to our MS4, develop an action plan to evaluate and address the impact the discharge is having on stormwater quality.
- 4) Implement the action plan for significant non-stormwater discharges and flows.

***Timeline/Implementation Schedule:**

Years 1-2 - Conduct investigation and evaluation of non-stormwater discharges and flows and develop action plans for those which are identified as being significant contributors of pollutants to our MS4.

Years 3-5 - Implement the action plans for significant non-stormwater discharges and flows.

Specific Components and Notes:

Incorporate the significant findings into the educational BMPs (1c-1).

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 4 – Construction Site Stormwater Runoff Control

Unique BMP Identification Number: 4a-1

<p>*BMP Title: Ordinance or Other Regulatory Mechanism</p>
<p>*BMP Description:</p> <p>Construction Site Erosion and Sedimentation Ordinance with enforcement provisions. Under Section 441 of the Maple Grove City Code is the "Grading, Erosion and Sediment Control Ordinance". The ordinance deals specifically with grading and post-grading procedures. The City has also made provisions for enforcement and penalties.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Complete evaluation of ordinance.2.) Draft amendments to ordinance if necessary.3.) Implementation of the ordinance.4.) Documentation of enforcement events.
<p>*Timeline/Implementation Schedule:</p> <p>Year 1 - Evaluate ordinance by comparing it to MPCA minimum standard. Year 2 - Complete a revised ordinance if necessary. Year 3 - Implement any new changes in the construction site erosion and sedimentation ordinance and enforcement procedures.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Construction site waste control.2.) Site erosion control timelines for compliance.3.) Penalties for non-compliance.4.) Required site plan review procedures.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 4 – Construction Site Stormwater Runoff Control

Unique BMP Identification Number: 4b-1

<p>*BMP Title: Construction Site Implementation of Erosion and Sediment Control BMPs</p>
<p>*BMP Description:</p> <p>Erosion and Sediment Control (ESC) BMP Implementation</p> <p>The City has a number of ESC BMPs that are required for each site. Many are required on all sites while others are site specific. Specifications and mapped locations of these BMPs are required prior to grading permit approval.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP:</p> <p>The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Annual number of conditional provisions included with grading permits.2.) Annual number of grading permits3.) Annual number of developer's agreements.
<p>*Timeline/Implementation Schedule:</p> <ol style="list-style-type: none">1.) Develop appropriate erosion and sediment control conditional provisions for each grading permit.2.) Require a developer's agreement with each grading permit.
<p>Specific Components and Notes:</p> <p>Grading permits with conditional provisions for appropriate BMPs. Developer's agreement.</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 4 – Construction Site Stormwater Runoff Control

Unique BMP Identification Number: 4c-1

<p>*BMP Title: Waste Controls for Construction Site Operators</p>
<p>*BMP Description:</p> <p>The City of Maple Grove will require developers and construction site operators to control waste such as discarded building materials, concrete truck washout material, chemicals, litter and sanitary waste at every site by adding acceptable procedures for waste disposal to the developer's agreement. Furthermore, the City will assure the compliance with the revised agreement through numerous site inspections during the progress of the site development.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP:</p> <p>The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Number of permits issued with the revised developer agreement.2.) Record of site inspection.
<p>*Timeline/Implementation Schedule:</p> <p>Year 1 - Revision of the developer's agreement Year 2 - Commence inspections for compliance with site waste control</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Developer's agreement2.) Grading permit3.) Site inspection
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 4 – Construction Site Stormwater Runoff Control

Unique BMP Identification Number: 4d-1

***BMP Title:** Procedure for Site Plan Review

***BMP Description:**

The City of Maple Grove has established procedures and guidelines for construction site soil and sedimentation erosion control during both the concept and development stage site planning and also throughout the grading permit process. Throughout this process the City will review site plans, make recommendations for appropriate erosion and sediment control standards, and analyze impacts to surrounding natural resources. The City will also coordinate with the watershed to further review and comment on these plans for erosion and sediment control and potentially sensitive natural resources. Plan reviews by the watershed provide the public an opportunity to comment.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Record the number of revisions to the site soil and sedimentation erosion control plan that are required by the City and the watershed.
- 2.) Record the number of BMPs required for each site plan.

***Timeline/Implementation Schedule:**

Complete a review by the City and watershed within 60 days of receipt of plans and within 15 days of receipt of plan revisions.

Specific Components and Notes:

- 1.) Communication link between planning, engineering and the watershed.
- 2.) Timeline for a site plan review process.
- 3.) Site plan review procedures and City permit application.

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 4 – Construction Site Stormwater Runoff Control

Unique BMP Identification Number: 4e-1

<p>*BMP Title: Establishing of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance</p>
<p>*BMP Description:</p> <p>The City will develop a community website and hotline for residents to report various issues regarding construction site storm water runoff control. Also, the City will incorporate their complaint procedures and filing system to post and document messages.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Develop a receipt log for recording information in regards to construction site issues and complaints.2.) Establish the City staff that are responsible for dealing with various issues regarding construction site storm water runoff control.3.) Develop a website and hotline for receipt of public concerns regarding construction site storm water runoff control. <p>Number of e-mails and calls received at the community website and hotline.</p>
<p>*Timeline/Implementation Schedule:</p> <p>Year 1) The website and hotline documenting procedure will be completed Years 2 - 5) Maintain web page and hotline</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Identify responsible City staff.2.) Facilitate resident comments on construction site storm water runoff control.3.) Consideration of public comments in regards to construction site storm water runoff control.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 4 – Construction Site Stormwater Runoff Control

Unique BMP Identification Number: 4f-1

<p>*BMP Title: Establishment of Procedures for Site Inspections and Enforcement</p>
<p>*BMP Description:</p> <p>The City of Maple Grove has established policies for timeliness and frequency of site inspections. The City will develop additional guidelines detailing what to look for and what elements to consider during inspections. Post-inspection procedures and penalties will be examined to encourage good site surface water management and erosion control practices.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Year 1) Implementation of the inspection and enforcement guidelines. Years 1 - 5) Log the number of inspections and enforcement actions</p>
<p>*Timeline/Implementation Schedule:</p> <p>Annually, ongoing revision of inspection guidelines, current notification of inspection procedures and penalties during each preconstruction meeting and throughout the construction process.</p>
<p>Specific Components and Notes:</p> <p>Post-inspection procedures Post-inspection penalties</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 4 – Construction Site Stormwater Runoff Control

Unique BMP Identification Number: 4g-1

<p>*BMP Title: Annual Public Meeting on the BMPs necessary for Construction Site Stormwater Runoff Control</p>
<p>*BMP Description:</p> <p>City staff will conduct one meeting each year for developers, builders and the public. The goal is to educate the audience on City policies and ordinances regarding BMP installation, inspection and maintenance procedures required byu the City and to acquire feedback in regards to the implementation of these policies and ordinances.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Number attending.2.) Number of questions answered.
<p>*Timeline/Implementation Schedule:</p> <p>One meeting per annual reporting cycle.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) BMP installation methods.2.) BMP installation requirements.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 5 – Post Construction Stormwater Management in New Development and Redevelopment

Unique BMP Identification Number: 5a-1

*BMP Title: Development and Implementation of Structural and/or Non-Structural BMPs
*BMP Description: The City of Maple Grove will continue to implement the current program to require the installation and maintenance of BMPs. All of the specific components listed below are current practices conducted by the City. Additional BMPs may be appropriate options for further minimizing storm water runoff pollution and flooding. The City engineering department will be responsible for improving and implementing proper procedures for the program. Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.
*Measurable Goals: 1.) List current BMP strategies. 2.) List potentially appropriate BMPs.
*Timeline/Implementation Schedule: Year 1 - Complete a review of existing BMPs and potential improvements Year 2 - Implemented revised BMP installation policy if necessary
Specific Components and Notes: 1.) Storm water detention 2.) Filtration 3.) Stabilization Seeding 4.) Bioengineering 5.) Structural controls 6.) Slope riprap stabilization 7.) Grading, Erosion and Sediment Control Ordinance 8.) Storm Water Management Plan 9.) Creek restoration 10.) Wetland restoration
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 5 – Post Construction Stormwater Management in New Development and Redevelopment

Unique BMP Identification Number: 5b-1

***BMP Title:** Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment

***BMP Description:**

City staff will conduct one meeting each year for developers, builders and the public. The goal is to educate the audience on City policies and ordinances regarding BMP installation, inspection and maintenance procedures required by the City and to acquire feedback in regards to the implementation of these policies and ordinances.

The City also has a sediment and erosion control ordinance (section 441) which addresses post construction run-off control. Furthermore, the City enforces the rules and limitations set forth in both the City's and watershed's stormwater management plans.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.

***Measurable Goals:**

- 1.) Number of attending.
- 2.) Number of questions addressed.
- 3.) Annual review of rules and policies in City ordinances and stormwater management plans.

***Timeline/Implementation Schedule:**

One meeting per annual reporting cycle.

Years 1 - 5) Annual reviews and necessary updates to ordinances and stormwater management plans.

Specific Components and Notes:

- 1.) BMP installation requirements.
- 2.) BMP inspection requirements.
- 3.) BMP maintenance requirements.

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 5 – Post Construction Stormwater Management in New Development and Redevelopment

Unique BMP Identification Number: 5c-1

<p>*BMP Title: Long-Term Operation and Maintenance of BMPs</p>
<p>*BMP Description:</p> <p>The City of Maple Grove inspects post construction BMPs on a regular basis to ensure proper functioning and the implementation of a regular maintenance schedule. The City will further update the community website to encourage public reports of damaged or failing BMPs.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Location and date of BMPs inspected.2.) Number of BMP inspections per year.3.) Number of BMP problems reported on website.
<p>*Timeline/Implementation Schedule:</p> <p>Year 1) Update website Years 1 - 5) Track and post the number of BMP inspections completed annually.</p>
<p>Specific Components and Notes:</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6a-1

<p>*BMP Title: Municipal Operations and Maintenance Program</p>
<p>*BMP Description:</p> <p>The City of Maple Grove engineering staff has attended Mn/DOT training programs in "Designing to Control Erosion and NPDES Compliance" and "Mn/DOT Erosion Control Project Reviews". These City staff will continue to receive training on an as needed basis in order to further prevent and reduce runoff from municipal operations.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Each permanent, full-time public works employee will attend at least one training course per year.2.) Track the number of man-hours spent in training annually.
<p>*Timeline/Implementation Schedule:</p> <p>Years 1 - 5) Training is current and ongoing annually.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Silt fence installation.2.) Disturbed soil protection training.3.) Inlet protection training.4.) Designing to control erosion and NPDES compliance.5.) Mn/DOT erosion control project review.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 6a-1.1

<p>*BMP Title: Park and Open Space Training Program</p>
<p>*BMP Description:</p> <p>The City of Maple Grove utilizes training from the University of Minnesota Extension Service / U.S. Department of Agriculture for the wise use and application of fertilizer, pesticides and herbicides in the City's park and open spaces. The training is annually attended by the staff that are responsible for these applications.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Completed annual fertilizer, pesticide and herbicide application training.2.) Number of employees trained per year.
<p>*Timeline/Implementation Schedule:</p> <p>Effective immediately</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Fertilizer application training.2.) Pesticide/herbicide application training.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 6a-1.2

*BMP Title: Fleet and Building Maintenance Training Program
*BMP Description: The City of Maple Grove has an existing Fleet and Building Maintenance Training Program. The program will focus on the four components listed below. Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.
*Measurable Goals: Number of employees trained per year
*Timeline/Implementation Schedule: Current and ongoing annually
Specific Components and Notes: 1.) Automobile Maintenance Program (6.B.1) - Vehicle inspection training - Vehicle washing training 2.) Spill clean-up training Building leak prevention and inspection training
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 6a-1.3

<p>*BMP Title: Automobile Maintenance Program</p>
<p>*BMP Description:</p> <p>The City of Maple Grove currently operates an Automobile Maintenance Program that requires inspection, corrective actions, and employee training. The City plans to continue with the program and report the percentage of vehicles inspected and the number of employees trained in proper procedures.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Number of vehicles in fleet inspected each year.2.) Number of employees trained per year in vehicle maintenance and reporting procedures within the Fleet and Building Maintenance Training Program.
<p>*Timeline/Implementation Schedule:</p> <p>Current and ongoing</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Vehicle washing procedures2.) Maintenance intervals3.) Inspection requirements and checklists4.) Documenting and reporting procedures5.) Fleet and Building Maintenance Training Program
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 6a-1.4

*BMP Title: Road Salt Materials Management Program
*BMP Description: <p>The City of Maple Grove will develop a program to track the amount of road salt applied during an annual reporting cycle. After reviewing the first two years the City will evaluate the application rates and compare them to industry standards and adjust the application accordingly.</p> <p>The City will also attend the salt management training seminars offered by the watershed.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
*Measurable Goals: <ol style="list-style-type: none">1.) Amount of road salt applied each year.2.) Number of employees trained per year in road salt management and application rates.
*Timeline/Implementation Schedule: Year 1 – Document the amount of road salt applied Year 2 – Document the amount of road salt applied and compare application to industry standard Year 3 – Make adjustments to the application rate according to years 1 and 2
Specific Components and Notes: Documenting the amount of road salt applied at the end of each day.
*Responsible Party for this BMP: Name: Rick Lestina Department: Engineering Phone: 763-494-6354 E-mail: rlestina@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6a-2

<p>*BMP Title: Street Sweeping **</p>
<p>*BMP Description:</p> <p>Parking lot and street cleaning.</p> <p>The City currently employs two City-owned, mechanical street sweepers to remove sediment and debris from paved surfaces in order to minimize the amount of sediment and pollutants entering the storm water conveyance system and surface water bodies. The City plans to continue to use the current system of street and parking lot sweeping which involves training, storage, disposal and schedules.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP:</p> <p>The information included or referenced on this Summary Sheet is intended to meet all SWPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <ol style="list-style-type: none">1.) Track the number of employees trained each year.2.) Track the number of hours spent on street and parking lot maintenance.
<p>*Timeline/Implementation Schedule:</p> <p>Years 1 - 5) Current and ongoing with at least two City-wide sweeping events annually</p> <p>Years 1 - 5) Current and ongoing site specific sweeping as needed.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Mechanical sweeping devices.2.) Annual training.
<p>*Responsible Party for this BMP:</p> <p>Name: Rick Lestina</p> <p>Department: Engineering</p> <p>Phone: 763-494-6354</p> <p>E-mail: rlestina@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6b-2

<p>*BMP Title: Annual Inspection of all Structural Pollution Control Devices</p>
<p>*BMP Description:</p> <p>Each year the City of Maple Grove inspects virtually 100% of the pollution control devices such as sumps, grit chambers floatable skimmers, traps and separators. The City will re-evaluate the inspection list every two years of the reporting cycle.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Annual inspection of virtually all pollution control devices.</p>
<p>*Timeline/Implementation Schedule:</p> <p>Current and ongoing. All pollution control devices inspected once per year.</p>
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Sumps2.) Grit chambers3.) Separators4.) Skimmers
<p>*Responsible Party for this BMP:</p> <p>Name: Rod Keller Department: Public Works Phone: 763-494-6370 E-mail: rkeller@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6b-3

***BMP Title:** Inspection of a minimum of 20 percent of the MS4 outfalls, sediment basins and ponds each year on a rotating basis

***BMP Description:**

The City of Maple Grove will inspect 20% of the outfalls, sediment basins, and ponds each year, including sumps, floatable skimmers, traps, and separators. The City will reevaluate the inspection intervals in Year 2 according to the results of the first two reporting years.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPP requirements for this BMP.

***Measurable Goals:**

- 1.) Inspect 20% of MS4 outfalls, sediment basins and ponds each year.

***Timeline/Implementation Schedule:**

- 1.) Current and ongoing.
- 2.) Year 1 - Reevaluate the cleaning schedule and incorporate into the storm drain system cleaning schedule.
Year 2 - Reevaluate the inspection intervals and increase inspection rate if both year 1 and year 2 warrant cleaning, or reduce inspection rate if neither year 1 and 2 required cleaning.

Specific Components and Notes:

- 1.) Outfall, sediment basins, and pond inspection form.
- 2.) Pollution control device inspection form.
- 3.) Storm sewer system map (3a.1)

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6376

E-mail: rkeller@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6b-4

*BMP Title: Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas
*BMP Description: <p>The Public Works Department routinely inspects all stockpiles, storage and material handling areas. The areas are inspected to assure that all materials remain within the manageable confines of the public works facility.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
*Measurable Goals: Document the date of at least one inspection annually for each stockpile, sotrage and material handling area.
*Timeline/Implementation Schedule: Annual and ongoing.
Specific Components and Notes: Site inspection forms.
*Responsible Party for this BMP: Name: Rod Keller Department: Public Works Phone: 763-494-6376 E-mail: rkeller@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6b-5

*BMP Title: Inspection follow-up including the determination of whether repair, replacement or maintenance measures are necessary and the implementation of the corrective measures
*BMP Description: The City Public Works Department will follow-up with the repair, replacement or any maintenance measures tht are necessary for proper operation and to prevent enviornmental impacts such as erosion. Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requiriements for this BMP.
*Measurable Goals: Record the implementation of corrective measures as needed to prevent any environmental impact.
*Timeline/Implementation Schedule: Currently ongoing as needed.
Specific Components and Notes: Inspection report.
*Responsible Party for this BMP: Name: Rod Keller Department: Public Works Phone: 763-494-6376 E-mail: rkeller@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 1 – Public Education and Outreach

Unique BMP Identification Number: 6b-5.1

<p>*BMP Title: Storm Drain System Cleaning</p>
<p>*BMP Description:</p> <p>The City of Maple Grove currently operates a sewer cleaning truck to clean out catch basin sumps and remove debris from the storm sewer line as needed. The current system requires all lines and structures to be cleaned within an annual cycle or as needed according to random inspections. The City will continue to operate within that schedule unless the Storm Sewer Inspection Program (6b.5) requires changes to the schedule.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Track the number of sumps cleaned each year</p>
<p>*Timeline/Implementation Schedule:</p> <ul style="list-style-type: none">- Implemented immediately- Year 3 – reevaluate the cleaning schedule according to the Storm Sewer Inspection Program (6b.5)
<p>Specific Components and Notes:</p> <ol style="list-style-type: none">1.) Storm sewer and sump cleaning schedule2.) Storm sewer system map (3a-1)3.) Sewer cleaning truck maintenance schedule4.) Storm Sewer Inspection Program (6b-5)
<p>*Responsible Party for this BMP:</p> <p>Name: Rod Keller Department: Public Works Phone: 763-494-6376 E-mail: rkeller@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6b-6

<p>*BMP Title: Record Reporting and Retention of All Inspections and Responses to the Inspections</p>
<p>*BMP Description:</p> <p>Public works staff will summarize the results of all inspections and responses to the inspections, including the date of completion of repairs and any major additional protection measures.</p> <p>Location(s) in SWPPP of detailed information relating to this BMP: The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.</p>
<p>*Measurable Goals:</p> <p>Produce one report annually describing the results of all inspections and the responses identifying the date of completion.</p>
<p>*Timeline/Implementation Schedule:</p> <p>Current and ongoing. Once annually.</p>
<p>Specific Components and Notes:</p> <p>Inspection report.</p>
<p>*Responsible Party for this BMP:</p> <p>Name: Rod Keller Department: Public Works Phone: 763-494-6376 E-mail: rkeller@ci.maple-grove.mn.us</p>

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure: 6 – Pollution Prevention / Good Housekeeping

Unique BMP Identification Number: 6b-7

***BMP Title:** Evaluation of Inspection Frequency

***BMP Description:**

The Public Works Department will keep records of the inspection results (6b-6) including as appropriate, the date, antecedant weather conditions, sediment storage and capacity remaining, and any maintenance performed or recommended. After two years of inspections, if patterns of maintenance become apparent, the frequency of inspections may be adjusted. If maintenance or sediment removal is required as a result of the first two annual inspections, the frequency of inspection shall be increased to at least two times annually, or more frequently as needed to prevent carry-over or washout of pollutants from the structures and maximize pollutant removal. If maintenance or sediment removal is not required as a result of both of the first two annual inspections, the frequency may be reduced to once every two years.

Location(s) in SWPPP of detailed information relating to this BMP:

The information included or referenced on this summary sheet is intended to meet all SWPPP requirements for this BMP.

***Measurable Goals:**

- 1.) Keep annual records of inspection.
- 2.) Results and modify inspection.
- 3.) Frequency as previously mentioned.

***Timeline/Implementation Schedule:**

Years 1 - 2) Keep annual inspection results.

Years 3 - 4) Modify inspections as previously described and continue to modify every two years, as necessary.

Specific Components and Notes:

Annual inspection reports.

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6376

E-mail: rkeller@ci.maple-grove.mn.us

Additional BMP Summary Sheet

MS4 Name: City of Maple Grove

Minimum Control Measure:

Unique BMP Identification Number: 7a-1 (X.App.D)

***BMP Title:** Nondegradation for Selected MS4s

***BMP Description:**

The City will prepare a Loading Assessment and Nondegradation Report as per Part X. Appendix D. Sections D. Sections B & C of the MS4 General Permit. The City will follow the public participation process as per Part X. Appendix D. Section D of the MS4 General Permit. After consideration of the input received during the public participation process, the City will prepare and submit the materials required in Part X. Appendix D. Section E of the MS4 General Permit.

During the MPCA review, notice, and preliminary determination processes, the City will work with the MPCA, if appropriate, to respond to comments and/or revise the submittal materials to prepare them for final approval.

After final determination by the MPCA, the City will modify the SWPPP as per the approved submittal materials and as needed to meet the nondegradation requirements.

Location(s) in SWPPP of detailed information relating to this BMP:

MCM (Unique BMP) Nos. 1-6

***Measurable Goals:**

- 1.) The City will prepare and submit materials to meet the requirements listed above.
- 2.) The City will respond to and coordinate with the MPCA, as appropriate, during the MPCA review, notice and preliminary determination processes.
- 3.) Modify the SWPPP as per the approved modifications and as needed to meet the nondegradation requirements

***Timeline/Implementation Schedule:**

Listed numbers below correspond to the Measurable Goals listed above.

- 1.) The City will prepare and submit the required materials listed above within 15 months after the effective date of the GSP MN R 040000 permit for Maple Grove.
- 2.) The City will respond to and coordinate with the MPCA, as appropriate, during the MPCA review, notice, and preliminary determination processes.
- 3.) After the submittal materials are approved by the MPCA, the City will modify the SWPPP, as per the approved Modifications and as needed to meet the nondegradation requirements, in a timely manner.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rick Lestina

Department: Engineering

Phone: 763-494-6354

E-mail: rlestina@ci.maple-grove.mn.us

SWPPP Addendum Discussion Section
Shingle Creek Chloride TMDL

The Shingle Creek Chloride TMDL and its Implementation Plan were developed as a cooperative effort between the MS4s in the watershed, the Shingle Creek Watershed Management Commission, and the MPCA. The Implementation Plan sets forth specific responsibilities and activities for each of those partners. The Commission has agreed to take the lead on general coordination, education, and ongoing monitoring and evaluation. Maple Grove will undertake specific implementation activities as detailed in this SWPPP addendum. The MPCA will serve in a regulatory and advisory capacity, ensuring through the NPDES permit process that implementation activities proceed as set forth in the SWPPP and that progress is being made toward chloride load reduction.

Commission Activities

Coordination. The Commission will coordinate chloride TMDL implementation in the following ways. These activities will be funded by the Commission's general administrative operations budget.

- Serving as a point of contact with the MPCA and other agencies.
- Taking the lead on watershedwide activities such as monitoring, evaluation, and education.
- Developing uniform BMP evaluations, implementation policies, and other special studies as necessary or as requested.
- Coordinating with the Technical Advisory Committee (TAC) to evaluate options for assigning individual wasteload allocations to the MS4s.

Education. The Commission has an active education program that is coordinated by its Education and Public Outreach Committee (EPOC). The EPOC is composed of city staff, residents, and agency representatives. The education program will undertake the following activities:

- Develop and make available to the MS4s brochures, articles, and other written and on-line material to be used in educating and informing residents, property owners, property managers, and private applicators. One brochure, "A Low Salt Diet for Shingle Creek," has already been produced and provided to the cities for distribution to residents and property managers.
- Provide information on training opportunities for private applicators, and periodically evaluate the need to offer training and certification at locations within the watershed. The Commission in 2007-2008 collaborated with Fortin Consulting to offer such training opportunities at several locations in the watershed.
- Coordinate an annual salt applicator workshop targeted to city, county, and state supervisory and street and highway maintenance staff to discuss salt use, application, and storage issues.

Monitoring. As part of its ongoing lake and stream monitoring program, the Commission will continue to monitor chloride and conductivity at locations in Shingle Creek and the watershed, and will continue to report this data in the Commission's Annual Water Quality Report. The Commission also will periodically conduct other monitoring indirectly related to the chloride TMDL, such as fish and macroinvertebrate monitoring in the creek. Fish and macroinvertebrate monitoring will be conducted in 2008 in Shingle and Bass Creeks as part of the Shingle and Bass Creeks DO/biotic integrity TMDL.

Evaluation. The Commission has collected monthly reports of road salt and brine application within the watershed from the MS4s since 2002 and will continue to collect those monthly reports at least through winter 2011-2012. At the end of the first five year period in 2012, the Commission will evaluate the success of BMP implementation in reducing chloride concentrations in Shingle Creek and will reconvene

the Technical Advisory Committee (of which the MPCA is a participant) to determine if adjustments to the Implementation Plan are necessary.

Maple Grove Activities

Maple Grove is committed to minimizing the use of chloride in snow and ice removal operations with no compromise to public safety. To accomplish this, we are already implementing the following Best Management Practices:

- Reduce chloride load using new technologies in equipment and material
- Annual inspection of exposed stockpile, storage and material handling areas
- Operator training to reduce road salt use
- Review and revise where necessary snow plowing and stockpiling practices to minimize snow storage adjacent to Shingle Creek or its tributaries
- Reduce chloride load to tributaries by sweeping streets as early as possible in late winter to remove residual product prior to spring rains
- Monitor the amount of road salt applied to roads under Maple Grove's jurisdiction

New or revised BMP sheets are attached to this SWPPP addendum.

Maple Grove will rely on the Shingle Creek Watershed Management Commission to monitor and evaluate progress toward meeting the watershed load reduction goals and the gross wasteload allocation. Maple Grove will evaluate progress in implementing BMPs as part of its NPDES permit annual report. The Commission will evaluate progress in 2012, and the Technical Advisory Committee may determine that adjustments to the Implementation Plan may be necessary. Revisions to the Implementation Plan may require revisions to the BMPs in this SWPPP.

Table 1 below sets forth the BMPs that Maple Grove intends to undertake to implement the Shingle Creek chloride TMDL.

Table 1. Shingle Creek Chloride TMDL BMP Implementation, Maple Grove

BMP	Time period for implementation	Resources needed	Estimated chloride load reduction	Comments
Street sweeping in early spring	Annually, at end of ice control season	\$50,000	Variable	Already implemented
Revise snow plowing and stock piling activities	Annually, at beginning of ice control season	None	Variable	Already implemented
Equip 1 truck with pre-wetting equipment	2008-2012	\$150,000 additional per truck	Based on literature, 20-25% reduction per truck	Already implemented
Practice good housekeeping in the storage yard by sweeping up any spilled or tracked salt daily or as soon as possible	Supervisors make daily inspection of yard to determine if sweeping is necessary	None	Variable	Already implemented
Train and certify all supervisors and crew leaders through LTAP	2009	\$250	Variable	In budget
Monitor salt use to assist with further salt reductions	Monthly during ice control season	None	Variable	Already implemented

BMP Summary Sheet

MS4 Name: Maple Grove

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-1

***BMP Title:** De-icing and Anti-Icing Equipment and Materials for Implementation of Chloride TMDL

***BMP Description:**

Reduce chloride load using new technologies in equipment and material to obtain the same de-icing and anti-icing benefit while applying less road salt. The specific activities the City will undertake to evaluate and implement new technologies are:

1. Calibrate spreaders annually.
2. Evaluate new technologies such as pre-wetting and anti-icing as equipment needs to be replaced. These technologies will be adopted where feasible and practical.
3. Investigate and adopt new products (such as Clear Lane, a commercially available pretreated salt) where feasible and cost effective.

***Measurable Goals:**

- Spreaders annually calibrated
- Acquisition and installation of one City truck with the necessary (EPOK) pre-wetting equipment
- Investigation and adoption of new salt alternative products where feasible and cost effective

***Timeline/Implementation Schedule:**

- Spreaders annually calibrated
- Schedule for acquisition and installation of new pre-wetting equipment
- Schedule for investigation and adoption of new products

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6370

E-mail: rkeller@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Maple Grove

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-2

***BMP Title:** Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas for Implementation of Chloride TMDL

***BMP Description:**

The City maintains a stockpile of road salt that is covered and stored on a paved building pad. Road salt loading and unloading generally takes place on the salt storage pad. Any road salt tracked onto pavement following loading or delivery is swept up as conditions allow and disposed of with street sweepings.

***Measurable Goals:**

- Staff person assigned to monitor need to sweep up spilled or tracked road salt
- Sweeping performed as necessary

***Timeline/Implementation Schedule:**

- Staff person assigned to monitor need to sweep up spilled or tracked road salt as soon as possible after storm event
- Sweeping performed as necessary

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6370

E-mail: rkeller@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Maple Grove

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-3

***BMP Title:** Operator Training to Reduce Road Salt Use for Implementation of Chloride TMDL

***BMP Description:**

The City truck operators will attend training for reducing the application of road salt. Topics covered in the training will include but not be limited to proper calibration of spreaders; understanding of and adherence to application policies; and optimum application rates for different temperature and road conditions.

***Measurable Goals:**

- All operators trained in the proper use of equipment and application of road salt.

***Timeline/Implementation Schedule:**

- All operators trained bi-annually

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6370

E-mail: rkeller@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Maple Grove

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-4

***BMP Title:** Snow Stockpiling Practices for Implementation of Chloride TMDL

***BMP Description:**

Snow plowed or stockpiled directly streamside can leak high concentrations of chloride directly into the stream. The City will review and revise where necessary its snow plowing and stockpiling practices to minimize snow storage adjacent to Shingle Creek or its tributaries.

***Measurable Goals:**

- Snow plowing and stockpiling practices minimize stockpiles of snow adjacent to Shingle Creek or its tributaries

***Timeline/Implementation Schedule:**

- Review snow plowing and stockpiling practices adjacent to Shingle Creek and its tributaries before winter every year
- Implement revisions to those practices as necessary before winter every year
-

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6370

E-mail: rkeller@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Maple Grove

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-5

***BMP Title:** Street Sweeping for Implementation of Chloride TMDL

***BMP Description:**

Reduce chloride load to tributaries by sweeping streets as early as possible in late winter to remove residual product prior to spring rains.

***Measurable Goals:**

- Street sweeping is performed as early as possible in the late winter or early spring

***Timeline/Implementation Schedule:**

- Review street sweeping practices to prioritize the street sweeping schedule in the late winter or early spring
- Implement revisions to the street sweeping schedule in the late winter or early spring

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6370

E-mail: rkeller@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Maple Grove

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-6

***BMP Title:** Data Reporting for Implementation of Chloride TMDL

***BMP Description:**

To assist in the ongoing monitoring and evaluation of the effectiveness of implementation activities in meeting the TMDL requirement, the City will continue to collect monthly reports on the amount of road salt applied to roads under its jurisdiction.

***Measurable Goals:**

- Monthly road salt application reports completed by the City.

***Timeline/Implementation Schedule:**

- Ongoing activity

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Rod Keller

Department: Public Works

Phone: 763-494-6370

E-mail: rkeller@ci.maple-grove.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Appendix F – Watershed Management Commission Rules and Standards

STANDARDS

STANDARDS OF THE ELM CREEK WATERSHED MANAGEMENT COMMISSION

The standards outlined below have been developed based on the goals and policies of the Commission provided in **Section III**. The policies that led to the standards are also listed in the boxes for reference purposes. The member communities will need to adopt the applicable standards within this section.

A. WATER QUANTITY

Policies

A1. The Commission adopts the current FEMA study as part of the Elm Creek floodplain for parts of Hassan and Dayton that drain to the Crow and Mississippi Rivers. This study is available in the Water Resource Library.

A2. The Commission adopts the Elm Creek Watershed Study and its associated flood elevations. This study is available in the Water Resource Library.

A3. The Commission shall establish floodplain management standards.

A4. The Commission shall establish water quantity management standards.

A5. The Commission shall develop standards to reduce the severity and frequency of flooding and high water by preventing the loss of floodplain storage below the established 100-year flood elevation.

A6. The Commission shall develop standards to manage the change in conveyance and the timing of flood waters.

A7. The Commission shall develop standards to reduce the severity and frequency of flooding and high water by avoiding the loss of wetland storage.

A8. The Commission shall develop standards to reduce the severity and frequency of flooding and high water by minimizing development in 100-year floodplains.

A9. Costs associated with floodplain management studies or projects shall be borne by all communities in the watershed in an equitable manner, as determined by the Commission and Joint Powers Agreement.

A10. The Commission prefers that stormwater rate control is provided through the use of regional stormwater retention systems when it is reasonable and practical to do so. The Commission also supports site-by-site retention systems when regional systems are not reasonable and practical.

A11. The Commission shall promote infiltration of precipitation and runoff.

A12. The Commission shall establish a water quantity monitoring plan.

A13. The local communities shall be responsible for removing deadfall in creek channels as appropriate provided that the deadfall is no longer attached to the land. For deadfall that remains attached to the land, it is the responsibility of the landowner to remove the deadfall. The Commission shall mediate deadfall removal issues as requested by the member communities.

I. Floodplain

1. The Commission requires a plan review to be completed by the local permitting authority for development or redevelopment if any part of the development is within a

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- 100-year floodplain or upland flood storage area and/or the project changes the timing, storage, or carrying capacity of any tributaries of the 100-year floodplain. The 100-year floodplain is defined as that area associated with a storm event that has a 1 percent chance of being equaled or exceeded any year as stated in **Appendix C**.
2. All member communities shall restrict or prohibit uses within the floodplain that are dangerous to health, safety, or property in times of flood or which cause increase in flood elevations or velocities.
 3. The Commission shall encourage the removal of existing structures from the 100-year floodplain.
 4. The Commission and member communities shall encourage the use of mitigating measures such as flood proofing to existing structures and dwellings in the 100-year floodplain which are subject to dangers to health, safety, or property during the 100-year flood if they cannot be removed from the floodplain.
 5. Local communities, or property owners, as determined on a site-by-site case, shall be financially responsible for funding the removal or implementation of mitigating measures to protect structures or property from the 100-year flood. The Commission may assist in securing grant monies to the extent reasonable.
 6. Wetlands, lakes, and other water bodies shall be maintained and utilized to store and retard flood waters to be consistent with the local Stormwater Management Plan.
 7. The Commission prohibits activities that impact the storage volume within the 100-year floodplain unless compensatory floodplain mitigation is provided at a 1:1 ratio by volume and it is demonstrated that the 100-year floodplain will not be impacted. In addition, no filling within the designated floodway shall be allowed. Suitable calculations must be submitted and approved demonstrating that filling in the flood fringe will not impact the 100-year flood profile. The 100-year floodplain is defined as that area associated with a storm event that has a 1 percent chance of being equaled or exceeded any year as stated in **Appendix C**.
 8. Structural flood control projects in the main tributaries of the Elm Creek Watershed drainage system shall be considered only if other measures are not feasible.
 9. The lowest floor elevation of new structures must be a minimum of 2-feet above the 100-year high water elevation. Runoff from back-to-back 100-year critical events will be used to analyze the storage capacity and freeboard for landlocked areas
 10. Member communities within the Commission shall adopt a floodplain management ordinance in conformance with the Commission's policies and standards.

II. Water Quantity

1. For areas where the Commission is the local permitting authority, the fee schedule in **Appendix B** shall apply.
2. A development plan review by the local permitting authority is required for the following projects:

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- a. Residential development or redevelopment on sites 8 acres or more, or
 - b. Residential development or redevelopment on sites 5 acres or more with a density of more than 2 units per acre, or
 - c. Commercial and industrial development or redevelopment on sites of one acre or more, or
 - d. Road projects that result in a net increase in impervious surface area of one acre or more.
3. A plan review by the Commission is required for projects that transcend the boundaries of an adjoining community and will affect the communities' approved stormwater management plan.
 4. Changes in the local communities' water quantity policies require review and approval of the Commission
 5. Plans must be submitted to the local permitting authority for any proposed alteration of waterways, culvert or bridge installations or replacements in waterways. Plans must show the location of installation, diameter, length and type of culverts, proposed invert elevations, bridge details, etc. along with pertinent hydrologic computations.
 6. The Commission promotes infiltration practices of the 2-year rainfall event for new development and redevelopment wherever it is practical and reasonable to do so, provided that past and existing land use practices do not have a significant potential to contaminate the stormwater runoff, the infiltration will not contaminate groundwater, the infiltration will have a regional benefit, and the soil characteristics are suitable for infiltration.
 7. Landlocked depressions that presently do not have a defined outlet and do not typically overflow may be allowed a positive outlet provided the downstream impacts are addressed and the plan is approved by the local permitting authority. The project proposer shall provide this information.
 8. The Commission recognizes that areas other than ponds, streams, wetlands, and lakes may be subject to storing stormwater runoff. These areas include acceptable levels of flooding within general depressions, low points, and street where structures and/or property are not damaged and any inundation that occurs is temporary in nature.
 9. Unless regional storm water management facilities are available to accommodate the development, future discharge rates from new development and redevelopment shall not exceed the existing discharge rates during 2-, 10-, and 100-year storm events.
 10. Flow rates in Elm, Diamond, and Rush Creek stream channels are to be maintained at pre-development flow rates for the 2-, 10-, and 100-year rainfall events by limiting

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the discharge rates from new development and redevelopment to equal to or less than the existing discharge rates.

11. Projects requiring review as defined in paragraphs 2., 3., and 4. above shall provide extended detention and/or runoff volume reduction to protect stream channels in the watershed.
- a. The minimum runoff volume to be controlled shall be the channel protection volume (V_{CP}) in acre-feet, obtained from Table 11.1 (below) by using the following methods:

$$V_{CP} = \frac{\text{Area of Site/Project in acres} \times \text{Value of R from Table 11.1, in inches}}{12 \text{ inches/foot}} = \text{Volume in acre-feet}$$

- i. Determine V_{CP} for the new site/project with the existing impervious ratio.
- ii. Determine V_{CP} for the new site/project with the improved impervious ratio.
- iii. Use the difference between the two V_{CP} values to determine the runoff volume to be controlled.

Table 11.1 Inches of Runoff to be used in Determining V_{CP}

Impervious Ratio	A Soils	B Soils	C Soils	D Soils
0.00	0.03	0.18	0.22	0.17
0.05	0.07	0.23	0.28	0.22
0.10	0.11	0.29	0.34	0.28
0.15	0.16	0.36	0.40	0.33
0.20	0.21	0.43	0.47	0.39
0.25	0.28	0.50	0.54	0.45
0.30	0.35	0.58	0.61	0.51
0.35	0.43	0.67	0.68	0.58
0.40	0.53	0.76	0.76	0.65
0.45	0.63	0.85	0.84	0.71
0.50	0.74	0.96	0.93	0.79
0.55	0.86	1.07	1.02	0.86
0.60	0.99	1.18	1.11	0.93
0.65	1.13	1.30	1.20	1.01
0.70	1.29	1.44	1.30	1.09
0.75	1.46	1.58	1.41	1.17
0.80	1.64	1.72	1.52	1.26
0.85	1.84	1.88	1.63	1.35
0.90	2.06	2.05	1.75	1.44
0.95	2.30	2.23	1.87	1.54
1.00	2.57	2.42	2.00	1.63

- b. Extended detention storage time is defined as the time between the

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center of mass of the inflow and outflow hydrographs. The minimum storage time shall be obtained from Table 11.2 (below).

Table 11.2 Required Storage Time

Site Area (acres)	Extended Detention Storage Time (hrs)
0 to 1	not required
1 to 30	24
30 to 40	36
40 +	48

- c. The minimum recommended outflow orifice diameter is 3". (Alternative equivalent outflow such as V-notch weir can be used.) Lower release rates will require infiltration, filtration or alternative practices to provide control of the channel protection volume V_{cp} .
 - d. Infiltration, permanent storage or other volume reduction methods are encouraged and may be applied to reduce or eliminate the volume needed for extended detention storage.
 - e. Current Elm Creek standards (no. 10, above) require control of 2-year peak flows. This standard will result in 2-year peak discharges that are far less than existing conditions; therefore, sites meeting the proposed standard will not be required to demonstrate compliance with the current 2-year peak control standard.
 - f. Sidewalks and trails that do not exceed twelve feet (12'0") in width, are not constructed with other improvements, and have a minimum of five feet (5'0") of vegetated buffer on both sides are exempt from the channel protection volume reduction requirement. Road and driveway crossings do not disqualify the exemption.
12. The design of all major stormwater storage facilities shall attempt to accommodate the 100-year critical duration event.
13. Stormwater rate control structures and drainageways shall be placed within a drainage, utility, or flowage easement.
14. All new outlet structures must have outlet erosion control devices.
15. All submitted development plans must be in conformance with the approved local stormwater management plans

B. WATER QUALITY

Policies

B1. The Commission encourages the adoption of the DNR's model shoreland ordinance.

B2. The Commission adopts the Minnesota Pollution Control Agency's Best Management Practices and Metropolitan Council's Minnesota Urban Small Site BMP Manual by reference.

B3. The Commission shall establish standards for stormwater treatment practices to prevent

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further degradation of lakes, streams, and wetlands.

B4. The Commission will establish a comprehensive water quality monitoring plan for area lakes and streams.

B5. The Commission will establish water quality goals for judging the adequacy of its water quality protection programs.

B6. The Commission shall promote the management of stormwater runoff quality on a regional basis in areas where it is reasonable and practical to do so. The Commission shall also manage stormwater runoff quality on a site-by-site basis when regional methods are not feasible.

B7. The Commission will coordinate with other agencies' efforts in monitoring, maintaining, and improving surface water quality within the watershed.

B8. The Commission shall provide services to assist the member communities in obtaining National Pollutant Discharge Elimination System (NPDES) Phase II permits once this program is implemented by the Minnesota Pollution Control Agency, if requested by the local community.

B9. The Commission shall establish manure management standards.

B10. The Commission shall develop standards and/or a model ordinance related to manure management, feedlots, and fencing/setback standards for livestock near water bodies.

B11. The Commission shall review progress and policies relating to Total Maximum Daily Loads (TMDL's) as they become available.

1. The Commission shall require conformance with the Minnesota Pollution Control Agency's Best Management Practices and the Metropolitan Council's Minnesota Urban Small Site BMP Manual.
2. The Commission shall require member communities to adopt the Minnesota Pollution Control Agency's Best Management Practices and the Metropolitan Council's Minnesota Urban Small Site BMP Manual as part of local surface water management plan development or implementation.
3. A plan review by the local permitting authority is required for the following projects:
 - a. Residential development or redevelopment on sites 8 acres or more, or
 - b. Residential development or redevelopment on sites 5 acres or more with a density of more than 2 units per acre, or
 - c. Commercial and industrial development or redevelopment on sites of one acre or more, or
 - d. Road projects that result in a net increase in impervious surface area of one acre or more.
4. The Commission encourages member communities to adopt a shoreland ordinance in conformance with the Department of Natural Resources. If the community does not have a shoreland ordinance, the Commission shall enforce the DNR sample shoreland ordinance. A sample ordinance is included in **Appendix H**.

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5. The Commission encourages the member communities to work with Hennepin County to develop a program to ensure that solid or liquid waste such as hazardous household waste is disposed of properly.
6. The Commission shall require member communities to develop a stormwater system maintenance plan that addresses public and private stormwater pond clean-out, public sump catch basin/manhole clean-out, and street sweeping of curb-and-gutter streets to the extent feasible and practical. A sample maintenance plan is contained in **Appendix I**.
7. The Commission shall require member communities to sweep City-owned paved streets at least once annually on rural section roads and twice annually on urban section roads.
8. The Commission encourages each member community to establish the street width for all public roads undergoing development or redevelopment in conformance with City Code. The Commission recognizes that narrow streets reduce pollutants loads, decrease runoff volumes, and increase infiltration. The municipality should give these factors consideration in concert with consideration for parking, public safety, and maintenance needs.
9. Phosphorus loadings from new or redeveloped sites shall not exceed predevelopment phosphorus levels. The following phosphorus export coefficients shall be used to calculate predevelopment and post-development land use phosphorus loadings:

Pre-developed land use

Woodland or wetlands: 0.1 pounds/acre/year

Grasslands, meadows, open space: 0.4 pounds/acre/year

Cropland: 1.0 pound/acre/year

Pasture: 2.0 pounds/acre/year

Urban (applicable for redevelopment): See Post-development land use

Post-development land use (to be used with runoff volumes)

Industrial/Commercial: 600 parts per billion

Single-family residential: 450 parts per billion

Multi-family residential: 500 parts per billion

This standard can be achieved through the use of ponding, Low Impact Development techniques, reduction in impervious surfaces, or other Best Management Practices deemed reasonable by the Commission. The local permitting authority shall consider a variance or flexibility to this standard if impacts to other natural resources are demonstrated. The local permitting authority can consider the implementation of this standard on regional/drainage area basis if this standard is deemed impractical on a site-by-site basis.

10. The Commission requires the pretreatment of stormwater runoff that conforms to Nationwide Urban Runoff Program (NURP) recommendations be provided for new or modifications to the stormwater conveyance system prior to discharge to wetlands, streams, and lakes.

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- a. A permanent pool ("dead storage") volume below the principal spillway (normal outlet) which shall be greater than or equal to the runoff from a 2.5 inch storm over the entire contributing drainage area assuming full development.
 - b. A permanent pool average depth (basin volume/basin area) which shall be > 4 feet, with a maximum depth of < 10 feet.
 - c. An emergency overflow (emergency outlet) adequate to control the one percent frequency/critical duration rainfall event.
 - d. Basin side slopes above the normal water level should be no steeper than 3:1, and preferably flatter. A basin shelf with a minimum width of 10 feet and one foot deep below the normal water level is recommended to enhance wildlife habitat, reduce potential safety hazards, and improve access for long-term maintenance.
 - e. To prevent short-circuiting, the distance between major inlets and the normal outlet shall be maximized.
 - f. A flood pool ("live storage") volume above the principal spillway shall be adequate so that the peak discharge rates from 99%, 10%, and 1% chance critical duration storms are no greater than pre-development basin watershed conditions.
 - g. Retardance of peak discharges for the more frequent storms can be achieved through a principal spillway design that may include a perforated vertical riser, small orifice retention outlet, or compound weir.
11. The Commission shall require a 60% phosphorus removal efficiency for stormwater pretreatment systems. The PondNet model (Walker, 1987) or model approved by the local permitting authority as equally applicable shall be used to determine the removal efficiency of the stormwater treatment system based on a 2.5-inch rainfall. This standard can be achieved through the use of ponding, Low Impact Development techniques, reduction in impervious surfaces, or other Best Management Practices deemed reasonable by the local permitting authority. The local permitting authority shall consider a variance or flexibility to this standard if impacts to other natural resources are demonstrated. The local permitting authority can consider the implementation of this standard on regional/ drainage area basis if this standard is deemed impractical on a site-by-site basis.
 12. The Commission will review the use of other Best Management Practices or innovative stormwater management practices that can be practically implemented for water quality treatment on a case-by-case basis.
 13. Buffer width standards for water quality ponds shall be at the discretion of the member community.
 14. In areas where NURP treatment basins are not feasible to construct, the MPCA Guidelines for Protecting Water Quality in Urban Areas or other methods may be substituted.

STANDARDS

15. The Commission requires treatment pond outlets to remove floating debris for a 2-year event.
16. The Commission shall develop water quality goals for specific water bodies within the watershed that transcend municipal boundaries. Development and redevelopment plans within the waterbodies' subwatershed shall include provisions to assist the Commission in meeting these water quality goals.
17. The local communities shall develop water quality goals for specific water bodies that are located entirely within their municipal boundaries. Assistance from the Commission for this task will be provided, if requested.
18. The following water quality goals have been established by a local community or organization for the following water bodies:

Plymouth	Water Quality Goals
Elm Creek	TP: 250mg/l TSS: 25 mg/l TN: 3 mg/l COD: 100 mg/l
See local plan for more details	
Maple Grove	Classification
Rice Lake	Class II – Indirect contact
Weaver Lake	Class I – Direct contact
Fish Lake	Class I – Direct contact
Cook Lake	Class I – Direct contact
Three Rivers Park District	Classification
Fish Lake	Class I – Direct contact
Elm Creek Pond	Class I – Direct contact
Lemans Lake	Class III – Wildlife/Interpretation
Elm Creek	Class III – Wildlife/Interpretation
Mud Lake	Class III – Wildlife/Interpretation
Rush Creek	Class III – Wildlife/Interpretation
Diamond Creek	Class III – Wildlife/Interpretation
Metropolitan Council	Classification
Fish Lake	Priority Water Body
Weaver Lake	Priority Water Body

19. The Commission shall promote and encourage all property owners adjacent to lakes, streams, and wetlands to have an established native vegetative buffer strip of at least 20 feet. This standard shall be promoted through education efforts.
20. The Commission shall implement a water quality monitoring program for area lakes and streams. More information about this program is included in **Appendix J**.
21. The Commission encourages member cities to develop and implement a water quality monitoring program for those lakes and streams not being monitored by the Commission.

STANDARDS

22. The Commission encourages local cities to maintain an inventory of wetland and public water bodies to assist in the management of these resources.
23. The Commission shall develop manure management and feedlot standards and/or model ordinances

C. RECREATION, FISH, AND WILDLIFE

Policies

C1. The Commission encourages fish and wildlife habitat protection and enhancement opportunities as part of surface and groundwater management practices.

C2. The Commission shall establish standards for the protection of water based recreational activities.

C3. The Commission will work with and support to the maximum extent practical the efforts of the Minnesota Department of Natural Resources, the US Corps of Engineers, the US Environmental Protection Agency, the US Fish and Wildlife Service, the Hennepin Conservation District, and Three Rivers Park District and other appropriate agencies in promoting public enjoyment and protecting fish, wildlife, and recreational resource values in the watershed.

1. The Commission shall encourage landowners to maintain wetlands and open space areas for the benefit of wildlife. This standard shall be promoted through education efforts.
2. The Commission shall require a 50-foot native vegetation buffer from Elm Creek, Rush Creek, North Fork Rush Creek, and Diamond Creek for any new development.
3. The Commission shall require member communities to develop buffer width policies for development around wetlands. Information about buffers is included in **Appendix K.**
4. The Commission shall promote and encourage property owners adjacent to lakes, streams, and wetlands to establish a buffer around the water resources of at least 20 feet. This standard shall be promoted through education efforts.
5. The Commission shall encourage the maintenance of existing water based recreational resources.
6. The Commission shall encourage member communities to address control of exotic plant species such as purple loosestrife at construction sites and elsewhere. Information on Best Management Practices for control of exotic species is available from the Department of Natural Resources.
7. Member communities are encouraged to utilize Minnesota Land Cover Classification System (MLCCS) data, where available, or other inventory methods to identify existing habitat patches and wildlife corridors and develop land use policies and strategies to protect these resources. Assistance for this task is available from the DNR.

STANDARDS

8. The Commission will continue to work cooperatively with the local communities and Three Rivers Park District to ensure protection and proper management of local and regional parks within the watershed.

D. ENHANCEMENT OF PUBLIC PARTICIPATION, INFORMATION, AND EDUCATION

Policies

D1. The Commission shall establish a public education program regarding watershed management practices. Information about this program can be found in Appendix G.

D2. The Commission encourages member cities to develop coordinated water resource public education programs to avoid duplication of effort and cost.

D3. The Commission will work with and support to the extent deemed necessary the efforts of the Hennepin Conservation District, Department of Natural Resources and others to develop and enhance public education programs.

1. The Commission shall promote responsible watershed management practices through a public education program in conformance with the NPDES Phase II program (see **Appendix G**). This program shall include, but not be limited to:
 - a. Publication of a newsletter twice annually. The newsletter shall be distributed to member communities and area libraries for distribution. The newsletter shall contain information on pertinent water resource issues such as lawn care and fertilizer use, Commission activities, and feedlot management.
 - b. Annual educational programs, classes, and/or workshops such as Project NEMO for member communities' elected officials and staff regarding watershed management practices.
 - c. A public input meeting and/or water resource survey every other year to obtain information related to the concerns of the general public within the watershed and determine the effectiveness of the Commission's implementation of the Watershed Management Plan.
 - d. Establishment of an internet web-site to promote the goals and policies of the Commission.
2. The Commission shall actively pursue grant funding to assist in public and member community education efforts related to watershed management. This assistance could be used to assist local communities with public education efforts such as catch basin stenciling programs, clean water festivals, and local newsletter and outreach efforts.
3. The Commission shall encourage member communities to include regular articles in city newsletters and/or on city web sites on pertinent water management issues.
4. The Commission shall work with area Lake Associations to the greatest extent practical and feasible to implement responsible watershed management practices

STANDARDS

around area lakes, streams, and wetlands.

5. The Commission will consider ways to assist the member communities as future implementation of NPDES Phase II.

E. PUBLIC DITCH SYSTEMS

Policies

E1. The public ditch systems within the Commission will be managed by Hennepin County, which is the public ditch authority.

E2. The Commission shall work with Hennepin County in resolving any issues associated with management of the public ditch systems in the watershed.

1. The Commission shall defer all public ditch authority to Hennepin County.

F. GROUNDWATER

Policies

F1. The Commission shall develop standards to improve and protect the groundwater within the watershed.

F2. The Commission will promote and coordinate with other agencies the continuation of existing groundwater monitoring, inventories, and/or permitting programs.

F3. The Commission will encourage member cities to develop and implement wellhead protection plans.

F4. The Commission will assist member communities or other governmental agencies in resolving groundwater quality problems.

F5. The Commission shall promote groundwater infiltration and recharge.

1. The Commission supports efforts to gather information on the hydrogeology of the region and identify potential sources of groundwater pollution.
2. The Commission shall encourage efforts to delineate and protect groundwater recharge areas.
3. The Commission shall encourage infiltration of the 2-year event for new and redevelopment wherever it is practical and reasonable to do so, provided that past and existing land use practices do not have a significant potential to contaminate the stormwater runoff, the infiltration will have a regional benefit, will not contaminate groundwater, and the soil characteristics are suitable for infiltration.
4. The Commission shall encourage member communities to develop spill prevention, control, and counter measure plans that are consistent with state and/or federal regulations.

STANDARDS

5. The Commission requires that member communities cooperate with the Department of Health to ensure that all unsealed or improperly abandoned wells within the watershed are properly sealed in accordance with state regulations.
6. The Commission will work towards educating the Commission members and member community officials about stormwater and groundwater interactions, especially those entirely within the Commission's boundaries.
7. The Commission will review the local wellhead protection plans as part of the local storm water management plan review or when available.
8. The Commission will work to coordinate efforts to include review of the local wellhead protection plan as part of the development plan review process.
9. The local communities shall forward their local wellhead protection plans to the Commission upon completion.
10. The Commission shall develop and maintain a map showing the wellhead protection zones within its boundaries upon completion of a local wellhead protection plan.

G. WETLANDS

Policies

G1. The Commission shall act as the Wetland Conservation Act's Local Government Unit (LGU) for those communities that choose to utilize this service.

G2. The Commission will protect and manage wetlands in conformance with the State Wetland Conservation Act (WCA).

G3. The Commission will support the local cities' efforts to become qualified to assume the LGU role to manage wetlands.

G4. The Commission shall promote and facilitate the creation of new wetland bankings within the watershed.

G5. The order of descending priority for the location of replacement wetlands, including the use of wetland bank credits, is as follows:

- a. On-site;***
- b. Within the same subwatershed;***
- c. Within the Elm Creek Watershed; and***
- d. Outside the Elm Creek Watershed within major Watershed No. 20 only under extreme and unusual circumstances.***

1. The Commission or designated Local Government Unit (LGU) shall protect and manage wetlands in conformance with the Wetland Conservation Act. A copy of Minnesota Rules 8410 is contained within the Water Resource Library.
2. The Commission or designated Local Government Unit (LGU) requires the developers to complete a wetland delineation by a trained wetland professional to identify the location and extent of any wetlands present within the development site.

STANDARDS

3. For areas where the Commission is the local permitting authority, the fee schedule in **Appendix B** shall apply.
4. The Commission shall review wetland delineations as part of the development plan review for all new developments and redevelopments for those communities where the Commission is the LGU.
5. The Commission shall require a wetland inventory, functions and values assessment, and wetland management plan be completed by each community as part of development or implementation of a local water resource management plan. This Plan can be in conformance with Minnesota Rules 8420 or can be developed in another acceptable manner agreed upon by the community and Commission. The Commission shall assist in approving the wetland evaluation method.
6. The Commission shall support local city efforts to manage wetlands for habitat diversity, water quality, and stormwater management. These efforts may include dredging of sediments to the extent allowed by the Wetland Conservation Act or construction of treatment basins. These activities will be supported provided that it can be demonstrated that the project will result in no net loss of wetland area.
7. The Commission encourages member communities to adopt a Shoreland Ordinance, as required by the timeline set forth by the DNR, as part of the development or implementation of a local water resource management plan. If the community does not have a shoreland ordinance, the Commission shall enforce the DNR sample shoreland ordinance. A sample ordinance is included in **Appendix H**.
8. The Commission shall require a 50 foot native vegetation buffer from Elm Creek, Rush Creek, North Fork Rush Creek, and Diamond Creek for any new or redevelopment.
9. The Commission shall encourage all property owners adjacent to lakes, streams, and wetlands to have a buffer of at least 20 feet. This standard will be promoted through public education efforts.

H. EROSION

Policies

H1. The Commission shall develop standards to minimize erosion due to development activities.

H2. The Commission will coordinate, where appropriate, with other agencies' efforts to implement Best Management Practice regarding erosion and sedimentation control.

H3. The Commission will identify locations for erosion control improvement projects.

H4. The Commission encourages the adoption of NRCS standards for cropland erosion control.

H5. The Commission shall coordinate with the Hennepin Conservation District and the Natural Resource Conservation Service to provide technical assistance and cost share programs regarding erosion control for farmers.

STANDARDS

1. The local permitting authority shall review plans for conformance with Best Management Practices for the following developments:
 - Residential development or redevelopment greater than 1 acre in size, or
 - Commercial/industrial development or redevelopment, or
 - Any road, street, or highway project that results in a net increase in impervious surface.
2. Sediment and erosion control plans shall conform to the general criteria set forth by the most recent versions of the Minnesota Construction Site Erosion Control Handbook, practices outlined in the Minnesota Pollution Control Agency “Protecting Water Quality in Urban Areas”, the local erosion control ordinance, the Metropolitan Council’s Minnesota Urban Small Sites BMP Manual, and/or the NPDES Construction site permit.
3. The Commission shall require member communities to adopt erosion control ordinances in conformance with the Commission policies and standards as part of development or implementation of the local water resource management plan. **Appendix H** contains a sample erosion control ordinance.
4. The Commission shall support the efforts of the Natural Resource Conservation Service, the Hennepin Conservation District, and the Minnesota Pollution Control Agency to the extent reasonable and practical in addressing soil stabilization within the watershed.
5. The Commission shall identify locations for erosion control improvement projects.
6. The Commission shall provide technical assistance to farmers who wish to evaluate the erosion potential on cropland fields and for the installation of soil conservation practices when requested as funding becomes available.

Shingle Creek/West Mississippi Watershed Management Commissions Management Rules and Standards

	Standard	Purpose	Applicability
Project Reviews Required	A Stormwater Management Plan consistent with all applicable management rules and standards must be reviewed and approved by the commission prior to commencement of land disturbing activities.	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes; improve water quality; protect water resources; and promote natural infiltration of runoff.	All development or redevelopment projects of the following types: <ul style="list-style-type: none"> • Single family detached housing project 15 acres or larger in size • Projects in any other land use 5 acres or larger in size • Projects within the 100-year floodplain • Projects adjacent to or within a lake, wetland, or watercourse • Any land disturbing activity requested by a member city to be reviewed regardless of project size
Rate Control	Peak runoff rates may not exceed existing rates for the 2-year, 10-year, and 100-year critical storm event; or the capacity of downstream conveyance facilities; or contribute to flooding	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes	All projects requiring a project review
Infiltration	One-half inch of impervious surface runoff must be infiltrated within 72 hours	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes; and promote natural infiltration of runoff.	All projects requiring a project review
Erosion and Sediment Control	Erosion control plan using Best Management Practices (BMPs) is required	To control erosion and sediment so as to protect conveyance systems and water quality	All projects requiring a project review
Floodplain Alteration	Compensating storage is required to mitigate floodplain fill	To prevent and control flooding damage	All development or redevelopment projects within the 100-year floodplain regardless of project size
Water Quality	Permanent sedimentation and water quality ponds consistent with NURP and BMPs are required, providing a permanent wet pool with dead storage of at least the runoff from a 2.5 inch event and an outlet skimmer controlling floatables and oils	To protect water quality	
Buffer Strips	Vegetated buffer strips of a minimum 20 foot, average 30 foot width are required adjacent to wetlands and watercourses	To protect water quality; reduce erosion and sedimentation; reduce contamination from runoff and debris; and provide habitat	All projects requiring a project review that contain or abut a wetland or watercourse
Wetland	Wetlands may not be drained, filled, excavated, or otherwise altered without an approved wetland replacement plan from the local government unit (LGU) with jurisdiction	To preserve and protect wetlands for their water quality, stormwater storage, habitat, aesthetic, and other attributes	All land disturbing activity impacting a wetland as defined by the Wetland Conservation Act (WCA)

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Appendix G – Lake Management Plan Summaries

Recent Cedar Island Lake Projects:

City of Maple Grove Surface Water Management Program

Numerous water quality protection projects have been conducted by the City or developers around the City's major lakes. On-going efforts and maintenance conducted around the area lakes consist of:

1. A minimum of semi-annual clean out of all sump manhole basins around the lakes.
2. A minimum of a semi-annual street sweeping program on all area lakes.
3. Pipe inlet monitoring and sedimentation clean out on an as-needed basis within all area lakes, ponds, wetlands, and streams.
4. All new developments must meet strict erosion and sediment control guidelines along with pollutant and nutrient controls before approvals.
5. Strict ongoing street sweeping is conducted on all new development and construction projects throughout the City. Since the inception of this policy in 1992, the City has spent 10,000 hours, costing \$750,000. All charges were paid for by the contractor or developer of the site.

Watershed water quality improvement projects specific to Cedar Island Lake

- A. Cedar Ponds NURP pond.
- B. Ditch/culvert control and freeway right-of-way pipe prior to discharge into Cedar Island Lake.
- C. Sediment clean out in 1996 of Cedar Island freeway inlet and 73rd Avenue inlet.

Cedar Island Lake Management Plan

City of Maple Grove, 1999

Summary

Lake Report Card: Grades for Cedar Island Lake indicate relatively poor water quality, and there is room for improvement. Cedar Island Lake has the potential to attain "B" grades for nutrients, algae, and clarity.

Cedar Island Lake water quality grades based on summertime averages.

	1984	1990	1991	1992	1993	1994	1995	1996	1997	1998
Secchi disc (water clarity)	D	F	F	F	F	F	F	F	F	F
Phosphorus (fertilizer level)	D	--	--	--	--	--	D	--	D	D
Chlorophyll (algae content in the lake)	B	--	--	--	--	--	F	--	--	--

Goals for Cedar Island Lake

Topic Area	Existing Conditions	Goals
Water Use Conflicts	Moderate boat traffic and lake use	Maintain moderate boat traffic.
Nutrients	Summer average phosphorus concentration is 117 ppb (City of Maple Grove 1997).	Reduce summer average phosphorus to 50 ppb or less.
Water Clarity	Summer average is 1.5 feet (Met Council, 1997).	Increase summer average transparency to 4 to 5 feet.
Algae	Algae blooms are a problem in most summers.	Reduce algae bloom occurrence to one week per summer.
Weeds	Some nuisance growth occurs.	Maintain diverse native aquatic plant community.
Fish	Gamefish community is not characterized.	Maintain predator control of forage fish through catch and release.
Wildlife	Typical urban diversity.	Improve wood duck habitat and shoreline areas to encourage other bird species and discourage geese nesting.

Lake Management Plan: To meet the goals for protecting and enhancing Cedar Island Lake, a project list has been prepared that lays out a five-year program and costs. An overview of the management plan is shown on the following two pages.

Recent Eagle Lake Projects:

City of Maple Grove Surface Water Management Program

Numerous water quality protection projects have been conducted by the City or developers around the City's major lakes. Ongoing efforts and maintenance conducted around the area lakes consist of:

1. A minimum of semi-annual clean out of all sump manhole basins around the lakes.
2. A minimum of a semi-annual street sweeping program on all area lakes.
3. Pipe inlet monitoring and sedimentation clean out on an as-needed basis within all area lakes, ponds, wetlands, and streams.
4. All new developments must meet strict erosion and sediment control guidelines along with pollutant and nutrient controls before approvals.
5. Strict ongoing street sweeping is conducted on all new development and construction projects throughout the City. Since the inception of this policy in 1992, the City has spent 10,000 hours, costing \$750,000. All charges were paid for by the contractor or developer of the site.

Watershed water quality improvement projects specific to Eagle Lake

- A. Water diversion (first flush pipe) during the reconstruction on Balsam Lane and 63rd Avenue.
- B. Red Fox Cove channel project (future).
- C. 73rd Avenue NURP pond at Magda Drive.

Eagle Lake Management Plan

City of Maple Grove, 1999

Summary

Lake Report Card: Grades for Eagle Lake indicate relatively good water quality, but there is room for improvement. Eagle Lake has the potential to maintain "B" grades for nutrients and clarity.

Eagle Lake water quality grades based on summertime averages.

	1973	1980	1983	1986	1991	1995	1996	1997	1998
Secchi disc	--	--	--	--	--	C	C	C	C
Phosphorus	C	C	C	C	C	C	C	B	B

Goals for Eagle Lake

Topic Area	Existing Conditions	Goals
Water Use Conflicts	Moderate boat traffic and lake use	Maintain moderate boat traffic.
Nutrients	Summer average phosphorus concentration is 31 ppb (Met Council 1997).	Maintain summer average phosphorus of 30 ppb or less.
Water Clarity	Summer average is 5 feet (Met Council, 1997).	Maintain summer average transparency to 4 to 5 feet.
Algae	Algae blooms are not a problem in most summers.	Maintain non-nuisance algae conditions.
Weeds	Some nuisance growth occurs, Eurasian milfoil is present.	Maintain diverse native aquatic plant community.
Fish	Average to above average gamefish community.	Maintain predator control of forage fish through catch and release.
Wildlife	Typical urban diversity.	Improve wood duck habitat and shoreline areas to encourage other bird species and discourage geese nesting.

Lake Management Plan: To meet the goals for protecting and enhancing Eagle Lake, a project list has been prepared that lays out a five-year program and costs. An overview of the management plan is shown on the following two pages.

Recent Edward Lake Projects:

City of Maple Grove Surface Water Management Program

Numerous water quality protection projects have been conducted by the City or developers around the City's major lakes. Ongoing efforts and maintenance conducted around the area lakes consist of:

1. A minimum of semi-annual clean out of all sump manhole basins around the lakes.
2. A minimum of a semi-annual street sweeping program on all area lakes.
3. Pipe inlet monitoring and sedimentation clean out on an as-needed basis within all area lakes, ponds, wetlands, and streams.
4. All new developments must meet strict erosion and sediment control guidelines along with pollutant and nutrient controls before approvals.
5. Strict ongoing street sweeping is conducted on all new development and construction projects throughout the City. Since the inception of this policy in 1992, the City has spent 10,000 hours, costing \$750,000. All charges were paid for by the contractor or developer of the site.

Edward Lake Management Plan City of Maple Grove, 1999

Summary

Lake Report Card: Grades for Edward Lake indicate fair water quality, but there is room for improvement. Edward Lake has the potential to maintain "B" grades for nutrients, algae, and clarity.

Edward Lake water quality grades based on summertime averages.

	1995	1996	1997	1998
Secchi disc (water clarity)	C	B	C	C
Phosphorus (fertilizer level)	C	D	C	C
Chlorophyll (algae content in the lake)	B	A	A	--

Goals for Edward Lake

Topic Area	Existing Conditions	Goals
Water Use Conflicts	Low boat traffic and lake use	Maintain moderate boat traffic.
Nutrients	Summer average phosphorus concentration is 50 ppb (City of Maple Grove 1997).	Reduce summer average phosphorus to 30 ppb or less.
Water Clarity	Summer average is 6.0 feet (City of Maple Grove 1997).	Maintain summer average transparency at 6 feet.
Algae	Algae blooms are not a problem in most summers.	Maintain non- nuisance algae conditions.
Weeds	Some nuisance growth occurs, primarily from coontail.	Maintain diverse native aquatic plant community.
Fish	Average gamefish community.	Maintain predator control of forage fish through catch and release.
Wildlife	Typical urban diversity.	Improve wood duck habitat and shoreline areas to encourage other bird species and discourage geese nesting.

Lake Management Plan: To meet the goals for protecting and enhancing Edward Lake, a project list has been prepared that lays out a five-year program and costs. An overview of the management plan is shown on the following two pages.

Recent Fish Lake Projects:

City of Maple Grove Surface Water Management Program

Numerous water quality protection projects have been conducted by the City or developers around the City's major lakes. Ongoing efforts and maintenance conducted around the area lakes consist of:

1. A minimum of semi-annual clean out of all sump manhole basins around the lakes.
2. A minimum of a semi-annual street sweeping program on all area lakes.
3. Pipe inlet monitoring and sedimentation clean out on an as-needed basis within all area lakes, ponds, wetlands, and streams.
4. All new developments must meet strict erosion and sediment control guidelines along with pollutant and nutrient controls before approvals.
5. Strict ongoing street sweeping is conducted on all new development and construction projects throughout the City. Since the inception of this policy in 1992, the City has spent 10,000 hours, costing \$750,000. All charges were paid for by the contractor or developer of the site.

Watershed water quality improvement projects specific to Fish Lake

- A. Expanded water treatment pond in southwest corner of the lake. Pond reconfigured for nutrient removal and elimination of short circuiting on Hennepin Park property pond. Drainage area to pond prior to discharge into lake was 25.3 acres.

Fish Lake Management Plan City of Maple Grove, 1999

Summary

Lake Report Card: Grades for Fish Lake indicate fair water quality, but there is room for improvement. Fish Lake has the potential to maintain "B" grades for nutrients, algae, and clarity.

Fish Lake water quality grades based on summertime averages.

	1980	1981	1982	1985	1986	1987	1988	1989	1990	1991	1992	1993	1995	1996	1997	1998
Secchi disc (water clarity)	C	C	B	C	B	C	C	C	C	C	C	C	C	C	C	C
Phosphorus (fertilizer level)	B	C	C	C	B	C	C	C	C	C	D	C	C	C	C	C
Chlorophyll (algae content in the lake)	C	C	C	C	A	B	B	B	B	B	C	B	B	A	B	B

Goals for Fish Lake

Topic Area	Existing Conditions	Goals
Water Use Conflicts	Moderate to heavy boat traffic and lake use	Maintain moderate boat traffic.
Nutrients	Summer average phosphorus concentration is 69 ppb (Elm Creek WD, 1997).	Reduce summer average phosphorus to 30 ppb or less.
Water Clarity	Summer average is 4.9 feet (Elm Creek WD, 1997).	Maintain summer average transparency at 5 feet.
Algae	Algae blooms are not a problem in most summers.	Maintain non-nuisance algae conditions.
Weeds	Some nuisance growth occurs, Eurasian milfoil and curlyleaf pondweed are present.	Establish and maintain diverse native aquatic plant community.
Fish	Average to above average gamefish community.	Maintain predator control of forage fish through catch and release.
Wildlife	Typical urban diversity with high potential due to Hennepin Parkland abutting lake.	Improve wood duck habitat and shoreline areas to encourage other bird species and discourage geese nesting.

Lake Management Plan: To meet the goals for protecting and enhancing Fish Lake, a project list has been prepared that lays out a five-year program and costs. An overview of the management plan is shown on the following two pages.

Recent Pike Lake Projects:

City of Maple Grove Surface Water Management Program

Numerous water quality protection projects have been conducted by the City or developers around the City's major lakes. Ongoing efforts and maintenance conducted around the area lakes consist of:

1. A minimum of semi-annual clean out of all sump manhole basins around the lakes.
2. A minimum of a semi-annual street sweeping program on all area lakes.
3. Pipe inlet monitoring and sedimentation clean out on an as-needed basis within all area lakes, ponds, wetlands, and streams.
4. All new developments must meet strict erosion and sediment control guidelines along with pollutant and nutrient controls before approvals.
5. Strict ongoing street sweeping is conducted on all new development and construction projects throughout the City. Since the inception of this policy in 1992, the City has spent 10,000 hours, costing \$750,000. All charges were paid for by the contractor or developer of the site.

Watershed water quality improvement projects specific to Pike Lake

- A. Water diversion (first flush pipe) during the reconstruction on Balsam Lane and 63rd Avenue.
- B. Red Fox cove channel project (future).
- C. 73rd Avenue NURP pond at Magda Drive.

Pike Lake Management Plan

City of Maple Grove, 1999

Summary

Lake Report Card: Grades for Pike Lake indicate fair water quality, with room for improvement. Pike Lake has the potential to attain "B" grades for nutrients, algae, and clarity.

Pike Lake water quality grades based on summertime averages.

	1981	1991	1992	1993	1995	1996	1997	1998
Secchi disc (water clarity)	D	C	C	D	D	D	D	D
Phosphorus (fertilizer level)	--	--	--	--	--	C	C	D
Chlorophyll (algae content in the lake)	--	--	--	--	--	C	C	C

Goals for Pike Lake

Topic Area	Existing Conditions	Goals
Water Use Conflicts	Moderate to low boat traffic and lake use	Maintain moderate boat traffic.
Nutrients	Summer average phosphorus concentration is 76 ppb (Met Council 1997).	Reduce summer average phosphorus to 30 ppb or less.
Water Clarity	Summer average is 3.6 feet (Met Council, 1997).	Increase summer average transparency to 4 to 5 feet.
Algae	Algae blooms are not a problem in most summers.	Maintain non-nuisance algae conditions.
Weeds	Some nuisance growth occurs.	Maintain diverse native aquatic plant community.
Fish	Average gamefish community.	Maintain predator control of forage fish through catch and release.
Wildlife	Typical urban diversity.	Improve wood duck habitat and shoreline areas to encourage other bird species and discourage geese nesting.

Lake Management Plan: To meet the goals for protecting and enhancing Pike Lake, a project list has been prepared that lays out a five-year program and costs. An overview of the management plan is shown on the following two pages.

Pike Lake 5-Year Plan, Costs, Responsible Groups, and Funding Sources.

Recommended Projects	Comments	Costs					5-Year Costs \$	Responsible Group						Funding Sources		
		1st Year	2nd Year	3rd Year	4th Year	5th Year		MnDNR		Shingle Creek W.D.	Hennepin SWCD and/or Met Council	City of Maple Grove			Pike Lake Assoc	Individ
								Ecol Serv.	Wildlife			City Council	LQC			
Shoreland Projects																
Shoreland inventory	Catalog shorelines; serves as a benchmark and helps find shorelands that can be enhanced.	400	--	300	--	--	700		X		X		X	X		LQC, MnDNR grant
Custom fertilizing	Reducing the use of phosphorus and nitrogen saves money and helps the lake.	--	200	200	--	--	400			X		X	X	X		LQC, Henn SWCD
Waterfowl and loon nesting improvements	Potential for improved waterfowl nesting conditions.	--	600	400	--	--	1,000		X							LQC, Lake Assoc
Purple loosestrife control	Rely on beetle control						--		X							MnDNR
In-Lake Algae Control																
Bioengineering to control ravine erosion	Erosion control will reduce sediment and nutrient input into Pike Lake.	20,000*	3,000*	3,000*	--	--	0					X				City CIP
Aquatic Plants																
Plant survey, with curlyleaf emphasis	Map curlyleaf beds, if they are a nuisance implement a control program.	--	1,200	1,000	800	--	3,000						X	X		LQC
Lake soil testing	Lake soil fertility may show areas that could support nuisance plant growth.	400	--	--	--	--	400						X			LQC, Henn Parks (in-kind)
Nitrogen management	Long term potential to control nuisance plant growth.	--	100	100	--	--	200				X		X			LQC
Fish																
Evaluate spawning habitat	Work with DNR to improve pike spawning.	--	1,000	1,500	--	--	2,500	X					X	X		DNR grant
Water Use Conflicts																
15 mph speed limit	Coordinate with City of Plymouth.	--	--	--	--	--	--						X	X		--
Monitoring Program																
Lake monitoring program	Continue lake monitoring through the Met Council program (Sponsored by Shingle Creek WD).	900	900	900	900	900	4,500			X					X	Shingle Creek WD
Monitor Pike Creek	Use City equipment to monitor Pike Creek in Year 3.	--	--	1,800	--	--	1,800			X		X		X		LQC
Education Program	Get a list of phosphorus-free fertilizer vendors.	200	200	200	200	200	1,000			X		X	X			MnDNR grant, LQC
Costs		1,900	4,200	6,400	1,900	1,100	15,500									

*Ravine erosion control project is underway. It may be completed by the end of 1999. Costs are not included in the five year budget.

Recent Rice Lake Projects:

City of Maple Grove Surface Water Management Program

Numerous water quality protection projects have been conducted by the City or developers around the City's major lakes. Ongoing efforts and maintenance conducted around the area lakes consist of:

1. A minimum of semi-annual clean out of all sump manhole basins around the lakes.
2. A minimum of a semi-annual street sweeping program on all area lakes.
3. Pipe inlet monitoring and sedimentation clean out on an as-needed basis within all area lakes, ponds, wetlands, and streams.
4. All new developments must meet strict erosion and sediment control guidelines along with pollutant and nutrient controls before approvals.
5. Strict ongoing street sweeping is conducted on all new development and construction projects throughout the City. Since the inception of this policy in 1992, the City has spent 10,000 hours, costing \$750,000. All charges were paid for by the contractor or developer of the site.

Watershed water quality improvement projects specific to Rice Lake

- A. NURP ponds:
 - Target pond
 - Rice Lake Farms pond
 - Freeway pond below Tom Thumb
 - Applebee's site ponds
 - Pond retrofit behind Maple Grove Evangelical Free Church
 - Future ponding along the freeway for the I-94/Weaver Lake Road eastbound exit ramp.
- B. Future grit chamber containment system along the Elm Creek Park at County Road 30 and evaluate other grit chambers where appropriate.
- C. Rice Lake drawdowns in 1996 and 1997.
- D. Shoreline erosion control along I-94 (bioengineering).

Rice Lake Management Plan City of Maple Grove, 1999

Summary

Lake Report Card: Grades for Rice Lake indicate relatively poor water quality, and there is room for improvement. Rice Lake has the potential to attain "B" grades for nutrients, algae, and clarity.

Rice Lake water quality grades based on summertime averages.

	1995	1996	1997	1998
Secchi disc (water clarity)	D	D	F	F
Phosphorus (fertilizer level)	D	F	F	F
Chlorophyll (algae content in the lake)	F	F	F	--

Goals for Rice Lake

Topic Area	Existing Conditions	Goals
Water Use Conflicts	Moderate boat traffic and lake use	Maintain moderate boat traffic.
Nutrients	Summer average phosphorus concentration is 284 ppb (City of Maple Grove 1997).	Reduce summer average phosphorus to 60 ppb or less.
Water Clarity	Summer average is 2.3 feet (City of Maple Grove 1997).	Increase summer average transparency to 4 to 5 feet.
Algae	Algae blooms are a problem in most summers.	Reduce algae bloom occurrence to one week per summer.
Weeds	Some nuisance growth of curlyleaf pondweed occurs, Eurasian milfoil is present.	Maintain diverse native aquatic plant community.
Fish	Average to below average gamefish community.	Maintain predator control of forage fish through catch and release.
Wildlife	Above average diversity, with potential for more.	Improve wood duck habitat and shoreline areas to encourage other bird species and discourage geese nesting.

Lake Management Plan: To meet the goals for protecting and enhancing Rice Lake, a project list has been prepared that lays out a five year program and costs. An overview of the management plan is shown on the following two pages.

Rice Lake 5-Year Plan, Costs, Responsible Groups, and Funding Sources.

Recommended Projects	Comments	Costs					5-Year Costs \$	Responsible Group						Funding Source		
		1st Year	2nd Year	3rd Year	4th Year	5th Year		MnDNR		Elm Creek W.D.	Hennepin SWCD and/or Hennepin Park	City of Maple Grove			Rice Lake Assoc	Individ
								Ecol Serv.	Wildlife			City Council	LQC			
Shoreland Projects																
Shoreland inventory	Catalog shorelands to set a benchmark and determine if areas can be enhanced -- buffer strips.	--	600	300	--	500	1,400		X				X			LQC, MnDNR grant
Shoreland habitat improve. along trail	Involve trail "task force" to install wildlife plantings and structure.	--	--	800	800	--	1,600		X		X		X			LQC, MnDNR grant
Custom fertilizer use	Lower fertilizer use saves money and helps the lake.	--	200	200	200	--	600						X	X	X	LQC, Henn Parks (in-kind)
Erosion control	Water level management (fall drawdown)	--	--	800	--	--	800					X				Maple Grove
Continue goose control	Control plans with the City								X					X		Maple Grove
In-Lake Algae Control																
Copper sulfate for odor control	For nuisance odor conditions, copper sulfate may offer a short-term solution.	--	3,000	--	--	--	3,000							X		Lake Assoc, City Park Department
Alum dosing on Elm Creek	Conduct feasibility study first, then implement if appropriate.	--	2,000	--	--	80,000*	2,000	X		X	X	X	X			LQC, City CIP
Aquatic Plants																
Lake soil testing	Soil fertility may delineate areas that could support nuisance EWM growth.	900	200	--	--	--	1,100				X		X			LQC, Henn Parks
Nuisance curlyleaf control using cutters	Cut nuisance curlyleaf areas using a volunteer work force.	1,100	800	800	800	600	4,100	X					X	X	X	LQC, Henn Parks
Drawdown for nuisance plant control	Evaluate effects of last drawdown and set-up a long term drawdown management plan.	600	--	--	1,200	--	1,800						X			LQC, Lake Assoc
EWM control	Boom in place, contingency plan												X	X		LQC
Fish																
Continue stocking program	If habitat improves, stock more bass.	--	--	900	--	--	900							X		Lake Assoc
Carp reduction program	Use commercial fisherman to reduce carp population.	--	1,500	1,500	6,000	--	9,000							X		Lake Assoc, MnDNR grant, LQC
Winter aeration	Feasibility study, maintain fish population over winter.	--	--	--	12,000	--	12,000					X	X	X		City CIP
Creel Census (MCC)	Survey anglers.								X							--
Water Use Conflicts																
No projects planned at this time	Re-evaluate in 3 years.	--	--	--	--	--	--									--
Monitoring Program																
Continue lake monitoring	Lake monitoring is City-sponsored at this time.	900	900	900	900	900	4,500						X			LQC
Evaluate Elm Creek	Set-up automatic sampler to monitor Elm Creek inflows. Storm sewer inflows also monitor delta formation.	3,000	2,000	--	--	--	5,000						X			LQC
Education Program	Distribute general lake and watershed information.	200	200	200	200	200	1,000			X			X	X		MnDNR grant, LQC
Costs		6,700	11,400	6,400	22,100	2,200	48,800									

* Dosing station is tentative, based on feasibility study results, regulatory, climate, and funding O&M costs could be substantial based on 10,000 to 30,000 gallons of alum used per year.

Recent Weaver Lake Projects:

City of Maple Grove Surface Water Management Program

Numerous water quality protection projects have been conducted by the City or developers around the City's major lakes. Ongoing efforts and maintenance conducted around the area lakes consist of:

1. A minimum of semi-annual clean out of all sump manhole basins around the lakes.
2. A minimum of a semi-annual street sweeping program on all area lakes with priority fall sweeping around the lakes.
3. Pipe inlet monitoring and sedimentation clean out on an as-needed basis within all area lakes, ponds, wetlands, and streams.
4. All new developments must meet strict erosion and sediment control guidelines along with pollutant and nutrient controls before approvals.
5. Strict ongoing street sweeping is conducted on all new development and construction projects throughout the City. Since the inception of this policy in 1992, the City has spent 10,000 hours, costing \$750,000. All charges were paid for by the contractor or developer of the site.

Watershed water quality improvement projects specific to Weaver Lake

- A. Water treatment pond on Highway 101.
Creation of a water treatment pond along the west side of Highway 101 prior to storm water discharge to Weaver Lake.
- B. Storm water diversion pipe.
During the construction of Weaver Lake Drive between Lawndale Land and County Road 101 a diversion pipe was installed on the storm sewer system to provide water treatment for the typical storm events prior to discharging to Weaver Lake.
- C. NURP pond construction during developments on:
 - Cobblestone Hills (2 cell treatment)
 - Weaver Lake Terrace
 - The Commons
- D. Pond/wetland expansion on 89th Avenue and Lawndale Lane.

Weaver Lake Management Plan

City of Maple Grove, 1999

Summary

Lake Report Card: Grades for Weaver Lake indicate average to good water quality, but there is room for improvement. Weaver Lake has the potential to maintain "B" grades for nutrients, algae, and clarity.

Weaver Lake water quality grades based on summertime averages.

	1981	1983	1985	1986	1987	1988	1989	1990	1991	1992	1993	1995	1996	1997	1998
Secchi disc (water clarity)	C	C	B	B	C	C	B	C	C	B	A	B	C	C	C
Phosphorus (fertilizer level)	B	C	B	B	C	A	C	C	C	C	C	C	C	B	C
Chlorophyll (algae content in the lake)	C	C	B	C	C	B	A	B	B	B	A	B	A	A	B

Goals for Weaver Lake

Topic Area	Existing Conditions	Goals
Water Use Conflicts	Moderate boat traffic and lake use	Maintain moderate boat traffic and reasonable hours.
Nutrients	Summer average phosphorus concentration is 39 ppb (Elm Creek WD 1997).	Reduce summer average phosphorus to 30 ppb or less.
Water Clarity	Summer average is 6.3 feet (Elm Creek WD, 1997).	Maintain summer average transparency of at least 6 to 7 feet.
Algae	Filamentous algae mats are a problem in summer.	Reduce extent of filamentous algae.
Weeds	Nuisance growth of curlyleaf pondweed occurs.	Maintain diverse native aquatic plant community.
Fish	Average to above average gamefish community.	Maintain predator control of forage fish through catch and release.
Wildlife	Typical urban diversity.	Improve wood duck habitat and shoreline areas to encourage other bird species and discourage geese nesting.

Lake Management Plan: To meet the goals for protecting and enhancing Weaver Lake, a project list has been prepared that lays out a five-year program and costs. An overview of the management plan is shown on the following two pages.



Legend

-  Non-Pipe Flow Arrows
-  Pipe Flow Arrows
-  Inter-Community Flow Arrows
-  Major Watershed Boundary
-  EC-A1 Minor Watershed Boundary
-  Creek
-  Existing Regional Pond
-  Proposed Regional Pond
-  Existing Storm Sewer
-  Proposed Storm Sewer
-  Water Bodies
-  City Boundary
-  Proposed Ponds

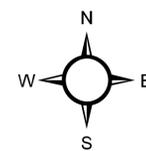
City of Maple Grove

Local Surface Water
Management Plan

SURFACE WATER SYSTEM

February 2009

Map 1



1,500 0 1,500
Feet

