

Comprehensive Surface Water Management Plan



Prepared by



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Comprehensive Surface Water Management Plan

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Acknowledgements

- City of Roseville City Council
- City of Roseville Parks and Recreation Commission
- City of Roseville Public Works, Environment, and Transportation Commission
- Rice Creek Watershed District
- Capitol Region Watershed District
- Ramsey-Washington Metro Watershed District
- City of Roseville Public Works Department and Engineering Division

Executive Summary

Purpose

This primary purpose of this plan is twofold. First, the Plan serves to further define the goals and policies that the City will follow as it continues to implement a comprehensive surface water management program. These goals and policies have been developed to support and facilitate the City in achieving the community vision as described in the Imagine Roseville 2025 Final Report (January 2007) and to shape the character and enhance the quality of life as described in the Comprehensive Plan (October 2009). Secondly, the Plan serves to meet state and local regulatory requirements.

There are two primary programs that establish the regulatory need to update the City's Comprehensive Surface Water Management Plan. First, Minnesota Statutes, Sections 103B.201 to 103B.255 and Minnesota Rule, Chapter 8410 comprise the State's Metropolitan Surface Water Management Program (MSWMP). These Statutes and Rules require the preparation of watershed plans by watershed management organizations (WMOs) and the preparation of local (City) water management plans.

The purposes of the water management programs required by Minnesota Statutes §103B.205 to 103B.255 are to:

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

A third regulatory program, very much related to the goals, policies and standards of this Plan, is the National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water Permit Program for Municipally Separate Storm Sewer Systems (MS4) that is administered in the State by the Minnesota Pollution Control Agency (MPCA) (<http://www.pca.state.mn.us>). The goals, policies and standards of this plan were developed to be consistent with the requirements of the City's NPDES MS4 permit and associated Surface Water Pollution Prevention Plan (SWPPP) as well as the respective WMO plans. The implementation program included in this plan and the SWPPP are intended to be a coordinated effort to realize combined efficiencies.

Plan Development

This Plan builds on the previous Plans adopted by the City in 1990 and 2003. Each of those previous Plans established goals and policies, contained an assessment of issues and called for implementation actions to address those issues. This CSWMP was developed through a process of soliciting input from City Commissions, Council and the public on water resources issues, specific problem areas and potential new topic areas and/or actions that the plan should address. Input was obtained through a series of meetings and providing plan information on the City's stormwater web page. A summary of those efforts follows:

- Parks and Recreation Commission Meeting
- Public Works, Environmental and Transportation Commission – 3 Meetings
- Public Open House Meeting

Executive Summary (Continued)

- City Council Review and Adoption of the Plan

Sustainability

Roseville is committed to the preservation and enhancement of its environment, and to the principle that each generation of residents must meet the needs of the present without compromising the ability of future residents to meet their own needs. This approach to sustainability is a thread that is woven throughout the City's Comprehensive Plan. Upon adoption of this Comprehensive Surface Water Management Plan (CSWMP) by Council, the CSWMP will become an integral component of the City's Comprehensive Plan. As in the Comprehensive Plan, this CSWMP will serve as a guide towards improving sustainability across all aspects of the City's surface water management program and activities.

Stormwater Management System

The City's storm sewer network and overall conveyance and treatment system is in place. Future changes to the system will primarily involve retrofitting to address flooding problems, to incorporate water quality treatment, or incorporate improvements at the time of redevelopment. This storm sewer system consists of:

- 126 miles of pipe,
- 4719 catch basins,
- 2728 manholes,
- 128 ponds,
- 58 special features (infiltration, biofiltration, water reuse, raingardens, ect.)
- 739 inlets and outlets, and
- six storm-sewer lift stations.

Water Resources

Roseville has a significant number of lakes, ponds, and wetlands within its boundaries. As shown in the table below, five of the six lakes within the City are classified as impaired for one or more pollutant or stressor. These impairments mean that the lake water is not meeting state water quality standards established by the Minnesota Pollution Control Agency (MPCA). The Federal Clean Water Act (CWA) requires that states establish total maximum daily loads (TMDLs) of pollutants to water bodies that do not meet water quality standards. Therefore, in the years ahead each of these impaired waters will be subject to TMDL Study that will result in an implementation plan that establishes a list of actions that will be needed to eliminate or manage the impairment. The City will need to work closely with the MPCA and local watershed organizations during the development of the TMDL Implementation Plans. For more information about impaired waters and TMDLs see www.pca.state.mn.us.

Lake Name	Surface Area (Acres)	Watershed Area (Acres)	Affected Designated Use	Pollutant or Stressor
Bennett	28	169	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
			Aquatic Consumption	Mercury in Fish Tissue
Little Johanna	18	NA	Aquatic recreation	Nutrient/Eutrophication Biological Indicators
			Aquatic Consumption	Perfluorooctane Sulfonate (PFOS) in Fish Tissue

Executive Summary (Continued)

Lake Name	Surface Area (Acres)	Watershed Area (Acres)	Affected Designated Use	Pollutant or Stressor
Josephine	116	839	Aquatic Consumption	Mercury in Fish Tissue
Langton (N&S)	30	257	NA	NA
McCarrons	73	1070	Aquatic Consumption	Mercury in Fish Tissue
Owasso	375	3022	Aquatic Consumption	Mercury in Fish Tissue

Watershed Districts

The City of Roseville falls under the jurisdiction of three watershed management agencies. They are the [Rice Creek Watershed District](#) (RCWD), the [Ramsey-Washington Metro Watershed District](#) (RWMWD), and the [Capitol Region Watershed District](#) (CRWD). All three of the Watershed Districts have jurisdictional authority within the City, and therefore each must review and approve the City's Plan to ensure consistency with the respective Watershed District Plan.

Goals and Policies

The following table summarizes the goals related to surface water management in the City of Roseville. These goals are a reflection of the City Council's desire to reach and sustain a high quality of life for the City's residents.

Goal	Goal Statement
Goal 1 – Flood Protection and Runoff Management	Provide flood protection to the maximum extent practicable for all residents and structures and to protect the integrity of our drainage and detention systems through runoff management
Goal 2 – Surface Water Protection	Maintain or improve the water quality and ecological integrity of the City's lakes, ponds, and wetlands.
Goal 3 – Groundwater Protection	Protect the quality and quantity of groundwater through collaboration with local and state agencies managing groundwater resources
Goal 4 – Public Education and Outreach	Promote stewardship and increase awareness of land and water resources through public education and outreach.
Goal 5 – Pollution Prevention and Maintenance	Protect the quality of the City's water resources through pollution prevention, good housekeeping practices, and routine maintenance.
Goal 6 – Coordination and Collaboration	To simplify and streamline processes and draw upon the expertise and resources of other local, state, and federal agencies in water resources management efforts.
Goal 7 – Sustainability	Achieve the water quality and water resources needs of the City based on the foundation of efficient use of community resources. In this approach both capital costs and long-term operational costs will be considered as well as the overall costs of a given project towards protection and/or improvement of the City water resources.

Executive Summary (Continued)

Issues Assessment

Over the years since the first plan was developed, the City has made significant improvements that reduce the extent of local flooding, provide water quality treatment benefits and improve educational opportunities for its residents. A few of these example projects are highlighted in the Plan.

Many of the flooding issues of the past have been addressed, but some remain. New water quality issues and concerns are emerging each year, requiring varying levels of effort by the city to address. And, the ongoing maintenance and operation of the storm water system has grown much more complex over the years due to new regulations and a better understanding of what is necessary to keep the treatment ponds and filtration systems functioning properly. Specific issues addressed in this plan include localized flooding issues, water quality impairments; operation and maintenance; and education, outreach and collaboration.

Implementation Program and Funding

The Implementation Program intended to provide guidance in carrying out the Plan goals and objectives. The Implementation Program and funding section summarizes capital improvement projects, studies and ongoing maintenance, inspection, monitoring and other management activities. This Plan is intended to serve the City for at least the next ten years and many of the program activities will continue at least out to the year 2030.

Except for the activities that are taken from the City NPDES SWPPP, the Implementation Program is not a hard and fast commitment to complete each and every activity in the time frame suggested. Rather, it is a suggested course of action that will help to accomplish the major goals of this plan.

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Comprehensive Surface Water Management Plan

Prepared for the City of Roseville, MN

1.0 Introduction

The City of Roseville (City) is an established suburban community of approximately 34,000 people in the northern Minneapolis/St. Paul metropolitan area. As an inner ring suburb, Roseville is conveniently located within close proximity to both downtown areas. The City is located in Ramsey County, Minnesota and is bordered by County Road D to the North, Larpenteur Avenue to the Southeast, Roselawn Avenue to the Southwest, Highcrest Road to the West, and Rice Street to the East (see Figure 1).

Roseville was incorporated as a city in 1948 and experienced dramatic growth in the 1950's and 1960's. Today, the City is almost completely built up and has achieved a stable population. It is expected, therefore, that the focus in the future will be on preservation, restoration and enhancement of natural resources and redevelopment of older parts of the City. This Comprehensive Surface Water Management Plan (CSWMP) will serve as a guide to protect the City's water resources, address current water resource related issues, and manage the surface water system throughout the City as redevelopment occurs.

1.1 Purpose

This primary purpose of this plan is twofold. First, the Plan serves to further define the goals and policies that the City will follow as it continues to implement a comprehensive surface water management program. These goals and policies have been developed to support and facilitate the City in achieving the community vision as described in the Imagine Roseville 2025 Final Report (January 2007) and to shape the character and enhance the quality of life as described in the Comprehensive Plan (October 2009). Secondly, the Plan serves to meet state and local regulatory requirements.

There are two primary programs that establish the regulatory need to update the City's Comprehensive Surface Water Management Plan. First, Minnesota Statutes, Sections 103B.201 to 103B.255 and Minnesota Rule, Chapter 8410 comprise the State's Metropolitan Surface Water Management Program (MSWMP). These Statutes and Rules require the preparation of watershed plans by watershed management organizations (WMOs) and the preparation of local (City) water management plans.

The purposes of the water management programs required by Minnesota Statutes §103B.205 to 103B.255 are to:

- *Protect, preserve and use natural surface and groundwater storage and retention systems;*

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

A third regulatory program, very much related to the goals, policies and standards of this Plan, is the National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water Permit Program for Municipally Separate Storm Sewer Systems (MS4) that is administered in the State by the Minnesota Pollution Control Agency (MPCA) (<http://www.pca.state.mn.us>). The goals, policies and standards of this plan were developed to be consistent with the requirements of the City's NPDES MS4 permit and associated Surface Water Pollution Prevention Plan (SWPPP) as well as the respective WMO plans. The implementation program included in this plan and the SWPPP are intended to be a coordinated effort to realize combined efficiencies.

1.2 Plan Development

This plan builds upon the City's previous Surface Water Management Plans (SWMP) completed in 1990 and 2003. The 1990 SWMP included detailed hydrologic TR-20 modeling for the entire City and the 2003 SWMP focused on updating and translating the 1990 modeling into a HydroCAD® model and analyzing select problem areas in the City. For this 2012 plan update hydrologic/hydraulic modeling has been completed for problem areas as separate efforts and the focus is on pulling together existing information related to the City's surface water systems into one easy to use management tool. A GIS-based mapping tool which organizes and inventories studies, projects, and current issues of the City's surface water resources accompanies this plan document.

The CSWMP was developed through a process of soliciting input from City Commissions, Council and the public on water resources issues, specific problem areas and potential new topic areas and/or actions that the plan should address. Input was obtained through a series of meetings and providing plan information on the City's stormwater web page. A summary of those efforts follows:

- Parks and Recreation Commission Meeting
- Public Works, Environmental and Transportation Commission – 3 Meetings
- Public Open House Meeting
- City Council Review and Adoption of the Plan

This CSMWP is organized into the following sections:

- Section 1.0 describes the plan purpose, organization and scope as well as sustainability within the plan.

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- Section 2.0 describes the physical environment including climate, drainage, soils, geology, land use, water resources, and wildlife.
 - Section 3.0 describes the entities responsible for water resource management.
 - Section 4.0 describes the City's goals and policies regarding surface water management.
 - Section 5.0 describes resolved and ongoing issues.
 - Section 6.0 describes the implementation plan and funding program.
 - Section 7.0 describes the plan adoption and amendment process.

1.3 Sustainability

Roseville is committed to the preservation and enhancement of its environment, and to the principle that each generation of residents must meet the needs of the present without compromising the ability of future residents to meet their own needs. This approach to *sustainability* is a thread that is woven throughout the City's Comprehensive Plan. Upon adoption of this Comprehensive Surface Water Management Plan (CSWMP) by Council, the CSWMP will become an integral component of the City's Comprehensive Plan. As in the Comprehensive Plan, this CSWMP will serve as a guide towards improving sustainability across all aspects of the City's surface water management program and activities.

This CSWMP includes sustainability in three of the Plan sections including this introduction; Section 4.0 Goals and Policies; and Section 6.0 Implementation Program and Funding. These Sections of the Plan provide additional background on what sustainability is and how it is a critical part of this Plan and what actions and approaches the City will take, related to its surface water management program, towards being more sustainable.

2.0 Physical Environment

2.1 Climate and Precipitation

The climate of Roseville is considered to be continental and subhumid. Because of its location near the center of the North American continent the Twin Cities metropolitan area (and Minnesota) experiences a wide variation in climate conditions (e.g., droughts and floods, heat and cold). However, even with these wide variations, climatologists have found four significant climate trends in the Upper Midwest (Minnesota Weather Almanac, Seeley, 2006):

- Warmer winters
- Higher minimum temperatures
- Higher dew points
- Changes in precipitation trends

Estimates from the National Weather Service (NWS) TP-40 publication for the precipitation depth of a 24-hour duration event for various return frequencies are presented in Table 1. The NWS is currently in the process of producing updated rainfall frequency estimates using a longer period of rainfall observations and state-of-the-art statistical methods. Updated estimates are anticipated in the spring of 2013 (see www.nws.noaa.gov for status updates).

Table 1
Precipitation Event Frequency

Return Frequency	Percent Probability	Historic Precipitation Depth (inches) ¹	Updated Precipitation Depth (inches) ²
1-year	100%	2.4	2.5
2-year	50%	2.8	2.8
5-year	20%	3.6	3.5
10-year	10%	4.2	4.2
25-year	4%	4.8	5.3
50-year	2%	5.3	6.3
100-year	1%	5.9	7.4

Sources:

(1) U.S. Weather Bureau's *Technical Publication No. 40* (Hershfield, 1961)

(2) NOAA Atlas 14, Volume 8 (2013)

In recent years, there has been more debate and discussion around the topic of rainfall depths and the frequency of larger storm events. As described in an issue paper on this topic prepared during the development of the Minnesota Stormwater Manual, precipitation in Minnesota has been rising since the 1930s. This increase is attributed to an increased frequency of heavy to extreme precipitation events (Karl and Knight 1998). The State Climatologist suggests that the amount of precipitation occurring as large events has been increasing in recent decades, and that about 100 years ago that fraction was similar to or even higher than what it is today.

The trends are changing and will likely continue to change. From a stormwater management perspective, these changes in precipitation may require larger pipes and ponds to capture, convey and treat the runoff from more intense events. The City will continue to monitor the outcomes of the changes in design guidance as well as review its standards for design of extreme event overflow areas for new and redevelopment projects.

2.2 Topography and Drainage

More than 10,000 years ago, Roseville evolved into a series of bluffs and upland hills that defined the adjacent lowlands, a network of drainage ways, lakes and marshes. The topography of northern Ramsey County (and Roseville) is irregular with ground elevations varying approximately 160 feet: from 1,000 feet above Mean Sea Level (MSL) near County Road B2 and Western Avenue to a low of 840 feet above MSL south of Lake McCarrons. Because of its topographic characteristics, the City of Roseville lies at the headwater of three subwatersheds:

- The western part of the City, which falls under the jurisdiction of Rice Creek Watershed District, drains northerly toward Rice Creek that drains into the Mississippi River. Flows leave the City and are transferred downstream through Ramsey County Ditch 4 and 5.
- The southeasterly part of the City drains to the south and east into the Trout Brook interceptor and then to the Mississippi River, a part of the Capitol Region Watershed.
- The east-central and northeast areas drain northeasterly into Lake Owasso which overflows into Grass Lake in Shoreview. This area is a part of the Ramsey-Washington-Metro Watershed District.

In order to better understand how the surface-water system works, the CSWMP divides the city into sub-watershed areas based on surface drainage features and the storm sewer system.

The City's sub-watershed areas are shown in Figure 2. There are a total of 16 sub-watersheds within the City and two landlocked drainage areas.

The City's storm sewer network and overall conveyance and treatment system is in place. Future changes to the system will primarily involve retrofitting to address flooding problems, to incorporate water quality treatment, or incorporate improvements at the time of redevelopment. This storm sewer system consists of:

- 126 miles of pipe,
- 4719 catch basins,
- 2728 manholes,
- 128 ponds,
- 58 special features (infiltration, biofiltration, water reuse, raingardens, ect.)
- 739 inlets and outlets, and
- six storm-sewer lift stations.

The citywide storm sewer map (Figure 3) shows the locations of the majority of these facilities and general direction of flow through the system.

2.3 Soils and Geology

A large portion of the landscape is dominated by Urban land-Zimmerman complex (859B) and Urban land-Hayden-Kingsley complex (860C), as identified in the Ramsey County Soil Survey. The Natural Resource Conservation Service (NRCS) also classifies soils by the Hydrologic Soil Group (HSG) based on estimates of runoff potential (Figure 4). These are:

- Hydrologic Soil Group A – Low runoff potential – high infiltration rate
- Hydrologic Soil Group B – Moderate infiltration rate
- Hydrologic Soil Group C – Slow infiltration rate
- Hydrologic Soil Group D – High runoff potential – very slow infiltration rate

The surficial geology consists of unconsolidated glacial sediments deposited during the Quaternary geologic period of two glacial ice lobes: the Superior lobe and the Grantsburg sublobe of the Des Moines lobe. The glacial deposits found in Ramsey County are primarily in the form of outwash, till, and stream and lake sediments ranging in thickness from 10 to 400 feet. Below the unconsolidated glacial sediment lies consolidated bedrock formed during the early Paleozoic age. Bedrock units from youngest to oldest in Roseville include: Decorah Shale, Platteville-Glenwood Formation, St. Peter Sandstone, Prairie Du Chien Group, and Jordan Sandstone. Maps of the surficial geology and bedrock geology from the Ramsey County Geological Atlas can be found on Figure 5 and Figure 6, respectively.

2.4 Land Use and Land Cover

The City of Roseville encompasses an area of 13.8 square miles which today is made up of mixed-land uses including established neighborhoods, parks and open space, and significant retail, commercial and industrial development. Some key aspects of the existing landuse pattern are:

- Low-density residential is the dominant land use. This form of housing occupies more than 34% of Roseville's total land area.
- Roadways have been a major factor in shaping the development pattern of Roseville. Business (commercial and industrial) uses are primarily concentrated in the western third

of Roseville, along the I-35W and Highway 36 corridors. Commercial areas can also be found along major street corridors (e.g. Rice Street and Snelling Avenue) and at major street intersections.

- Lakes, parks, and open spaces are defining characteristics of Roseville.

Table 2 provides a summary of the existing land use by category. For more detailed information about the future planned land-use refer to Chapter 4 of the City’s *2030 Comprehensive Plan*.

Table 2
Existing Land Use

Land Use Category	Acres	% Total
Single-Family Detached	2925	33.0%
Single-Family Attached	126	1.4%
Manufactured Home Park	9	0.1%
Multifamily	279	3.1%
Common Areas	59	0.7%
Business/Retail	486	5.5%
Office	192	2.2%
Light Industrial	396	4.5%
Heavy Industrial	471	5.3%
Institutional	510	5.8%
Parks and Open Space	1089	12.3%
Right of Way	1810	20.4%
Railroad	96	1.1%
Vacant	33	0.4%
Vacant Developable	129	1.5%
Water	251	2.8%
Total	8861	100%

Figure 7 and Figure 8 display the current and planned future land use maps which describe the activities that occur on a piece of land and the function that land serves. In contrast, the land cover is the characterization of the features covering the ground surface which can be either natural or manmade. The Minnesota Land Cover Classification System (MLCCS) is a vegetation oriented classification system designed to identify natural and cultural land cover types using a standardized methodology. Roseville’s land cover map is shown in Figure 9 which also includes overlays of regionally significant ecological areas and metro conservation corridors identified by the Minnesota Department of Natural Resources (DNR).

Closely related to water resources management and land cover is the management of parks and open space throughout the City. Many of the parks and open spaces are located around the City’s surface water resources and may provide opportunities for stormwater management. Table 3 lists the parks and open spaces throughout Roseville.

Table 3
Parks and Open Space

Park Name	Area (acres)	% of Parks Area	% of City Area	Address
City Parks - Owned				
Acorn	44.60	6.8	0.5	286 County Road C W
Applewood Overlook	2.42	0.4	0.0	1478 Terrace Drive W
Applewood Park	2.09	0.3	0.0	2838 Arona Street N
Autumn Grove	6.54	1.0	0.1	1365 Lydia Avenue W
B-Dale Fields	7.95	1.2	0.1	2100 Dale Street N
Bruce Russell	1.95	0.3	0.0	1175 Roselawn Avenue W
Central Park-Arboretum	18.97	2.9	0.2	2525 Dale Street N
Central Park-Dale West	16.98	2.6	0.2	2555 Dale Street N
Central Park-Lexington	63.47	9.7	0.7	2540 Lexington Avenue N
Central Park-North	17.47	2.7	0.2	816 Heinel Drive N
Central Park-Nature Center	52.28	8.0	0.6	2520 Dale Street N
Central Park-Victoria Ballfields	37.52	5.7	0.4	2490 Victoria Street N
Central Park-Victoria West	2.31	0.4	0.0	2495 Victoria Street N
Concordia	4.77	0.7	0.1	2394 Dale Street N
Cottontail	6.48	1.0	0.1	1281 County Road C2 W
Howard Johnson	9.56	1.5	0.1	1260 Woodhill Drive W
John Rose Oval	9.76	1.5	0.1	2661 Civic Center Drive N
Keller Mayflower	2.26	0.3	0.0	2070 Fernwood Street N
Ladyslipper	17.48	2.7	0.2	299 S Owasso Boulevard W
Langton Lake	62.72	9.6	0.7	3 park location/addresses
Lexington	8.18	1.2	0.1	2131 Lexington Avenue N
Mapleview	3.28	0.5	0.0	2917 Matilda Street N
Materion	8.51	1.3	0.1	225 Minnesota Avenue W
Memorial Park	NA	NA	NA	2660 Civic Center Drive N
Oasis	15.37	2.3	0.2	1700 County Road C2 W
Owasso Hills	8.53	1.3	0.1	593 Owasso Hills Drive W
Pioneer Park	13.52	2.1	0.2	1966 Chatsworth Street N
Pocahontas	5.67	0.9	0.1	2540 Pascal Street N
Rosebrook	8.28	1.3	0.1	2590 Fry Street N
Sandcastle	3.43	0.5	0.0	3060 Patton Road N
Tamarack	6.93	1.1	0.1	1745 Farrington Street N
Valley	10.58	1.6	0.1	3110 Avon Street N
Veterans	3.59	0.5	0.0	1135 Woodhill Drive W
Villa	33.10	5.1	0.4	2055 Cohansey Boulevard
Willow Pond	14.88	2.3	0.2	1283 County Road B2 W
Woodhill	1.33	0.2	0.0	2724 Western Avenue N
Unnamed Parks	4.18	0.6	0.0	
Subtotal	536.96	82.0	6.1	
City Parks - Leased				
Evergreen	3.94	0.6	0.0	1810 County Road B W
Owasso Ballfields	4.40	0.7	0.0	2659 Victoria Street N
Reservoir Woods	109.42	16.7	1.2	1901 Alta Vista Drive N
Subtotal	117.76	18.0	1.3	
Golf Courses				
Cedarholm - City Owned	25.79		0.3	2323 Hamline Avenue N
Midland Hills Country Club	155.45		1.8	
Subtotal	181.24		2.0	
Ramsey County Parks				
Lake Josephine	75.37		0.9	
McCarrons	8.71		0.1	
Subtotal	84.08		0.9	

Table 3 (Continued)
Parks and Open Space

Park Name	Area (acres)	% of Parks Area	% of City Area	Address
Open Space				
City Open Space Other	3.57		0.0	
County Open Space	48.50		0.5	
Open Space Ponding	62.61		0.7	
Open Space Cemetery	135.79		1.5	
Subtotal	250.47		2.8	
<hr/>				
Total Parks/Open Space	1,170.51		13.2	

A map of the parks and open spaces in Roseville is displayed in Figure 10. Parks and open space have historically played an important role in managing stormwater in Roseville. Many of the parks and open space areas are built around ponds and water bodies, with many of these water bodies functioning as flood detention areas as well as providing water quality treatment. Parks play an important role in water resources management in the City.

As part of the planning process for this Plan update, Public Works staff met with the Parks and Recreation Commission to coordinate the problem areas and issues that need to be addressed and to discuss what opportunities city owned parks and open space may provide in the future for storm water. The following major themes were identified at that meeting:

- The Parks and Recreation Commission is supportive of continuing to collaborate with Public Works on incorporating storm water features into city parks and open space areas where the improvements are feasible and practical and provide an opportunity to more efficiently use City funds to meet the regulator requirements and the goals of this plan.
- There was strong consensus that the City should not convert active park areas (e.g., soccer fields or other active play areas) to stormwater management functions. However, some discussion related to the potential for underground facilities that could serve both purposes. The cost effectiveness of the combined function would be a critical factor in the determining the feasibility of such systems.
- There was strong consensus that the parks and open spaces can and should play a key role in the educational aspects of the CSWMP. For example, a stormwater exhibit or example stormwater treatment features could be created at the Harriet Alexander Nature Center. This would better educate the public on the need for storm water management throughout the City, and help them understand what their role can be in helping the City achieve its goals to manage stormwater and improve water quality.

2.5 Water Resources

2.5.1 Surface Water

Roseville has a significant number of lakes, ponds, and wetlands within its boundaries. Summary information on each of the priority lakes in the City is displayed in Table 4 below. Due to the varying nature of water quality data, detailed information on surface water assessment data is available through the MPCAs Environmental Data Access tool and may be accessed through the hyperlink provided in Table 4.

Table 4
Lake Data Summary

Lake Name	DNR Identification Number	Watershed Area (Acres)	Surface Area (Acres)	Maximum Depth (Feet)	Ordinary High Water
Bennett	62-0048	169 ³	28	9	887.6 ⁴
Little Johanna	62-0058	NA	18	28	NA
Josephine	62-0057	839 ¹	116	44	884.4 ⁴
Langton (N&S)	62-0049	257 ¹	30	5	906.6 ⁵
McCarron	62-0054	1070 ²	73	57	842.2 ⁴
Owasso	62-0056	3022 ³	375	37	887.1 ⁴

Source: DNR Unless otherwise noted

Notes: ¹RCWD, ²CRWD, ³RWMWD, ⁴MSL 1912 datum, ⁵NGVD 29

Figure 11 illustrates the Public Water Inventory (PWI) for the City with all water basins and watercourses that meet the criteria set in Minnesota Statutes, Section 103G.005, subd. 15. Additionally, Figure 12 illustrates the lake and wetland systems from the National Wetlands Inventory (NWI) program of the US Fish and Wildlife Service.

Of the lakes and wetlands within the City, five of them are classified as impaired (not meeting state water quality standards) by the MPCA. Figure 14 displays the impaired waters map and Table 5 summarizes each of the water body impairments. Section 303(d) of the Federal Clean Water Act (CWA) requires that states establish total maximum daily loads (TMDLs) of pollutants to water bodies that do not meet water quality standards.

TMDLs are the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. TMDL also refers to the process of allocating pollutant loadings among point and nonpoint sources. Each TMDL includes an implementation plan that establishes a list of actions that will be needed to manage the pollutant(s) with the goal of eliminating the impairment. For more information about impaired waters and TMDLs see www.pca.state.mn.us/.

Table 5
Impaired Water Bodies Summary

Name	Year Listed as Impaired	Affected Designated Use	Pollutant or Stressor	Approved TMDL
Little Johanna ¹	2012	Aquatic Consumption	Perfluorooctane Sulfonate (PFOS) in Fish Tissue	NA
Little Johanna	2004	Aquatic recreation	Nutrient/Eutrophication Biological Indicators	Target Start Date – 2012
Bennett	2006	Aquatic recreation	Nutrient/Eutrophication Biological Indicators	Target Start Date – 2012
Bennett ¹	2012	Aquatic Consumption	Mercury in Fish Tissue	2008
McCarrons	2010	Aquatic Consumption	Mercury in Fish Tissue	2008
Owasso	1998	Aquatic Consumption	Mercury in Fish Tissue	2008
Josephine	1998	Aquatic Consumption	Mercury in Fish Tissue	2008

(1) New listing from draft 2012 Impaired Waters List

2.5.2 Floodplains

Areas of Roseville prone to larger regional flooding near surface water sources have been identified and mapped by the Federal Emergency Management Agency (FEMA) through the National Flood Insurance Program (NFIP). Flood Insurance Rate Maps (FIRMs) for the City of Roseville were recently published on June 6th, 2010. Figure 14 displays the special flood hazard areas mapped by FEMA.

While the 1 percent chance flood hazard areas (Zones A and AE) are mapped in Figure 14, it is important to recognize that the areas designated as Zone X (the remaining portions of the City) may still have potential for flooding.

2.5.3 Groundwater

Roseville is served by the St. Paul Regional Water Services (SPRWS) which supplies drinking water to the City of St. Paul and neighboring communities. The St. Paul Regional Water Service is supplied primarily by surface water from the Mississippi River, but approximately 7% of all the water they provide is groundwater. In Ramsey County, both porous unconsolidated sand and gravel glacial deposits and fractured, weathered limestone or sandstone bedrock formations act as aquifers. The primary public drinking water aquifer is the Prairie du Chien-Jordan (Ramsey County Groundwater Protection Plan, 2009). In order to protect groundwater aquifers and public drinking water sources, the Minnesota Department of Health (MDH) delineates wellhead protection areas and drinking water supply areas which are shown in Figure 15. Because drinking water in the City is provided by the St. Paul Regional Water Service and the City does not own any public water supply wells, the City has not prepared a Wellhead Protection Plan.

2.5.4 Pollution Sources

Information on individual pollutant sources is available from the MPCA's "What's In My Neighborhood?" (WIMN) online tool. This detailed information has not been included here as it is subject to frequent change and may be obtained by calling the MPCA or by visiting the MPCA's website (www.pca.state.mn.us) which has information on various pollutant sources and related regulatory programs. A map identifying site locations (as of 07/16/12) is displayed in Figure 16. The MPCA WIMN tool identified the following types of sites within the City of Roseville:

- Air Permits
- Hazardous Waste, Large Quantity Generators
- Hazardous Waste, Small to Minimal Quantity Generator
- Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) sites
- Unpermitted Dump Site
- Voluntary Investigation & Cleanup (VIC) Site
- Landfill, Permitted By Rule
- Leak Site
- Petroleum Brownfield
- Tank Site
- Construction Stormwater Permit
- Industrial Stormwater Permit
- Wastewater Dischargers

-
- Multiple Activity sites

2.6 Recreation, Fish, and Wildlife

The City manages a variety of recreation, leisure and sport facilities and offers more than 1,000 annual recreation and leisure programs and events. Along with many athletic programs, the City also offers recreational opportunities to connect to the nature and wildlife through a sample of the following programs:

- Family fishing clinic
- Minnesota Horticultural Society gardening classes
- Harriet Alexander Nature Center naturalist programs
- Kids Gardening Club

The natural communities that remain in Roseville are largely located in city parks and around lake and wetland edges and buffers. The major natural community types in Roseville are:

- Prairie and Savanna Communities: Sand-Gravel Prairie, Sand-Gravel Oak Savanna, Mesic Prairie and Wet Prairie
- Forest Communities: Dry Oak Forest, Mesic Oak Forest, Oak Woodland-Brushland, and Lowland Hardwood Forest
- Wetland Communities: Deep Marshes, Shallow Marshes, Wet Meadows, Shrub Swamps, Wooded Swamps, and Seasonally flooded basins.

For more information on each of the natural community classifications refer to *Minnesota's Native Vegetation, A Key to Natural Communities* (Minnesota Department of Natural Resources, 1993) and *Wetland Plants and Plant Communities of Minnesota & Wisconsin* (Eggers and Reed, US Army Corps of Engineers, 1997).

Roseville is fortunate to have several lakes within the city that serve as important recreational and habitat resources. Langton Lake features a nature trail, an accessible fishing pier and is great for canoeing. Bennett Lake is great for shore fishing and features a new fishing pier with lowered rail sections making it easier for children to fish. It is stocked with walleye fingerlings, channel catfish yearlings, and large adult bluegills. Lake Josephine has public shoreline access at the Ramsey County park. Fishing at Lake Josephine has been limited to angling for bass, small bluegill and the occasional northern pike but stocking of walleye fingerlings is anticipated to provide additional angling opportunities.

McCarrons Lake has a fishing pier and designated shore fishing area along the south shore of the lake near the intersection of South McCarrons Boulevard and Western Avenue accessed by a flight of stairs. Lake Owasso is accessible by a Ramsey County owned boat ramp on North Owasso Boulevard but shore fishing is limited. Owasso is a managed Muskie lake, however, it is most popular with recreational boaters and water skiers.

3.0 Water Resource Management

This section of the CSWMP presents a synopsis of the current organizational entities whose programs and regulations are relevant to the management of water resources within Roseville. The City is committed to the preservation and enhancement of its water resources through full compliance with local, state, and federal regulations.

3.1 County, State and Federal Agencies

There are numerous County, State, and Federal agencies which play a role in managing water resources within the City. Among them are:

- [Federal Emergency Management Agency](#) – the Federal Emergency Management Agency (FEMA) operates the National Flood Insurance Program (NFIP). To participate in the NFIP and receive federally backed flood insurance, communities must adopt and enforce floodplain management ordinances to reduce future flood damage.
- [Metropolitan Council](#) – the Metropolitan Council is responsible for monitoring the metro area surface water quality, leading watershed planning through the authority provided by state law to review and comment on metro area watershed management organization (WMO) or watershed district (WD) plans and local water resources plans as part of local comprehensive plans, and collecting and treating wastewater for the Twin Cities metro area.
- [Minnesota Board of Water and Soil Resources](#) – the Minnesota Board of Water and Soil Resources (BWSR) relevant core functions include water resource planning with comprehensive land use planning, implementing the comprehensive local water management acts, and administering the Wetland Conservation Act.
- [Minnesota Department of Health](#) – the Minnesota Department of Health (MDH) is responsible for operating the state’s drinking water protection program and implementing the federal Safe Drinking Water Act (SDWA) in Minnesota. The MDH produces source water assessments and drinking water supply management areas as well as aid in the development of local wellhead protection plans.
- [Minnesota Department of Natural Resources](#) – the Minnesota Department of Natural Resources (DNR) is responsible for protecting public waters and managing water supply. It regulates activities below the ordinary high water level (OHW) of public waters and public waters wetlands through public water works permits. It also oversees and administers the National Flood Insurance Program (NFIP) for the State of Minnesota.
- [Minnesota Department of Transportation](#) – the Minnesota Department of Transportation (MnDOT) Metro district is a designated MS4 and is responsible for stormwater pollution prevention within MnDOT right-of-way which included but is not limited to implementing proper erosion and sediment controls on construction sites, street sweeping practices, and analyzing low environmental impact de-icing measures. MnDOT also publishes standard specifications for construction related to erosion prevention and sediment control which many entities utilize.
- [Minnesota Pollution Control Agency](#) – the Minnesota Pollution Control Agency (MPCA) is charged with administering the federal Clean Water Act (CWA) in Minnesota. Functions relevant to this CSWMP include regulating stormwater through the National Pollutant Discharge Elimination System (NPDES) permits (MS4, Industrial, and Construction), monitoring and assessing water quality, listing impaired waters, and conducting total maximum daily load studies/reports (TMDLs).
- [Ramsey County](#) - The County Public Works Department monitors water quality in several lakes within the City each summer: Bennett, McCarrons, Owasso and Josephine and completes macrophyte surveys on each lake as part of the monitoring program on a 5- year cycle.. The County Public Works Department also monitors beach water quality at the County beaches on McCarrons, Owasso and Josephine. The County also operates and maintains Gottfried Pit through a cooperative agreement with Roseville and Falcon Heights.

-
- [United States Army Corps of Engineers](#) – the U.S. Army Corps of Engineers permits all work in, over, or under navigable waters of the US under Section 10 of the federal Rivers and Harbors Act. Under Section 404 of the federal CWA, a Corps permit is also required for the discharge of dredged or fill material into waters of the U.S.
 - [United States Environmental Protection Agency](#) – the U.S. Environmental Protection Agency (EPA) enforces the federal CWA and SDWA, provides support for municipal wastewater treatment plants, and takes part in pollution prevention efforts aimed at protecting watersheds and sources of drinking water.

3.2 Watershed Districts

The City of Roseville falls under the jurisdiction of three watershed management agencies. They are the [Rice Creek Watershed District](#) (RCWD), the [Ramsey-Washington Metro Watershed District](#) (RWMWD), and the [Capitol Region Watershed District](#) (CRWD). The geographical extent of each organization’s jurisdictional boundaries within the City of Roseville is shown in Figure 17. Note that the jurisdictional boundaries differ slightly from the hydrologic boundaries shown in Figure 2. While hydrologic boundaries represent where the water flows in different directions, jurisdictional boundaries generally follow parcel lines and road alignment to provide a more efficient approach to the administration of the watershed management organization programs.

All three of the Watershed Districts have jurisdictional authority within the City, and therefore each must review and approve the City’s Plan to ensure consistency with the respective Watershed District Plan. A generalized overview of the requirements of each organization is presented in Table 7. This is not intended to represent a full analysis of Watershed District rules, each organization should be contacted directly to obtain the most up-to-date information on their goals, policies, and rules.

Table 6
Watershed District Standards Summary

Standard	Rice Creek Watershed District ⁽¹⁾	Capitol Region Watershed District	Ramsey-Washington Metro Watershed District
Project size applicability	Development or redevelopment 1-acre or greater, single family residential development 5-acres or greater; size thresholds do not apply if the site is within the 100-yr floodplain, within 1000' of a public water or wetland, or within 300' of Rice Creek, Clearwater Creek, or a public ditch. (See additional applicability for ESC).	Projects disturbing greater than one acre of land, or 10,000 square feet of land adjacent to a waterbody and repairs, replaces, or creates impervious surface.	Projects disturbing greater than one acre of land.
Water Quality	BMPs sized to treat runoff from a two-year (2.8") storm under the developed condition. For redevelopment disturbing less than 50% of the existing impervious surface and increasing the impervious surface by less than 50% the standard is the 0.8" event rather than the 2.8" event.	Stormwater BMPs shall remove 90% of total suspended solids from the runoff generated by a 2.5-inch rainfall event (NURP water quality storm).	Developments shall incorporate effective non-point source pollution reduction BMPs to achieve 90% total suspended solids removal from the runoff generated by a NURP water quality storm (2.5" rainfall).
Volume Control		Stormwater runoff volume reduction shall be achieved onsite in the amount of one inch of runoff from impervious surfaces.	Stormwater runoff volume retention shall be achieved onsite in the amount equivalent to the runoff generated from a one inch rainfall over the impervious surfaces of the development.
Rate Control	Proposed runoff rates at the site boundary, in aggregate, must not exceed existing rates for the critical two-year and 100-year frequency events.	Runoff rates shall not exceed existing runoff rates for the 2-year, 10-year, and 100-year critical storm events.	Runoff rates for the proposed activity shall not exceed existing runoff rates for the 2-year, 10-year, and 100-year critical storm events.
Wetland bounce/inundation	Permitted bounce and inundation period based on susceptibility classification of wetland (see Rule C paragraph 7).	Wetlands shall not be drained, filled wholly or in part, excavated, or have sustaining hydrology impacted such that there will be a decrease in the inherent (existing) functions and values of the wetland.	All stormwater must be treated to the water quality standard outlined in Rule C.d.3 before discharge to a wetland.
Wetland buffer	NA	A minimum buffer of 25 feet of permanent District approved non-impacted vegetative ground cover abutting and surrounding a wetland is required.	Wetland buffers shall be required for all developments adjacent to a wetland whether or not the wetland is located on the same parcel as the proposed development. See Rule E, Table 4 for average and minimum wetland buffer widths.

Table 6 (Continued)
Watershed District Standards Summary

Standard	Rice Creek Watershed District ⁽¹⁾	Capitol Region Watershed District	Ramsey-Washington Metro Watershed District
Flood control	No person may alter or fill land below the 100-year flood elevation of any public water, public water wetland or other wetlands without first obtaining a permit from the District. New structures and stormwater basins must be constructed so that the lowest floor and lowest entry elevations comply with district Rule C paragraph 8(e)	Placement of fill within the 100-year floodplain is prohibited unless compensatory storage is provided. All habitable buildings, roads, and parking structures on or adjacent to a project site shall comply with flood control and freeboard requirements (see Rule D, Table 3)	Placement of fill within the 100-year floodplain is prohibited unless compensatory storage is provided. All habitable buildings, roads, and parking structures on or adjacent to a project site shall comply with flood control and freeboard requirements (see Rule D, Table 3)
Erosion and Sediment Control	Site erosion and sediment control practices must be consistent with the Minnesota Pollution Control Agency document "Protecting Water Quality in Urban Areas" (1994), as amended, and District-specific written design guidance and be sufficient to retain sediment on-site. Required for surface soil disturbance or removal of vegetative cover on between one-quarter and one acre of land, if any part of the disturbed area is within 300 feet of the OHW of a lake, stream, wetland or ditch.	Erosion and sediment control measures shall meet the standards for the General Permit Authorization to Discharge Storm Water Associated With Construction Activity Under the National Pollutant Discharge Elimination System/State Disposal System Permit Program except where more specific standards are required.	Erosion and sediment control measures shall meet the standards for the General Permit Authorization to Discharge Storm Water Associated With Construction Activity Under the National Pollutant Discharge Elimination System/State Disposal System Permit Program except where more specific standards are required.
Illicit Discharge and Connection	NA	No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water. The construction, use, maintenance or continued existence of illicit connections to the storm drain system without a District permit is prohibited.	No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water. The construction, use, maintenance or continued existence of illicit connections to the storm drain system without a District permit is prohibited.

⁽¹⁾ A revision will be necessary to comply with the proposed Rice Creek Watershed District update in 2013.

3.3 City of Roseville

One of the primary means for the City to manage surface water is through this plan which is legally enforceable through city ordinances and standards such as Shoreland, Wetland, Storm Water Management and Floodplain Regulations. City code chapters and sections relevant to surface water management have been included in Appendix C. In addition to City ordinances, Roseville enforces stormwater design standards through development review, building permits and erosion control permits. For example, currently, all sites that are greater than 10,000 square feet or land adjacent to a water resource are required to get an Erosion Control Permit. Further detail regarding design standards can be found in Appendix B.

Enforcement of the City's ordinances and standards goes hand-in-hand with compliance with local, state, and federal regulations. Closely related to surface water management is the NPDES MS4 permit program. As of March 2003, all cities in the Twin Cities metropolitan area are permittees under the NPDES Phase II MS4 Storm Water permit and must therefore meet certain requirements related to stormwater pollution control. The six minimum control measures and associated BMPs of the NPDES MS4 program are included in the City's Storm Water Pollution Prevention Plan (SWPPP) found in Appendix D.

4.0 Goals and Policies

Minnesota Rules, Part 8410.0170, subpart 5 (*italics below*), relating to Surface Water Management Plans, requires local governments to establish goals and policies for the effective management of water resources.

M.R. 8410.0170, Subpart 5. Establishment of policies and goals (Local Plans). Each local (SWMP) plan must state specific goals and corresponding policies related to the purpose of these plans, be consistent with the policies and goals of the organization plans within the City or township, and address the relation of the local plan to the regional, state, and federal goals and programs outlined in Part 8410.0070.

A **goal** is the specific end point which is desired and **policies** are guiding principles which altogether form a strategy to attain the goals. Plan standards (or storm water development criteria) are an extension of the goals and policies that provide detailed criteria on storm water management practices. This section of the CSWMP outlines goals and policies related specifically to surface water management in the City of Roseville. These goals and policies are a reflection of the City Council's desire to reach and sustain a high quality of life for the City's residents.

4.1 Flood Protection and Runoff Management

Development and the related changes in land use can increase runoff rates and volumes due to additional impervious surface. As areas develop or redevelop at a higher density, storm water runoff generally increases. In addition, and as discussed briefly in Section 2.1, changes in the characteristics of rainfall events are trending toward more intense rainfall and greater depth storms and the NWS is in the process of updating precipitation frequency estimates. Whatever the cause of more intense and greater depth storms, this increase in runoff rates and volumes can result in localized and/or large scale flooding issues in the downstream system. It is important to manage these increased runoff rates and volumes in order to ensure reduction of flooding in the downstream system and to control the potential effects of erosive flows on streams and waterways.

As an established community with a developed built environment, Roseville has dealt with and continues to deal with numerous flooding issues as a result of development altering the natural hydrology and infiltration characteristics of the land. These resolved and ongoing issues are further elaborated upon in Section 5.0 and the interactive mapping tool accompanying this document.

The City of Roseville has policies and standards that require volume reduction and rate control for new and redevelopment. The City has also adopted a floodplain ordinance, and has adopted policies that regulate minimum building elevations that comply with Minnesota DNR recommendations for a 1' minimum freeboard between a structures lowest floor and the 100-yr flood level. Freeboard is the vertical distance above a certain level (often the 100-yr flood level) which provides a factor of safety to compensate for unknown factors such as ice jams or debris clogging culverts. The City has developed the flood protection and runoff management policies listed in Table 7 to support the flood protection and runoff management goals of this Plan.

Table 7
Goal 1 – Flood Protection and Runoff Management

Goal Statement: Provide flood protection to the maximum extent practicable for all residents and structures and to protect the integrity of our drainage and detention systems through runoff management.	
Policy No.	Goal 1: Flood Protection and Runoff Management – Policies ⁽¹⁾
1	The City shall require runoff rate control for land disturbing activities exceeding one-half acre or creating new impervious area of 5,000 square feet or more.
2	The City shall require volume reduction for development and redevelopment projects in accordance with watershed district rules and City standards.
3	For development and redevelopment projects affecting on-going issue areas (see ongoing issues on Figure 19), the City shall require developers to incorporate practices to resolve a proportionate share of the problem through a reduction based on existing runoff volumes.
4	The City shall require structure freeboard elevations in accordance with watershed district rules and City code (Section 1017.17) .
5	The City shall enforce its Floodplain regulations (City Code Chapter 1021) which are designed to minimize flood losses and requires no net loss of storage volume.
6	For newly constructed stormwater retention ponds, the City shall require an emergency overflow spillway to safely convey flows in excess of the 100-year (1% probability) event to the maximum extent practicable.
7	The City encourages reduction of, or minimizing increases in, the amount of impervious surface created as a result of land development or redevelopment activities through City Code, development review processes, and a stormwater utility fee.

8	The City shall cooperate and collaborate with adjacent municipalities and watershed districts to address intercommunity drainage issues.
9	The City shall seek to enhance or maintain existing drainage facilities in a sustainable manner taking into consideration available personnel and financial resources.

⁽¹⁾It is requested that Rice Creek Watershed district continues to implement its regulations and issue permits within the City.

4.2 Surface Water Protection

The City of Roseville seeks to maintain and improve the water quality in its lakes, ponds and wetlands. Water quality is often directly related to the water clarity (suspended solids) and level of available nutrients in a water body. While nutrients comprise only one category of substances that can affect water quality, nutrients (principally phosphorous) must be controlled to achieve the water quality goals of this Plan. Phosphorous is most often the limiting factor for plant growth, and increases in available phosphorous allow plant species to dominate the lakes, ponds and wetlands.

Many people do not realize that when organic materials, like leaves, grass clippings, fertilizer and pet waste, enter a waterbody, they can disrupt the ecosystem. Once in the water these organic materials decay, releasing phosphorus. Excess phosphorus increases algae growth, inhibiting the growth of other aquatic plants. When algae die and decay, they exert a biological oxygen demand on the lake, depleting available oxygen for fish and other aquatic species. Limiting nutrient loading to surface waters is one of the keys to maintaining and improving water quality.

There are several activities that can be followed to minimize the delivery of suspended solids and phosphorus into the City’s water bodies. These activities include better management of construction site erosion control measures, reducing the level of impervious cover, reducing the extent of managed lawn areas and replacing them with native vegetation, reducing bank erosion, and requiring more infiltration and volume control best management practices for storm water treatment. Residents can also do their part by keeping grass clippings, fertilizer and pet waste out of the streets where it has a direct route into the storm sewer systems and ultimately into lakes, ponds, and wetlands.

To reduce the impacts to shoreland and wetlands the City as adopted a Shoreland, Wetland, and Stormwater Management ordinance. The purpose of the ordinance is to control and guide future development within and surrounding those land areas which are contiguous to designated bodies of public water and areas of natural environmental significance. Any water resource on property to be developed will be subject to these management policies, as well as the rules and requirements of the Wetland Conservation Act, the City and the watershed management organizations.

Table 8
Goal 2 – Surface Water Protection

Goal Statement: Maintain or improve the water quality and ecological integrity of the City's lakes, ponds, and wetlands.	
Policy No.	Goal 2: Surface Water Protection - Policies
1	The City shall enforce the Erosion and Sediment Control ordinance (City Code Section 803.04) for all land disturbing activity greater than 10,000 square feet or adjacent to a water resource.
2	The City shall require stormwater treatment for land disturbing activities exceeding one-half acre or 5,000 square feet new impervious. The level of treatment provided shall comply with the infiltration/volume reduction standards or if infiltration is not feasible remove 90% of total suspended solids and 60% of total phosphorus.
3	The City shall enforce the Shoreland, Wetland, and Storm Water Management ordinance to regulate alterations of shorelands and wetlands and to maintain existing aquatic, vegetation and wildlife conditions to the maximum extent possible.
4	The City delegates administration of the Wetland Conservation Act (WCA) to the Watershed Districts which will act as the Local Government Units (LGUs) for enforcing the regulations of WCA. The City shall be informed of and provide informal review of all wetland impacts within the City.
5	The City shall cooperate and collaborate with the MPCA and local agencies in conducting and implementing TMDL projects for impaired waters within and downstream of the City.

4.3 Groundwater Protection

Unlike surface water resources, which can be managed within well defined and limited physical boundaries, groundwater is a natural resource feature of large geographic areas. For this reason, groundwater must be managed by a local government agency that has authority outside of the City's jurisdiction. In Ramsey County, the Ramsey Conservation District has been delegated the responsibility to write and administer the Ramsey County Groundwater Protection Plan. Because drinking water in the City is provided by the St. Paul Regional Water Service and the City does not own any public water supply wells, the City has not prepared a Wellhead Protection Plan.

Table 9
Goal 3 – Groundwater Protection

Goal Statement: Protect the quality and quantity of groundwater through collaboration with local and state agencies managing groundwater resources.	
Policy No.	Goal 3: Groundwater Protection – Policies
1	The City will follow the Minnesota Department of Health's (MDOH) guidance on evaluation of stormwater infiltration projects in vulnerable wellhead protection areas (WHPAs) and drinking water source management areas (DWSMAs) to determine if infiltration practices are appropriate.

2	The City acknowledges the potential for stormwater infiltration practices to mobilize soil contaminants and shall support alternate volume reduction practices in areas of known or suspected soil contamination.
3	The City will cooperate with Ramsey Conservation District to develop and revise land-use regulations as necessary in DWSMAs to protect drinking water and public health.
4	The City shall encourage Low Impact Development (LID) to minimize imperviousness and promote naturally occurring groundwater recharge.

4.4 Public Education and Outreach

Public involvement and outreach is a strategy and an effort that recognizes people want to be involved in decisions that affect any facet of their life. Public involvement creates opportunities for the residents and the general public to participate in the processes that impact them directly which often leads to more informed decision making. Public involvement also allows the City to reach residents that might be looking for educational information on water resources or opportunities to get involved in local improvement projects.

The City’s web site is an alternative medium to provide municipal information to both City residents and those people who live outside Roseville. An electronic version of this Plan is accessible on the City’s stormwater webpage. Because the Plan has such a wide audience, including engineers, planners, developers, citizens, scientists and educators; electronic access to the text and mapping creates a better understanding of the goals, policies and activities of this Plan, as well as links to previous studies and tools that will help to make better decisions on projects ranging from a development site plan to a backyard landscaping project.

The City will make an ongoing effort on both a City-wide and watershed level toward educating the public by distributing information to its residents on responsible practices they should employ to protect water resources throughout the City. The program can also educate residents on better land use practices such as the benefits of using phosphorus-free fertilizer and keeping grass clipping out of the streets. Educational information will also be provided regarding the proper use of a wide range of lawn chemicals and installing and maintaining rain water gardens.

Table 10
Goal 4 – Public Education and Outreach

Goal Statement: Promote stewardship and increase awareness of land and water resources through public education and outreach.	
Policy No.	Goal 4: Public Education and Outreach – Policies
1	The City will continue to implement an education and outreach program using a variety of media, including use of notices, mailings, local cable television, newsletters, articles in Roseville City News, web sites, workshops and/or presentations to inform the community about water resource issues.
2	The City will continue to conduct a public annual stormwater meeting as described in the City’s SWPPP for the MS4 NPDES permit.

3	The City shall make this Plan available to the residents of Roseville and general public through the City's stormwater webpage.
4	The City will use a public involvement process in water resource management decision-making (i.e., the Public Works, Environment, and Transportation Commission).
5	The City will make an ongoing effort on both a local and regional level by distributing information to residents on responsible practices to protect water resources such as alternative landscapes, phosphorus free fertilizer, aquatic plant management, proper use of a wide range of lawn chemicals and proper disposal of hazardous household materials etc.
6	The City will work with existing public and private resources to increase public participation in water resources management and disseminate information regarding each of the local watershed management organizations having jurisdiction within the City.
7	The City will cooperate with other organizations and consider establishment of model interpretative sites for public education.
8	The City will continue to educate elected officials on water resources management needs and issues.

4.5 Pollution Prevention and Maintenance

Housekeeping practices, such as removing leaves from streets and storm drains and limiting the use of phosphorus fertilizers, are examples of simple ways individuals (residents) and the City can prevent pollution and make improvements in water quality. Although suspended solids and nutrients are traditionally what come to mind regarding surface water quality pollutants, there are a number of other pollutants that harm surface waters and aquatic ecosystems. The following list summarizes additional water quality pollutants of concern to regional surface waters:

- **Chloride.** Chloride is a main component of most deicing products such as road salt. Once in the water, it is a conservative pollutant making it difficult to remove. It can be toxic to aquatic plants and organisms and can reduce or delay vertical mixing in lakes. Using properly calibrated equipment to apply deicing products is one of the ways City crews reduce the amount of chlorides applied to City streets.
- **Pathogens.** Pathogens are disease causing organisms such as Giardia and Cryptosporidium. They are difficult to identify and thus fecal coliform and *E. coli* bacteria are used to indicate the possible presence of pathogens. Sources are human, pet, livestock, and wildlife excrement.
- **Mercury.** Mercury is naturally occurring element which finds its way to surface waters primarily through atmospheric deposition. The primary regional source of atmospheric mercury is from burning coal. Once in the water, it is converted to methylmercury which bioaccumulates up the food chain and is a known neurotoxin which impacts the central nervous system. Several of the City's lakes are impaired for mercury resulting in fish consumption advisories.
- **Other heavy metals** (e.g. lead, zinc, copper and cadmium). Heavy metals are primarily found bound to suspended solids in stormwater and surface waters although they are also

present in dissolved forms. They can be toxic in certain concentrations to animals and humans.

- **Polycyclic aromatic hydrocarbons (PAHs).** PAHs are a class of chemicals that harm fish and, with prolonged exposure, pose a risk of cancer in humans. Common sources are coal-tar based sealcoat, petroleum products and oil. A current challenge for many cities, including Roseville, is how to cost-effectively remove sediments from stormwater ponds that have PAH levels that require disposal at a landfill.
- **Polychlorinated biphenyls (PCBs).** PCBs are a class of chemicals manufactured and commonly used from 1930 to 1979 in electrical and hydraulic products. They do not readily break down in the environment and bioaccumulate in organisms, fish, and ultimately humans who ingest the fish. The EPA and other organizations consider PCBs to be probable human carcinogens.
- **Perfluorochemicals (PFCs).** PFCs are a family of chemicals used to make products resist heat, oil, stains, grease, and water. Examples of PFCs are perfluorooctane sulfate (PFOS) and perfluorooctanoic acid (PFOA) which are extremely resistant to breakdown in the environment and bioaccumulate in animals and humans. In animal studies high concentrations of PFCs have been shown to have adverse health effects but the effects in humans are still unclear.
- **Endocrine disrupting compounds (EDCs).** EDCs are not a discrete class of chemicals but rather a chemical which mimics or blocks normal hormonal function in animals and humans (a process called endocrine disruption). In animals, exposure to EDCs has been associated with reduced reproductive success, reduced survival, altered sex typing, and developmental abnormalities. Potential EDCs include chemicals such as PCBs, polybrominated biphenyls (PBBs), bisphenol A (BPA), phthalates, and many others found in a range of products from pharmaceuticals and personal care products to pesticides.
- **Aquatic nuisance and invasive species.** Aquatic plants such as Eurasian Watermilfoil and Purple Loosestrife have become well established throughout certain areas of the Twin Cities Metropolitan area and can create significant impacts to wetland and water resources if not managed. In addition, aquatic animals such as the Zebra Mussel can create nuisance problems in area lakes and have the potential to significantly alter the character and quality of the resource. The following link provides a thorough overview of some of the more prevalent aquatic invasive species in the region:
www.invasivespeciesinfo.gov.

Many of the pollutants listed above are either already in the environment (e.g. PCBs, PFCs) or are found in many commonly used products (e.g. Chloride, PAHs, EDCs) and are difficult to remove from the aquatic environment once introduced with traditional treatment methods. To avoid potentially expensive remediation/treatment costs associated with many of these pollutants, the City will need to take a proactive approach with prevention/reduction through considerable educational efforts and public policies.

Examples of efforts the City has already made towards pollution prevention include reducing road salt usage and prohibiting the use of coal-tar based sealers. The City also has an illicit discharge ordinance which prohibits illicit discharge of non-stormwater into the storm sewer system and intentionally disposing of grass, leaves, dirt, or landscape material into a water resource, natural conveyance, or street/road/alley.

The City can work with contractors to limit the spread of invasive species is through implementing best practices for pumping equipment. For example, where pump systems are used in City water bodies for a pond clean out project or dewatering, the contractor should be aware of the potential presence of Zebra Mussels in the water bodies where they previously used the equipment and take the necessary steps to decontaminate their equipment.

Complementing pollution prevention is performing routine maintenance of existing stormwater treatment and drainage systems. As sediment builds up over time, it reduces the capacity of drainage systems and the pollutant removal capabilities of ponds by reducing dead storage volume (i.e., the volume below the outlet elevation). Sediment from erosion can also significantly reduce infiltration rates in basins or BMPs designed for volume control and/or groundwater recharge. Extending the life of these facilities involves source control and elimination of material that causes the problem, and maintenance of the systems on a regular basis. Better construction methods and maintenance efforts will control a major portion of the sediment at the source, and an effective street sweeping program will also have a positive impact.

Table 11
Goal 5 – Pollution Prevention and Maintenance

Goal Statement: Protect the quality of the City’s water resources through pollution prevention, good housekeeping practices, and routine maintenance.	
Policy No.	Goal 5: Pollution Prevention and Maintenance – Policies
1	The City encourages residents to take advantage of the free Ramsey County yard waste collection sites, Roseville Leaf Recycling Center or backyard composting to prevent these potential sources of TSS and nutrients from reaching the storm sewer system and downstream receiving water bodies.
2	The City encourages residents to properly dispose of household hazardous waste (cleaning products, automotive fluids, lawn and garden chemicals, ect.) at a Ramsey County collection site to prevent these potential sources of pollutants from reaching the storm sewer system and downstream receiving water bodies.
3	The City prohibits non-storm water discharges to the storm drainage system to the maximum extent practicable as described in the Section 803.03 (Storm Water Illicit Discharge and Connection) of the City Code .
4	The City shall conduct street sweeping at least three times a year. The first sweep shall be as soon as practical in the spring. Storm water sensitive areas are priority and swept first throughout the year.
5	The City prohibits the use of coal tar-based sealer on asphalt driveways and parking lots within the City to prevent Polycyclic Aromatic Hydrocarbons (PAHs) present in coal tar from contaminated stormwater runoff and downstream receiving water bodies (City Code Chapter 410).
6	Appropriate City staff shall have training and equipment available to deal with small spills of hazardous material on City property. All spills which cause pollution of the air, land, or water resources must be reported immediately to the State Duty Officer at 651.649.5451.

7	Appropriate City staff shall have training on best management practices for the application of road salt and de-icing materials and shall reduce the amount of chlorides to the maximum extent practicable. The City also encourages property owners to reduce salt usage and offers tips to cut salt usage on the City website.
8	The City limits phosphate application within the City and prohibits application during certain periods and on impervious surfaces. The fertilizer ordinance (City Code Chapter 408) also includes licensing requirements for commercial applicators.
9	The City shall annually inspect and clean all structural pollution control devices. A minimum of 20 percent of the MS4 outfalls, sediment basins and ponds are inspected annually on a rotating basis in accordance with its SWPPP. Cleaning, sediment and debris removal will be performed as necessary.
10	The City requires private storm water systems to be maintained in proper conditions consistent with the performance standards for which they were originally designed (City Code Section 1017.26 Subp. B.4). Clean up and removal of settled materials is required every five years.
11	The City will support state and watershed programs to limit the spread of invasive species and will encourage contractors to take the necessary actions to avoid the spread of invasive species.

4.6 Coordination and Collaboration

A successful surface water management program requires extensive coordination with the many regulatory agencies having jurisdiction in the City as well as close collaboration with the local watershed organizations and the developers proposing projects within the City. The best solutions are often found through combined efforts and from building on what others have learned from similar projects and/or similar management activities. Coordination and collaboration will be accomplished through a variety of methods including meetings and discussions with project partners and regulators on a project-specific basis; ongoing posting and updates of this plan on the City’s webpage; posting design standards and historical surface water studies and resources on the City’s webpage; and participating in organizational programs like the Public Works Forum and the Minnesota Cities Stormwater Coalition.

The three watershed management organizations (Capitol Region, Ramsey-Washington-Metro and Rice Creek) all have very active programs with a wealth of resources and staff to assist the City towards meeting the goals of this plan. The watersheds have funding programs that can assist the City with its municipal projects as well as residents on their individual projects.

The City will continue to collaborate with residents by providing an opportunity for residents to recycle yard waste and obtain compost and woodchips for landscape projects.

Table 12
Goal 6 – Coordination and Collaboration

Goal Statement: To simplify and streamline processes and draw upon the expertise and resources of other local, state, and federal agencies in water resources management efforts.	
Policy No.	Goal 6: Coordination and Collaboration – Policies
1	The City will endeavor to inform developers about Federal, State, and local stormwater management regulations including the NPDES requirements, watershed district rules, floodplain regulations, and WCA rules.
2	The City shall utilize educational materials and activities from watershed districts and other entities to deliver a consistent message regarding water resources and stewardship.
3	City staff will be encouraged to attend watershed district hosted education programs directed at municipal officials and staff.
4	The City shall seek opportunities to leverage limited available funding through project partnerships.
5	The City shall encourage landscaping practices that promote infiltration and promote existing programs that meet this goal such as the leaf recycling center, which includes compost and woodchips for property owners to use.

4.7 Sustainability

Sustainability means many things to many people. For some it is an opportunity, for others it is an obligation, and in many cases, it is an expectation of communities, businesses and citizens. The most basic definition of sustainability is “meeting our current needs without sacrificing the ability of future generations to meet their own needs.” In a very basic sense, this is accomplished by balancing environmental, economic, and social (quality of life)

considerations. A sustainable approach inherently achieves efficiencies that balance environmental, economic, and social demands.

An example of a sustainability policy the City has developed is the Complete Streets Policy. By integrating innovative and non-traditional design options and involving the local community and stakeholders, the policy permits flexibility in accommodating different modes of travel on existing streets to balance the needs of all corridor users. Complete street elements to be considered include: pathways, both on-road and off-road, crosswalks and crossings, stormwater drainage, trees and other landscaping options, lake widths, lighting, public transportation facilities, bicycle facilities, on-street parking, and environmental corridors and wildlife movement.

Another way the City of Roseville has incorporated sustainability is through the Parks and Recreation Renewal Program. The Parks Renewal program is a 3-year improvement program guided by the [Parks and Recreation System Master Plan](#) that allows community members to plan for the future of Roseville's Parks and Recreation System. This is done through neighborhood meetings and implementation of park projects throughout the City. The goals of the renewal program include recreation systems management, redevelopment and rehabilitation, space acquisition, trail and pathway connections, recreation programs and services, community facilities, and natural resources management.

As mentioned previously in this Plan, *sustainability* is a thread that is woven throughout the City's Comprehensive Plan, and this CSWMP is an integral component of the City's Comprehensive Plan. As in the Comprehensive Plan, this CSWMP will serve as a guide towards improving sustainability across all aspects of the City's surface water management program and activities. Sustainability represents an approach that strives to achieve the most efficient use of community resources. It is a complicated concept that includes many facets of City government and includes areas such as waste reduction, water conservation, and carbon-emission reduction.

Nature is a good example to follow as it works to reduce runoff volumes by infiltration, reduce soil loss through vegetation, enhance habitat, and reduce pollutants in storm runoff by infiltration and biological uptake. When we develop land, we change the natural system. Often, we increase both the peak runoff rate as well as the volume of runoff. The increase in both developed runoff rate and volume can be harmful to downstream channels, resulting in degradation. This degradation has effects on habitat as well as water quality by increasing sediment loads.

In addition to channel degradation, we also introduce new sediment loads and pollutants into the natural system through the development process. During construction, we can introduce new sediment loads by exposing previously vegetated soil. After development is completed, we often see a whole new set of pollutants in storm runoff.

One example of how during development sustainability could be incorporated into construction site practices would be to use woodchips as a construction site entrance instead of rock. The woodchips not only help to remove the sediment from construction vehicles, but may also be reused elsewhere onsite at a later stage of construction for final restoration. Furthermore, woodchips could be made on-site from clearing and grubbing operations, thus reducing the energy use and costs associated with transporting rock to and from the site. Another sustainable construction practice example is using trenchless technologies to reduce

the construction impacts to the ground surface thus reducing the area exposed to rainfall and the potential for sediment to enter surface waters in runoff.

The primary objectives of stormwater sustainability are to mitigate these changes to the natural system. The City goals and policies for sustainable stormwater management area listed in Table 13.

Table 13
Goal 7 – Sustainability

Goal Statement: Achieve the water quality and water resources needs of the City based on the foundation of efficient use of community resources. In this approach both capital costs and long-term operational costs will be considered as well as the overall costs of a given project towards protection and/or improvement of the City water resources.	
Policy No.	Goal 7: Sustainability – Policies
1	The City will use the recently completed Stormwater Reuse Guide (Metropolitan Council, Fall 2011) as a guide in considering water reuse on City projects.
2	The City will strive to incorporate construction, building, and landscape designs and practices that mimic natural systems, and infiltrate, retain, detain rainfall onsite, or can reduce excess flows into our sewers, streets, and waterways.
3	The City shall consider using trenchless technologies to reduce the impact on the ground surface and expose less disturbed area to erosion and runoff when appropriate.
4	The City shall consider tree trenches for stormwater treatment and encourage the installation of trees in boulevards and parking lots for stormwater management.
5	The City shall seek to collaborate efforts with the Parks Renewal Program and incorporate multi-use green space.
6	The City shall endeavor to incorporate pretreatment, treatment trains, and maintenance access for new and retrofit public stormwater treatment facility projects.

5.0 Issues Assessment

5.1 Resolved Issues & Past Project Examples

As discussed previously, this Plan builds on the previous Plans adopted by the City in 1990 and 2003. Each of those previous Plans contained an assessment of problem areas and called for implementation actions to address those issues. The following sections provide descriptions of past example projects and resolved issues. Figure 18 identifies the locations of the following examples.

5.1.1 Rosewood Neighborhood Drainage Improvements

The existing storm sewer system in the Rosewood neighborhood consists of a network of pipes that lead to a manhole at Draper Avenue and Midland Hills Road. From this manhole,

the storm water runoff flows through a dual pipe system west to Walsh Lake. The existing storm sewer system was built in the 1970's and additional build-out of the neighborhood, which included the filling of wetlands, resulted in an under-sized storm sewer system for today's conditions.

The pipe configuration at Draper Avenue and Midland Hills Road creates a bottleneck on the system, which causes localized street flooding. The streets in this neighborhood are in good condition; upsizing the entire storm sewer system wouldn't have been a cost-effective manner in which to improve the drainage conditions, as it would have required significant pavement removal and excavation. In addition to costs, upsizing the pipe would increase flow rates into Walsh Lake. Since the outlet of Walsh Lake is controlled by a lift station, increased flow to Walsh Lake could cause significant problems downstream and localized flooding



Rain garden being constructed in Rosewood Neighborhood

Instead, the City of Roseville installed 19 neighborhood raingardens in the Walsh Lake area to encourage infiltration of stormwater runoff and alleviate frequent local flooding problems. Additionally, a large underground storage/infiltration device was installed and Rosewood Wetland was expanded to provide additional stormwater storage and treatment capacity in this area. Creating additional storage possibilities throughout the existing storm sewer system alleviated the stress on the existing system; reduced the threat of flooding, while also improving water quality. By creating additional storage to reduce the risk of flooding, street flooding has also been reduced.

5.1.2 Aladdin Street Bioinfiltration Basin Retrofit Installation

A long urbanized area along Aladdin Street in Roseville drains to a wetland which is hydraulically connected to Lake Owasso. To provide water quality treatment for this area, the Grass Lake Watershed Management Organization, in cooperation with the Ramsey Conservation District and City of Roseville, installed a bioinfiltration basin with funding provided by the Clean Water Land & Legacy Amendment Fund.



Aladdin Street Bioinfiltration Basin Retrofit (Source: Ramsey Conservation District)

5.1.3 Arona Pond Reconstruction

Arona pond is located within the Applewood Pointe redevelopment area. Prior to development, this pond was a landlocked basin. For years, the normal water level of the pond was governed by infiltration. As the surrounding area developed, the basin became a part of the storm water system. An outlet was installed around 1979 that enabled the basin to pass runoff from extreme events. Approximately 112 acres contribute runoff to Arona Pond. Over the years, the sandy bottom of this pond became sealed with sediment, eliminating the infiltration capacity of the basin. This resulted in localized flooding of the surrounding properties.

As a part of the Applewood Pointe redevelopment project in 2003, the City reconstructed this pond. The reconstruction project nearly doubled the capacity of the basin. Years of sediment

accumulation was excavated, restoring the infiltration capacity that had been sealed. In addition, a lift station was constructed to provide a secondary outlet for extreme events. The new pond serves as a regional storm water treatment facility for the subwatershed.

5.1.4 South Owasso Boulevard

As a part of the 2006 South Owasso Boulevard Reconstruction project, the City constructed the improvements for the storm water runoff being discharged into Ladyslipper Park. Between Rice Street and Western Avenue, approximately 160 acres of single family residential property drain into Lake Owasso through a drainage ditch that cuts through Ladyslipper Park in a north south direction. This ditch was constructed in 1971 as a canoe access to Lake Owasso. In the 1991 Lake Owasso Survey report, it was determined that the removal efficiency of this system is very limited. Only 30 to 50% of suspended solids and 9% of the total phosphorus were removed before being discharged into Lake Owasso.

In 2005, the City constructed a two cell pond system north of the road as well as three wetland/ biofiltration basins south of the road. These basins increased the TSS removal to 81% and Phosphorus removal to 52%. This is a significant improvement to this subwatershed area.

5.1.5 William Street Pond



In 2011, a retrofit project on the William Street Pond was completed in partnership with CRWD. The project featured sediment removal, a new baffle device and pond inlet pipe, and two iron-enhanced sand filtration benches. The iron-enhanced sand filtration benches provide for removal of dissolved phosphorus (a fraction of the total phosphorus not removed through sedimentation). The benches, which consist of sand mixed with iron filings, remove the dissolved phosphorus via surface sorption to oxidized iron.

5.1.6 Lake McCarrons Alum Treatment

In October 2004, an aluminum sulfate (alum) treatment was applied to Lake McCarrons in order to improve the poor lake water clarity caused by excessive nutrients available for algae growth. The alum bonds with phosphorus present in the water which forms a non-toxic, white floc which descends to the bottom of the lake. The floc remains chemically stable and keeps the phosphorus unavailable for algae overgrowth. The floc also creates a chemical barrier to phosphorus adhered to the sediment at the bottom of the lake.

5.1.7 Villa Park Wetland Restoration

The Villa Park Wetland System is a constructed wetland located upstream of Lake McCarrons to provide stormwater treatment. Water quality monitoring and data analyses completed for CRWD suggests that the wetlands have become a source of dissolved phosphorus to Lake McCarrons and the sediment removal efficiency of the system has significantly decreased over the past couple decades. Engineering design reports and plans

were recently completed in 2012 to restore the Villa Park Wetland System by removing accumulated sediment and the project is scheduled to be completed in 2013.

5.1.8 Gottfried's Pit Pump

The City of Roseville cooperated on a study of downstream flooding and water quality issues with CRWD, Falcon Heights, the City of St. Paul, and Ramsey County in 2003 for the northwestern watershed area to Como Lake. Roseville drains 315 acres to this system. Just east of Gottfried's Pit is a low point in local topography near the intersection of Larpenteur Avenue and Fernwood Avenue which is prone to frequent flooding. Solutions to mitigate the flooding issue on Larpenteur involved increasing the volume stored within Gottfried's Pit countered by a pump upgrade for a faster draw-down time and closing the valve located in the pipe connecting the Ramsey County storm sewer trunk to the lift station.

5.2 Ongoing Issues

While the previous section provided just a few of the many project examples and accomplishments the City has made in the 20 plus years since completing its first surface water management plan, there is also more work ahead. Many of the flooding issues of the past have been addressed, but some remain. New water quality issues and concerns are emerging each year, requiring varying levels of effort by the city to address. And, the ongoing maintenance and operation of the storm water system has grown much more complex over the years due to new regulations and a better understanding of what is necessary to keep the treatment ponds and filtration systems functioning properly.

An example of one of these complex issues is the management of contaminated stormwater sediment dredged from stormwater ponds. This section of the plan provides an overview of some of the more significant of these ongoing issues that will require substantial efforts and resource commitments. Location specific issues such as localized flooding issues and ongoing impairments are identified in Figure 19.

5.2.1 Localized Flooding Issues

While many of the known flooding areas have been addressed by infrastructure improvements over the past 20 years, some remain and are identified in the implementation section of the plan. Unfortunately, the very nature of storm water management means that at some point new issues will likely present themselves due to the plugging of a storm system from debris, for example, or simply a larger or more intense rainfall event than the City has previously experienced. The flooding in Duluth, Minnesota in June 2012 is a notable example of how a storm larger than anticipated can create problems where none were anticipated in the past and will require extensive repair and restoration work for months to years. Specific known local flooding issues are presented below in Table 14.

Table 14
Localized Flooding Issues

Location	Issue	Implementation Item(s)
I-35W and Co.Rd. C corridor	Chronic flooding at the low point of Cleveland Avenue and Long Lake Pond	1
Walsh Lake	The lake utilizes a lift station to control the bounce and high water level. The upstream Rosewood neighborhood is prone to flooding.	2

1800-block of Skillman Avenue west of Fairview Avenue	Skillman Ave. storm sewer capacity and Fairview trunk storm sewer surcharge and backflow.	3
1200-block of W. Sherren Street	Chronic flooding occurs along the 1200-block of W Sherren St., known capacity issues within the Fernwood-Lexington trunk storm sewer system.	4
Larpentuer Avenue	The intersection of Larpenteur Avenue and Fernwood Avenue is prone to frequent flooding.	5
Cohansey Boulevard	Cohansey Boulevard adjacent to the Villa Park Wetland System has experienced flooding during extreme events.	6

5.2.2 Water Quality Impairments

Earlier sections of this plan presented the current known and confirmed impairments to waters within the City. The plan also discussed a few of the emerging water quality issues that have the potential to significantly alter the quality and characteristics of water resources. Much like some localized flooding issues that won't be identified until the next big rainfall, new water quality issues may not be known for years to come. Researchers throughout the country are identifying new issues on a regular basis and regulators and policy makers are developing requirements and guidance to manage these new pollutants. The City's plan is to focus resources on the pollutants that they can best address, such as total suspended solids and total phosphorus and at the same time recognize that new issues may arise that requires adjustment to the current approach.

5.2.3 Operation and Maintenance

With more than 140 public storm water treatment systems (ponds, infiltration basins, etc.), more than 120 miles of storm pipe and an extensive road system on which to complete street sweeping and deicing, the overall stormwater system operation and maintenance needs of the City is significant. In fact, the resources needed to maintain the system will likely grow due to more treatment devices being installed each year and the need to conduct maintenance on those that have been in service for 20 years or more.

One of the most challenging ongoing maintenance needs will be the pond cleanout work that relates to requirements of the NPDES MS4 Permit Program. The MPCA recently published [Managing Stormwater Sediment Best Management Practice Guidance for Municipalities](#) (June 2012) and describes when the dredged sediment can be used as unregulated clean fill and when it is considered regulated solid waste. The cost difference can be significant depending on the levels of contaminants of concern found in tested sediment samples.

5.2.4 Education, Outreach and Collaboration

Managing storm water is no longer just the responsibility of the City. A coordinated approach with residents, local interest groups, developers, City and watershed staff, and elected officials is needed in order to achieve local water quality improvements and meet the goals of this plan. The City is required to complete public education efforts as part of its NPDES MS4 Permit Program. The City has also conducted and supported a number of educational programs such as rain water garden workshops that help residents contribute to community efforts. These efforts will continue to be critical towards improving management of grass

clippings, fertilizers, chemicals and yard waste. The efforts will help to reduce the chances of a residential backyard grading project that might change the flow of storm water, and they will help inform the public of fish consumption advisories on area lakes and invasive species issues.

6.0 Implementation Program and Funding

The Implementation Program intended to provide guidance in carrying out the Plan goals and objectives. The Implementation Program and funding section summarizes capital improvement projects, studies and ongoing maintenance, inspection, monitoring and other management activities. This Plan is intended to serve the City for at least the next ten years and many of the program activities will continue at least out to the year 2030.

Except for the activities that are taken from the City NPDES SWPPP, the Implementation Program is not a hard and fast commitment to complete each and every activity in the time frame suggested. Rather, it is a suggested course of action that will help to accomplish the major goals of this plan.

Table 15 (at the end of this section) summarizes the activities and efforts of the overall implementation program. Information in the table is not the entire body of work the City conducts or will do in the area of storm water management. Rather, the table provides a summary of the some of the key efforts needed to help achieve the goals of this Plan. Estimated planning-level costs of recommended actions are provided with a cautionary note that they are not intended to set unrealistic expectations of the actual costs of projects and/or activities. The costs provided are intended to serve as an order-of-magnitude look at what the activity may require.

Paying for water management projects and administrative activities has become more complex in recent years. In addition, public improvement and private development projects are seeing a higher percentage of their planning and construction budget being needed for water resources and environmental protection efforts. In the past, special assessments against benefited properties financed most of the necessary improvements. However, the financial options have broadened considerably. The question is which method or methods best suit the needs of the City. The major categories of funding sources are: Ad Valorem Taxes; Special Assessments; Storm Water Utility; and Grants, as summarized below.

- *Ad Valorem Tax.* General taxation is the most common revenue source used to finance government services, including minor maintenance measures for drainage and water quality facilities. Using property tax has the effect of spreading the cost over the entire tax base of a community. A special tax district can also be used to raise revenue. The special tax district is similar to the administrative structure under general taxation except that all or part of the community may be placed in the tax district. The principle is to better correlate improvement costs to benefited or contributing properties.
- *Special Assessments.* Municipalities are familiar with the use of special assessments to finance special services from maintenance to construction of capital improvements. The assessments are levied against properties benefiting from the special services. The philosophy of this method is that the benefited properties pay in relation to benefits received. The benefit is the increase in the market value of the properties.
- *Trunk Storm Sewer/Development Fees.* Fees charged to new development that generates runoff can be charged to finance infrastructure needed to serve the development. This is a useful tool in communities that are rapidly developing.

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- *Storm Utility Fee.* A utility is a service charge or fee based on usage, similar to the fees charged for sanitary sewer or potable water supply. The fee is typically charged against improved parcels based on the concept of contributors (or users) pay. The rate structure is based on the land use type, density, and parcel size to reflect the typical runoff contributed by a given parcel. In some cases parcels may be eligible for a credit to reduce their fee.
 - *Grants.* State grants are available for surface water management and non-point source pollution. However, it is generally not a good financial practice to rely on grants for a service program. This source of revenue is not dependable and requires constant speculation as to its availability. Grants are useful but should only be used to supplement a planned local revenue source. Some of the agencies and programs that may have available grant funds include:
 - Environmental Protection Agency
 - Watershed Districts
 - U. S. Fish and Wildlife Service
 - Minnesota Department of Natural Resources
 - Metropolitan Council
 - Ramsey Conservation District
 - Minnesota Board of Water and Soil Resources
 - Minnesota Pollution Control Agency

The City currently has a storm drainage utility fee in place which funds storm water management related costs such as educational programs, construction of treatment systems and maintenance of the overall storm water treatment and conveyance systems (storm sewer maintenance and street sweeping). Using a combination of all available funding sources will be continued in order to fund surface water management activities within Roseville. The charges and fees will be reviewed and adjusted annually to ensure adequate funding for the activities set forth in this plan and those required by law.

Table 15
Implementation Plan

Item	Applicable Goal	Activity/Project	Schedule (Priority)	Location	Estimated Cost
1	Flood Protection and Runoff Management	Expand the drainage analysis of the I-35W corridor at Co. Rd. C and evaluate options for upstream storage/volume reduction potential to alleviate flooding at Cleveland Avenue and the ponds at the highway ramps.	2014	35W-3	\$\$
2	Flood Protection and Runoff Management	Investigate alternatives for the Walsh Lake outlet and/or explore opportunities to provide upstream volume control at the Midland Hills golf course.	2015	WL-6	\$\$\$
3	Flood Protection and Runoff Management	Construct storage capacity within the Fairview Avenue trunk storm sewer drainage area to alleviate flooding at the Trunk Highway 36 low point and provide system –wide surcharge relief.	Ongoing	OP-1	\$\$\$\$
4	Flood Protection and Runoff Management	Construct an alternative drainage outlet for the Dellwood/Sherren neighborhood to the Highway 36 ditch system and/or provide additional storage capacity/volume reduction upstream in the Willow Pond drainage area to provide surcharge relief.	2013	WP-1	\$\$\$
5	Flood Protection and Runoff Management	Investigate opportunities to provide upstream storage/volume reduction in the drainage area to Gottfried’s Pit to alleviate flooding at Larpentuer Ave.		GP-1	
6	Coordination and Collaboration	Collaborate with CRWD on improvements for the Villa Park sub-watershed involving sediment removal and restoring/enhancing storage capacity. Investigate opportunities to implement sediment BMPs within the upstream watershed.	2013	ML-9	\$\$\$\$
7	Coordination and Collaboration	Collaborate with the City of Maplewood, Ramsey County, and CRWD to resolve storm sewer capacity issues at Center Street which discharges into the Trout Brook Interceptor storm system.	2014	TB-2	\$\$\$
8	Coordination and Collaboration	Explore with RCWD, and Ramsey County the potential to incorporate BMPs in the Rosedale Mall site to reduce flooding and improve water quality.	2016	OP-1	\$\$\$\$
9	Surface Water Protection	Track load reductions of BMPs in watersheds of impaired waters as a condition of the requirements for the MS4 NPDES (draft 2012) permit and TMDLs.	Ongoing	Citywide	\$

10	Public Education and Outreach	Collaborate with Parks and Recreation to create a stormwater exhibit at the Harriet Alexander Nature Center to educate visitors on the impacts non-point sources have on water quality and wildlife.	2014	LO-8	\$
11	Pollution Prevention and Maintenance	Monitor sedimentation in city storm water ponds. Implement a pond cleanout and dredging program to restore design capacity.	2014	Citywide	\$\$\$\$
12	Public Education and Outreach	Develop education for property owners on how to manage snow removal to minimized water quality and quantity concerns.	2014	NA	\$
13	Public Education and Outreach	Investigate the potential for developing an electronic public photo database of unique features/BMPs and before & after examples of City water resource projects.	2015	NA	\$
14	Pollution Prevention and Maintenance	Develop Standard Operating Procedure (SOP) documents in compliance with requirements of the (draft 2012) MS4 NPDES permit.	2013	NA	\$
15	Surface Water Protection	Review and update as necessary the City's design standards for water quality treatment, rate control and volume reduction. Update the design standards for design events when the NWS publishes updated rainfall frequency estimates.	2014	NA	\$
16	Public Education and Outreach	Investigate opportunities to collaborate on developing unique public education opportunities such as a stormwater geocache.	2015	NA	\$
17	Sustainability	Incorporate water resources elements of the Complete Streets Policy into city projects.	Ongoing	NA	\$
18	Coordination and Collaboration	Collaborate with the Parks and Recreation Commission to incorporate stormwater BMPs, above and beyond required levels, concurrent with the parks renewal program while maintaining active park space.	2013-2015	Citywide	\$\$\$\$
19	Coordination and Collaboration	Investigate and seek opportunities to partner with WDs, RCD, and local entities (e.g., religious groups, schools, and service clubs) on water quality improvement projects.	Ongoing	Citywide	\$
20	Sustainability	Monitor the Twin Lakes water reuse system and develop a water reuse policy.	Ongoing	NA	\$
21	Flood Protection and Runoff Management	Conduct analysis to identify vulnerable areas where 100-yr flood protection is not possible and prepare emergency response plan.	2012	Citywide	\$\$

22	Public Education and Outreach	Expand the City's website to include this plan, identify citizen involvement opportunities, and provide additional storm water management resources.	2013	NA	\$
23	Public Education and Outreach	Explore an annual City Council recognition program for environmental projects completed in the City.	2014	NA	\$
24	Groundwater Protection	Explore the potential for a policy regarding monitoring requirements of underground storage and infiltration BMPs treating large commercial/industrial areas.	2016	NA	\$
25	Coordination and Collaboration	Explore requirements to transfer the LGU authority for administering the WCA to the Watershed Districts having jurisdiction in the City.	2014	NA	\$
26	Surface Water Protection	Effectively update Shoreland, Wetland, and Stormwater Management ordinance to meet the goals of the CSWMP	2013	NA	\$
27	Surface Water Protection	Establish ordinary high water or boundaries for all waterbodies within the City for purposes of effectively implementing the Shoreland, Wetland, and Stormwater Management ordinance.	2013	NA	\$\$
28	Pollution Prevention and Maintenance	Develop a private BMP agreement and incorporate into City asset management system for tracking.	2013	NA	\$
29	Flood Protection and Runoff Management	Develop a stormwater utility fee credit.	2013	NA	\$

Notes: \$ = Less than \$5000
 \$\$ = less than \$50,000
 \$\$\$ = less than \$250,000
 \$\$\$\$ = greater than \$250,000

7.0 Plan Adoption and Amendments

7.1 Formal Plan Review and Adoption

Minnesota Statute 103B.235, Subd. 3 (italics below) describe the required formal review process for local water management plans.

*Subd. 3. **Review.** After consideration but before adoption by the governing body, each local unit shall submit its water management plan to the watershed management organization for review for consistency with the watershed plan adopted pursuant to section 103B.231. If the county or counties having territory within the local unit have a state-approved and locally adopted groundwater plan, the local unit shall submit its plan to the county or counties for review. The county or counties have 45 days to review and comment on the plan. The organization shall approve or disapprove the local plan or parts of the plan. The organization shall have 60 days to complete its review; provided, however, that the watershed management organization shall, as part of its review, take into account the comments submitted to it by the Metropolitan Council pursuant to subdivision 3a. If the organization fails to complete its review within the prescribed period, the local plan shall be deemed approved unless an extension is agreed to by the local unit.*

*Subd. 3a. **Review by Metropolitan Council.** Concurrently with its submission of its local water management plan to the watershed management organization as provided in subdivision 3, each local unit of government shall submit its water management plan to the Metropolitan Council for review and comment by the council. The council shall have 45 days to review and comment upon the local plan or parts of the plan with respect to consistency with the council's comprehensive development guide for the metropolitan area. The council's 45-day review period shall run concurrently with the 60-day review period by the watershed management organization provided in subdivision 3. The Metropolitan Council shall submit its comments to the watershed management organization and shall send a copy of its comments to the local government unit. If the Metropolitan Council fails to complete its review and make comments to the watershed management organization within the 45-day period, the watershed management organization shall complete its review as provided in subdivision 3.*

The following organizations will receive Agency Review Drafts of this plan for the formal review and comment:

- Rice Creek Watershed District (60-day review period)
- Capitol Region Watershed District (60-day review period)
- Ramsey-Washington Metro Watershed District (60-day review period)
- Ramsey County (45-day review period)
- Metropolitan Council (45-day review period)

After the City receives formal comments on the Agency Review Draft, the City's consultant will make necessary revisions to the plan to receive agency approval. Upon approval of the plan the City Council must formally consider and adopt the Final Plan through a Council Action.

7.2 Amendment Process

The Comprehensive Surface Water Management Plan is intended to extend approximately through the year 2022. In conjunction with this Plan, the NPDES SWPPP activities will be reviewed and evaluated annually in a public meeting and the permit program itself will be

updated as required by the MPCA NPDES permit program. For this plan to remain dynamic, an avenue must be available to implement new information, ideas, methods, standards, management practices, and any other changes which may affect the intent and/or results of this Plan. Amendment proposals can be requested at any time by any person or persons either residing or having business within the City.

7.2.1 Request for Amendments

Any individual can complete a written request for a Plan amendment and submit the request to City staff. The request shall outline the specific items or sections of the Plan requested to be amended, describe the basis and need for the amendment and explain the desired result of the amendment towards improving the management of surface water within the City. Following the initial request, staff may request that additional materials be submitted in order for staff to make a fully-informed decision on the request.

The City may also initiate an amendment to respond to amendment to a local watershed organization plan or following the completion and approval of a TMDL implementation plan.

7.2.2 Staff Review

Following a request for Plan amendments, staff will make a decision as to the completeness and validity of the request. If additional information is needed by staff to determine the validity of the request, staff will generally respond to the requestor within 30-60 days of receiving the request.

Following receipt of sufficient information such that validity of the request can be evaluated, there are three options which are described below:

- a. Reject the amendment. Staff will reject the amendment if the request reduces, or has the potential to reduce, the Plan's ability to achieve the goals and policies of the Plan, or will result in the Plan no longer being consistent with one or more of the watershed district's plans.
- b. Accept the amendment as a minor issue, with minor issues collectively added to the plan at a later date. These changes will generally be clarifications of plan provisions or to incorporate new information available after the adoption of the 2012 Plan. Minor changes will generally be evaluated on the potential of the request to help staff better implement and achieve the goals and policies the Plan. Minor issues will not result in formal amendments but will be tracked and incorporated formally into the Plan at the time any major changes are approved.
- c. Accept the amendment as a major issue, with major issues requiring an immediate amendment. In acting on an amendment request, staff should recommend to the City council whether or not a public hearing is warranted. In general, any requests for changes to the goals and policies or the development standards established in the Plan will be considered major amendments.

Staff will make every attempt to respond to the request within 30-60 days of receiving sufficient information from the requestor. The timeframe will allow staff to evaluate the request internally and gather input from the WD/WMOs and other technical resources, as needed. The response will describe the staff recommendation and which of the three categories the request falls into. The response will also outline the schedule for actions, if actions are needed to complete the requested amendment.

7.2.3 Watershed District Approval

All proposed major amendments must be reviewed and approved by the appropriate Watershed Districts prior to final adoption of the amendments. Major amendments would include changes to the goals and policies of the Plan. Staff will review the proposed amendments with the WDs to determine if the change is a major amendment and if determined to be major amendment, then will assess the ability of the requested amendment to maintain consistency with WD plans.

7.2.4 Council Consideration

Major amendments and the need for a public hearing will be determined by staff and if identified as a major amendment, the request will be considered at a regular or special Council meeting. Staff recommendations will be considered before decisions on appropriate action(s) are made. The requestor will be given an opportunity to present the basis for, and intended outcomes of, the request at the public hearing and will be notified of the dates of all official actions relating to the request.

7.2.5 Public Hearing and Council Action

The initiation of a public hearing will allow for public input or input based on public interest in the requested amendment. Council, with staff recommendations, will determine when the public hearing should occur in the process. Consistent with other formal Council actions and based on the public hearing, Council would adopt the amendment(s), deny the amendment(s) or take other action.

7.2.6 Council Adoption

Final action on any major amendments, following approval by the Watershed Districts, is Council adoption. Prior to the adoption, an additional public hearing may be held to review the Plan changes and notify the appropriate stakeholders.