City of Osseo

Stormwater Management Plan

April 2015

2015 Stormwater Management Plan

City of Osseo, MN

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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EXECUTIVE SUMMARY

The City of Osseo's 2015 Storm Water Management Plan (Plan) was prepared, in part, as an update to the City's previous Storm Water Management Plan (2008). The intent of this revised Plan is adoption in conjunction with the Shingle Creek and West Mississippi (SCWM) Watershed Management Commission (WMC) Third Generation Watershed Management Plan and accompanying Rules, as amended, to meet the requirements of the SCWM WMC regulations as well as applicable regulations specific to the State of Minnesota, Minnesota Statutes 103B and Minnesota Rule 8410, and the Metropolitan Council for local water plans. The City of Osseo (City) will reference the SCWM Watershed Management Plan (2013) requirements herein and will utilize this Plan, Rules, existing and new ordinances as the basis for managing wetlands, surface, storm, flood, and groundwater within the municipal boundary.

The Plan has been prepared with cooperation of Shingle Creek and West Mississippi Watershed staff, the City of Osseo Staff, and the Osseo City Council to address the concern for the City's wetlands, surface, storm, flood, and groundwater impacts resulting from continued redevelopment in and adjacent to the City of Osseo. For matters related to protection, preservation, use, and regulation of surface and groundwater resources, the City of Osseo has designated the Shingle Creek and West Mississippi Watershed Commissions as the Local Government Unit (LGU) for the Wetland Conservation Act (WCA).

This Plan addresses various methods of ensuring that continued growth through redevelopment does not adversely affect the City's natural resources as well as the existing storm sewer and open channel. In addition, this Plan includes a review of the surface water related costs associated with continued development in the City. It identifies a basis and a methodology for storm sewer infrastructure related charges associated with the corresponding development and provides a framework for managing the City's natural resources in relation to continued redevelopment. Given this information, the findings and goals of this Plan are summarized as follows:

- The majority of the existing storm sewer serving the developed portion of the City is adequately sized to accommodate the design storm runoff from the existing service area given current land use data.

- The existing natural resources within the City must be preserved while accommodating future redevelopment.

- This Plan is a document-in-progress and will be amended as required. As redevelopment occurs within the City, the hydrologic model will be reviewed and modified to account for the differences between the actual and modeled hydrologic conditions.

- The goal of this Plan is to provide and compile information relative to the current surface water planning needs, to protect the natural resources within the municipal boundary, and to some extent propose and predict sustainable methods of accommodating continued growth through

redevelopment. This Plan will also ensure that future redevelopment is in compliance with the associated Rules, for the management of urban stormwater and protection of natural resources.

Chapter 1

Introduction

1.1 INTRODUCTION

The Shingle Creek and West Mississippi Watershed Management Commissions (SCWMWMC) were formed in 1984 using Joint Powers Agreements developed under authority conferred to the member communities by Minnesota Statutes 471.59 and 103B.201 through 103B.251. The watersheds are located in the northwest portion of the Minneapolis-St. Paul seven county metropolitan area. The Commissions' purpose is to preserve and use natural water storage and retention in the Shingle Creek and West Mississippi watersheds to meet Surface Water Management Act goals. Because many of the communities that are members of the Shingle Creek WMO (watershed management organization) are also members of the West Mississippi WMO, the Commissions often work jointly on issues of interest to both and have adopted similar standards.

The City of Osseo is wholly within the Shingle Creek and West Mississippi watershed. Both the City limits and watershed boundaries are illustrated in Figure No. 1 in the Appendix.

The Commissions adopted the Third Generation Management Plan in 2013. This Third Generation Plan describes how the SCWMWMC will address activities in the two watersheds over the period 2013-2022.

The 1982 Minnesota Legislature adopted the "Metropolitan Surface Water Management Act" mandating that all watersheds within the seven county metropolitan area be governed by watershed management organizations. Subsequently amended several times, the Act requires that these organizations prepare and adopt management plans. After adoption of a watershed management plan, local government units are required to prepare a local water management plan, capital improvement program, and necessary official controls to bring local water management into conformance with the watershed management plan.

This Plan, in conjunction with the SCWM WMO Comprehensive Water Resource Management Plan satisfies the requirements of MN Statute 103B.231-Surface Water Planning and MN Rule-8410.0100 to 8410.0180 – Local Water Management.

The overall purpose of this plan is to protect, preserve, and manage surface and groundwater systems within the City. This Plan outlines sustainable and equitable means to effectively reach this goal. This Plan provides goals, policies, guidance, and specific standards for decision-makers, residents, landowners, and City personnel.

The Osseo Stormwater Management Plan (SWMP) is a comprehensive guide for the implementation of city wide surface water management strategies. Osseo is situated within two watersheds and must follow the requirements of both the Shingle Creek Watershed Management Plan and the West Mississippi Watershed Management Plan. This Plan is not a "stand-alone" document and should only be utilized in conjunction with the SCWM WMO Comprehensive Water Resource Management Plan.

These requirements have been grouped into the following eight categories:

- Storm water quantity and quality management

- Floodplain management
- Shoreland management
- Water quality monitoring
- Erosion and sedimentation control
- Wetland management
- Groundwater protection and recharge
- Improve public information and education

This plan reviews the existing storm water management system in Osseo and the current system of local controls, and determines where modifications are necessary to provide compliance with the requirements of the two watershed plans. It begins with an introduction to the physical environment of Osseo and establishes a context for the plan by listing the goals and policies upon which the plan is based. These goals and policies are guided by appropriate engineering and planning principles, Best Management Practices (BMP) to emphasize the protection of existing resources, and identification and correction of problem situations. The applicable BMPs are below:

- The control of urban non-point source pollutants.
- Site planning principles for the control of erosion, pollution, and sedimentation
- Storm water management practices for the control of water quality.

Following this introductory chapter is an inventory of the existing storm drainage system detailing system shortcomings and identifying strategies for corrective actions. The third chapter of this plan reviews each of the eight management areas identified above and describes how Osseo's policies and local controls are in compliance with the requirements, or alternatively, how Osseo intends to come into compliance. Finally, the fourth chapter sets forth a specific implementation plan.

The City of Osseo (City) will be assuming regulatory authority for development while recognizing the role of other local, state, and federal entities. Several entities will have administrative responsibilities within the planning area. For a local water management effort to be successful, each entity's commitment and role must be clearly understood. The agencies currently having some level of administration responsibility include the City, Shingle Creek / West Mississippi (WMO), Hennepin County, Minnesota Department of Natural Resources (Mn/DNR), Minnesota Pollution Control Agency (MPCA), the U.S. Army Corps of Engineers (USACE), and the Board of Water and Soil Resources (BWSR). It has been recognized that regulatory agencies can achieve common goals by joining together to combine already scarce financial and regulatory resources.

Intergovernmental cooperation is an excellent tool to address natural resource protection. This is due to the fact that natural resources do not recognize political boundaries and are often located across local, state, and federal regulatory boundaries. The City is ultimately responsible for planning, permitting, construction, maintenance, and other projects related to the City's surface water and ground water

infrastructure and will work in conjunction with all state and federal agencies to achieve its goal of sound resource management. The City looks forward to cooperating with intergovernmental agencies in the future if the need should arise.

A key opportunity for the City to implement this plan is through the development/redevelopment review process. Surface water management elements will be reviewed through this process, ensuring that these elements will meet the requirements of existing City Ordinance, design standards of this plan, and the associated Rules. For projects that meet the watershed commissions' mandatory review threshold, the commission(s) will be given opportunity to review the project for conformance with its standards. The City would then complete its development review process with the recommendations of the commission(s).

To ensure conformance to this Plan and the associated Rules, the City's preliminary process and site plan approval will require more detailed information with redevelopment. Erosion control, water quality, and other pertinent information such as stormwater rate and volume control, regarding local plan standards are among the elements that will be addressed on preliminary and final plans. Conditional approvals by the Planning Commission and/or City Council must require the incorporation of conditional elements into the final plan to ensure compliance.

The revised plan will then be re-distributed to City staff to confirm the inclusion of the provisions under which the plans were approved. The Building Permit issuance process can be the check-point for staff to review final plans for compliance with this Plan and associated Rules while holding the condition of building permit issuance as the incentive. Engineering staff will have a sign-off procedure prior to permit issuance.

The City's administrative responsibilities include, but are not limited to the following:

- Comprehensive Plan update(s)
- Land use regulation
- Ordinance review and amendment
- Local plat review and amendments
- Permits
- Sediment and erosion control (Ordinance)
- Groundwater protection
- Participation and cooperation with the programs of the Shingle Creek West Mississippi WMO, Minnesota DNR, and Hennepin County
- Hydrologic model development and update with comprehensive plan changes
- Financing Alternatives
- Capital improvements

- Conveyance system maintenance

Shingle Creek / West Mississippi WMO responsibilities and authorities may include but are not limited to the following:

- Monitoring
- Establishing land use or Ordinance requirements
- Local plan review and approval
- Administering a project review program
- Projects of regional significance
- Verification of Plan implementation
- Administration of the Wetland Conservation Act

Metropolitan Council: Comprehensive Plan Amendment
Metropolitan Council has a regional review authority regarding surface water management including:

- Local Plan review
- Regional controls related to nonpoint source pollution

This Plan and all subsequent amendments will become part of the City's Comprehensive Plan (adopted by reference), in accordance with Minnesota Statutes 103B.235, Subd. 3A and 473.859, Subd. 2 (Chapter 176, Laws of Minnesota 1995), as part of the adoption process for this Plan.

This Plan does not have to be re-submitted as a formal comprehensive plan amendment, subject to additional review, at a later date. The adopted City Plan and associated Rules will satisfy Metropolitan Council's requirements and will be thereby recognized as an amendment to the City's Comprehensive Plan.

1.2 PHYSICAL ENVIRONMENT

Osseo occupies approximately 474 acres of land in north central Hennepin County (see Figure 1). Osseo is bordered by Brooklyn Park and Maple Grove.

Osseo is completely urbanized. Approximately 54% of the land use comprises Single Family residential development and the remaining land use is composed of public schools (ISD 279), commercial, and industrial development. Existing and Year 2030 Land Use Maps are included in Appendix A.

The City of Osseo is fully developed, therefore no significant changes to the existing environment and the current land use plan are anticipated. The city however, has adopted the "Osseo Redevelopment Master Plan" (2007) in attempts to re-vitalize the City's central corridor. The recommendations of this master plan are represented in the 2030 Land Use Map; the primary change being in the densities of residential and commercial uses. The current nature of the City's central corridor is highly impervious with little to no stormwater treatment. Future redevelopments should evaluate infiltration and volume management goals as opportunities arise.

The topography is flat to gently rolling with a maximum elevation differential of 20 feet. Approximately 70 percent of the soils found are classified as SCS, type A and approximately 30 percent of the soils are classified as type B soils. For the most part, the majority of the Type A soils consist of Dorset sandy loam, which has a high infiltration rate. The type B soils consist mainly of Verndale sandy loam, which has a medium to high infiltration rate.

The typical 24-hour Atlas 14 precipitation amounts for the Osseo area are shown in the table below:

	1-Year	2-Year	10-Year	50-Year	100-Year
Rainfall (inches)	2.48	2.87	4.28	6.28	7.29

The total average annual precipitation in this area is approximately 30.6 inches. The average annual snowfall is about 54 inches, which is roughly equivalent to 5.4 inches of water.

The SCWMWMC plan – Section 2.0: Inventory and Condition Assessment contains the most current and comprehensive resource inventory for Osseo. Please reference the SCWMWMC for further information:

(http://shinglecreek.server301.com/pages/ThirdGenerationPlan/)

1.3 GOALS AND POLICIES

The foundation of Osseo's SWMP is the goals and policies upon which the Osseo plan is based. The goals and policies were established under the guidance of City staff. The goals stated in this Plan are complimentary to the goals stated in the Shingle Creek and West Mississippi Watershed Management Commission Third Generation Watershed Management Plan. The goals for the SWMP are as follows:

a) Goal 1: Water Quantity - To reduce water quantity

b) Goal 2: Water Quality - To improve water quality

c) Goal 3: Erosion Control - Erosion and sedimentation control

d) Goal 4: Wetlands - To protect wetlands

e) Goal 5: Groundwater Management - To promote groundwater recharge and management

f) Goal 6: Floodplain Management - Manage and protect the flood-prone areas

g) Goal 7: Public Participation, Information, and Education - Increase public participation and knowledge in management of the water resources within the community

Based on the SWMP goals prescribed for Osseo, the policies are listed below. A goal is a desired end toward which Osseo's policies, standards, criteria, and rules are directed. A policy is a governing principle, a means of achieving an established goal.

Policies prescribe a general course of conduct that leads toward goal achievement. As with all planning tools, these goals and policies are meant to be dynamic and flexible and to evolve with changing conditions in Osseo. Chapter 4 outlines specific implementation measures to provide for attainment of the goals described herein.

GOAL 1: WATER QUANTITY

The purpose of this goal is to control flooding and minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of surface water runoff, in accordance with the Shingle Creek and West Mississippi WMO SCWMP, as amended. Traditional surface water management deals with just one component of the hydrologic cycle: surface runoff. Large amounts of energy are directed towards alleviating significant negative impacts of surface runoff and flooding for the cultural, water, and natural resources.

Current redevelopment practice in the City of Osseo is to maintain the 2, 10, and 100-year runoff rates within predevelopment conditions, and for those projects meeting the Shingle Creek or West Mississippi review standards, infiltration of 1" of runoff from new impervious surfaces is required.

The primary management strategy is shifting from detention in both existing natural and constructed basins, to Low Impact Development (LID) techniques and Integrated Management Practices (IMPs) that emphasize reduction of runoff volume and on-site runoff control via infiltration or small volume storage to mimic predevelopment hydrology for more frequent rainfall events. This trend will help remedy the negative impact of stormwater runoff on water quality. With increased value placed on natural wetlands, the number and extent to which wetlands can be used for detention is already in decline. The approach to sound water quantity management relates directly to water quality, wetland management, erosion control, and land development strategies. By comprehensively managing the quantity and quality of surface water runoff, the other goals of this Plan are more efficiently achieved. In general, the City of Osseo should review infiltration and volume management goals as opportunities arise.

Subject: Surface Water Runoff (Rate and Volume) Management

Purpose: Control post-development stormwater runoff

Goal: Control flooding, protect human life, protect public and private property, minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of surface water runoff, and maintain or improve the downstream conveyance system
To develop a hydrologic and hydraulic model that relates runoff to the existing and planned land use within Osseo. Maintain the existing 100-year flood profile throughout the watersheds.

Water Quantity Policies

Policy 1.1
Develop a SWMP that accommodates the existing land use in Osseo.

Policy 1.2
Develop a SWMP that is flexible in incorporating future redevelopment.

Policy 1.3
Coordinate the preservation and enhancement of storage areas with state, county, and neighboring municipal agencies.

Policy 1.4
Implement the most efficient and effective methods to limit public cost of future improvements.

Policy 1.5
Coordinate street and other reconstruction projects with SWMP improvements.

Policy 1.7
When upgrading existing storm water facilities, provide a 10-year level of service to the upgraded portions of the drainage area.

Policy 1.8
Ensure that all new habitable structures are protected from flooding during a 100-year rainfall event.

Policy 1.9
The commissions will regulate stormwater discharge rates at member city boundaries.

GOAL 2: WATER QUALITY

The purpose of this goal is to achieve water quality standards in lakes, creeks, and wetlands consistent with the intended use and classification, in accordance with the Shingle Creek and West Mississippi WMO SWMP, as amended. Water quality is often directly related to the level of nutrients in the water body. While nutrients comprise only one category of substances that can affect water quality, nutrients, principally phosphorous and chloride, must be controlled to achieve the water quality goals of this Plan.

Phosphorous is generally the limiting factor to plant growth. An increase in phosphorous will cause the plant species dominating the lakeshore, open water, or marsh to shift in favor those plants that can best take advantage of the increased supply of the nutrient.

Controlling nutrients through housekeeping practices are a way for City residents to make a difference. According to the Minneapolis Chain of Lakes Clean Water Partnership, many people do not realize that organic materials like leaves, grass clippings, fertilizers, pesticides, and pet waste can disrupt the fragile ecosystem of a lake or creek.

Leaves and grass clippings that make their way into lakes and creeks are doing more damage than fertilizers, pesticides, or motor oils, according to the Minneapolis Chain of Lakes Clean Water Partnership. Once in the lakes and creeks, these organic materials decay, and subsequently release nutrients. The excess nutrients increase algae growth, which inhibits the growth of other aquatic plants and animals. When algae die and decay, they exert a biological oxygen demand on the lake, depleting available oxygen for fish. Algae growth due to nutrient loading can damage or even kill a lake's ecosystem.

Fertilizer application may be necessary for a healthy lawn, but the nutrients in fertilizer can be harmful to lakes, creeks, and wetlands. Nutrients from fertilizers run off lawns and ultimately discharge to area lakes, creeks, and wetlands. Effective January 1, 2005, in Minnesota, fertilizers containing phosphorous was restricted for used on lawns. Refer to the Minnesota Department of Agriculture (www.mda.state.mn.us/en/protecting/waterprotection/phoslaw.aspx) website for additional information. Applying the proper fertilizer, in the right amount, ensures a healthier lawn and healthier lakes, creeks, and wetlands.

Shingle Creek is listed as an Impaired Water for biotic integrity, chloride and dissolved oxygen. Because there is not enough information available to assign diffuse loads to individual permitted dischargers for biotic integrity and dissolved oxygen, Osseo will be considered in compliance with the Total Maximum Daily Load (TMDL) provisions if they follow the conditions of the individual permit and implement the appropriate Best Management Practices.

The Chloride Implementation Plan calls for a 71% reduction in chloride by the stakeholders. Osseo is expected to implement the Best Management Practices (BMPs) identified in the implementation plan to attain that reduction.

Subject: Water quality in lakes, creeks, and wetlands.
Purpose: To protect and improve water quality.
Goal: Protect and improve water quality based on practical use. To preserve, obtain, and use storage and retention areas for maintenance and improvement of the hydrologic systems within Osseo.

Water Quality Policies

Policy 2.1
Preserve existing storage capacities of protected waters and wetlands and natural watercourses.

Policy 2.2
Coordinate the preservation and enhancement of storage areas with state, county, and neighboring municipal agencies.

Policy 2.3
Limit development runoff rates to the projected management plan rate for each subwatershed.

Policy 2.4
Provide for additional storage either on a site or within the subwatershed as necessary to comply with the SWMP.

Policy 2.5
Consider other forms of runoff volume and rate control where necessary to comply with the SWMP.

Policy 2.6
Promote the treatment and/or control of runoff to enhance water quality by reducing nutrient and sediment loadings.

Policy 2.7
Through the development of lake and resource management plans the Commissions will refine their rules and standards for new development to prevent further degradation of water quality.

Policy 2.8
Review, update, and facilitate NPDES Phase II – MS4 minimum requirements

Policy 2.9
Identify and implement BMPs in support of the Shingle Creek Chloride TMDL, in accordance with NPDES Phase II permit requirements.

GOAL 3: EROSION CONTROL

The purpose of this goal is to minimize soil erosion through increased education and enforcement, in accordance with the Shingle Creek and West Mississippi WMO CSSWMP, as amended. Water quality problems are frequently linked to high phosphorus concentrations. Phosphorus is often transported to surface water through soil erosion but can also be transported to waters in a variety of other mechanisms. Nevertheless, erosion control is an important factor in the effort to improve surface water quality. Soil erosion and sediment deposition can also create pond and drainage-way performance and maintenance issues.

Ponds and drainage facilities may be impacted by erosion and sedimentation from a variety of sources including construction sites and winter street sanding. The coarse sediment accumulates in ditches and ponds where runoff velocities are low. When a sand delta appears at a storm sewer outfall; the delta is a visible indication of the effectiveness of erosion and sediment control measures and road maintenance activities of the past winter. As the sediment builds up over time, it reduces the capacity of the drainage system and the pollutant removal capabilities of ponds by reducing storage volume below the outlet. This also reduces the infiltration rates for stormwater facilities. Extending the life of facilities involves source control and elimination of the material that causes the problem. Regulatory actions will control a major portion of the sediment. Street maintenance and an effective sweeping program will also have a positive impact.

The City currently has an erosion control ordinance in its City Code:

§ 153.051 LAND ALTERATION; EROSION CONTROL.

Subject: Erosion control
Purpose: To control erosion and sedimentation
Goal: Minimize soil erosion through increased education and enforcement

Erosion Control Policies

Policy 3.1
Minimize runoff velocities and maximize natural cover to reduce erosion.

Policy 3.2
Require all measures necessary to effectively control sediment and erosion within construction sites.

Policy 3.3
Review, update, and facilitate NPDES Phase II – MS4 minimum requirements.

GOAL 4: WETLANDS

The purpose of this goal is to maintain the amount of wetland acreage, and increase the wetland functions and values within the City, in accordance with the SCWM WMO, as amended. The City has not completed a Comprehensive Wetland Management Plan.

The Shingle Creek and West Mississippi Watershed Commissions will serve as the LGU for the WCA. Additional, the policies below will be used to achieve the City's wetland goals. The National Wetland Inventory (NWI) has identified wetlands within the Osseo city limits. The wetlands inventoried are located in the NE quadrant of the city within the St. Vincent de Paul Cemetery. Thereby, the City anticipates no redevelopment of the existing land use. However, the City of Osseo recognizes the importance of these wetlands as a natural drainage passage for runoff accumulated in the City and Maple Grove; as the ditch through the cemetery is a DNR public watercourse.

Any modifications to any of the inventoried wetlands will be subject to review, as well as the rules and requirements of the WCA and other City, State, and Federal regulations.

Subject: Wetland Management
Purpose: To utilize, protect, preserve, and enhance existing natural wetlands.
Goal: Protect and improve wetlands. Maintain or increase the amount of wetland acreage, and increase the wetland functions and values within the City, in accordance with the WCA, USACE, and SCWM WMO.

Wetland Policies

Policy 4.1
The City may utilize the available technical resources of outside agencies, such as the Minnesota DNR, USACE, the Board of Water and Soil Resources and/or the SCWM WMO, for review of private developments and City-proposed projects that may affect wetland resources.

Policy 4.2
Developers must provide field delineation in accordance with applicable rules and regulations to determine the jurisdictional boundaries of wetlands, including a report of the results of the field delineation, detailing the methodology and findings of the delineation. A printed and electronic copy (.dwg) of the approved delineation boundary will be required to be submitted to the City.

Policy 4.3
Prior to any site development activities, the City will verify through a wetland boundary delineation review, the location and extent of all wetlands present. The results of the wetland boundary delineation will be compared to the field delineation data provided by the developer.

Policy 4.4

Any review of a proposed wetland encroachment will first address the issue of avoidance and project alternatives. Prior to allowing any wetland encroachment, all reasonable attempts to avoid such alteration must be demonstrated. This avoidance must also consider the reasonableness of the no-build alternative.

GOAL 5: GROUNDWATER MANAGEMENT

The City of Osseo no longer receives a potable water supply from a municipal well system that was previously owned and maintained by the City; the City of Maple Grove currently supplies the entire Osseo community with water. However, the City of Osseo will continue to promote groundwater quality efforts to reduce non-point sources of contamination in groundwater and promote recharge of aquifers through infiltration.

Subject: Groundwater Management
Purpose: To protect groundwater quality and improve groundwater supplies through effective management.
Goal: Protect and improve groundwater quality and promote groundwater recharge. To maintain and improve both surface water and groundwater quality.

Groundwater Management

Policy 5.1
Evaluate and control (re)development over groundwater recharge areas.

Policy 5.2
Protect groundwater recharge areas form potential contamination sources.

Policy 5.3
Promote redevelopment projects within the City that utilizes infiltration techniques that promote groundwater recharge.

GOAL 6: FLOODPLAIN MANAGEMENT

The Flood Insurance Rate Map (FIRM) for the City of Osseo and the metropolitan urban service area (MUSA) that is identified as the City Limits indicates the community, as a whole, is classified as having no special flood hazard areas (SFHA). The effective date of such community classification from the FIRM Map is September 2, 2004.

Because the City of Osseo has a low level of a flooding occurrence, it does not diminish the City's awareness on the importance of maintaining current levels of protection provided to the community.

Subject: Flood-prone area management
Purpose: To provide flood protection for people and property.
Goal: Manage and protect the flood-prone areas from encroachment.

Floodplain Management Policies

Policy 6.1
Protect the natural function of a floodwater storage area in a flood prone area from encroachment.

Policy 6.3
Manage flood-prone areas to maintain critical 100-year flood storage volumes.

Policy 6.4
Restrict reconstruction of new structures to sites above flood prone areas.

GOAL 7: PUBLIC PARTICIPATION, INFORMATION & EDUCATION

The purpose of this goal is to increase public participation and knowledge in management of the City's water resources, in accordance with the Shingle Creek / West Mississippi Watershed WMO, as amended. Public involvement is a strategy that recognizes that people want to be involved in decisions that affect any facet of their life. It provides opportunities for the public to participate in the processes that lead to decision-making.

Website Availability - http://www.ci.osseo.mn.us/

The website is an alternative medium to provide municipal information to both City residents and those people who live outside of Osseo. An electronic version of this Plan will ultimately be accessible on the website. Because the Plan has such a wide audience from 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.

The City of Osseo will rely on the Shingle Creek and West Mississippi Watershed Commissions to the fullest extent possible to provide fundamental public participation, information, and education opportunities in accordance with their goals and policies. In an effort to supplement these commission activities and comply with all NPDES requirements, the City of Osseo will strive to implement the additional policies of this section.

The City will continue to distribute information on pertinent water and wetland management issues via the City of Osseo Quarterly Newsletter (Osseo Outlook). The newsletter will promote opportunities for residents to participate in water resources management activities. 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 within the community. The program will also educate residents on the benefits of using phosphorus-free fertilizer.

Subject: Enhancement of Public Participation, Information and Education
Purpose: Encourage active community involvement in water resources management.
Goal: Establish an education and public outreach program. Increase public participation and knowledge in management of the water resources of the community.

Public Involvement Policies

Policy 7.1
Coordinate activities of Osseo and citizens relating to water management.

Policy 7.2
Work closely with adjacent communities in planning and developing mutually beneficial storm water management improvements.

Policy 7.3

Work closely with developers in planning and developing of future improvements to incorporate City, County, and Federal requirements.

Chapter 2

Stormwater System Description and Analysis

2.1 INTRODUCTION

Storm water runoff is defined as that portion of precipitation which flows over the ground surface during and for a short time after a storm. The quantity of runoff depends on the intensity of the storm, the amount of antecedent rainfall, the length of the storm, the type of surface the rain falls on, and the slope of the surface.

The intensity of a storm is described by a return storm interval or frequency of occurrence. The return storm interval is the average period of years within which a storm of a certain magnitude is expected to occur one time. Thus, the degree of protection is determined by selecting a return storm interval for the basis of design. For the Osseo Water Management Plan, a 10-year frequency storm event is used for the storm sewer design, while a 100-year frequency event is used for overland drainage and pond storage design. A 10-year frequency storm has a 10% chance of occurring or being exceeded in any given year, whereas a 100-year frequency storm has a 1% chance of occurring or being exceeded in any given year.

Precipitation amounts for the desired storm event shall be obtained from NOAA Atlas 14 Volume 8, published June 2013, or its successor, using the online NOAA Precipitation Frequency Data Server or a similar data source.

Atlas 14 Website: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mn

The City of Osseo is divided into three water drainage districts: North, South and Central with each containing interior subdistricts. The districts are based on topographic information and data on the existing storm water system. The districts are given a number designation as shown in Figure 2.

The trunk storm water system is defined as pipes generally larger than 30" in diameter and major natural drainage ways. The trunk system in each of the storm water districts were reviewed to determine its ability to meet a variety of storm conditions. The key storm conditions are:

2-year ---------Predict annual nutrient loading and evaluate the system during a smaller storm.

10-year -----Assess the ability of the storm sewer system to convey the standard design runoff (see Policy 1.7).

100-year --- Determine the extent of flooding during a major storm event.

The analysis of the storm water system includes:

- Delineation of the storm drainage district.
- Subdivision of districts into subdistricts.
- Evaluation of the system under surcharged conditions.

Using the existing data, the issues facing Osseo are identified and separated into two categories:

Global Issues:
Major inter-community, inter-watershed, or inter-district issues requiring the cooperation of one or more outside party (Watershed, adjacent community, Agency) for resolution.

Local Issues:

Existing storm water management issues within the City can be resolved by Osseo. The individual drainage descriptions in Section 2.4 and 2.5 present issues specific to each district. Chapter 4 subsequently describes specific improvement measures to be implemented for both global and local issues.

2.2 GLOBAL ISSUES

Regulations and Enforcement

Osseo is the administering agency (as the Local Government Unit) for the regulations contained in the Shingle Creek and West Mississippi Watershed Management Plans, with the exception of administration of the Wetland Conservation Act, where the Watershed Management Commission is the local government unit.

The following are goals and actions that have been identified in the Commissions Third Generation Watershed Management Plan that are pertinent to, and are supported by, the City of Osseo's plan:

Water Quantity

Goal A.1.

- Maintain the existing 100-year flood profile throughout the watersheds.

Proposed Action:

- Maintain rules and standards requiring new development and redevelopment to control the rate and volume of runoff discharged from their sites, and update those standards as necessary.

Water Quality

Goal B.5.

- Maintain nondegradation of all waterbodies compared to 1985 conditions.

Proposed Action:

- Maintain rules and standards requiring new development and redevelopment to control the total phosphorus and total suspended solids discharged from their sites, and update those standards as necessary.
- Evaluate progress toward achieving TMDL goals every five years following adoption of the respective Implementation Plans.

Groundwater

Goal C.1.

- Infiltrate stormwater runoff from new impervious surface.

Goal C.2.

- Identify opportunities for and implement projects to infiltrate runoff from existing impervious surface.

Proposed Action:

- Maintain rules and standards requiring new development and redevelopment to abstract or infiltrate stormwater runoff from new impervious surface, and update those standards as necessary.

Goal D.1.

- Maintain the existing functions and values of wetlands identified in the Commissions' Water Quality Plan as high-priority.

Proposed Action:

- Adopt a wetland replacement sequencing policy.
- Identify wetland restoration opportunities and implement projects to restore wetland functions and values or to create new wetland acreage.

Operations and Programming

Goal F.1.

- Identify and operate within a sustainable funding level that is affordable to member cities.

Goal F.2.

- Foster implementation of TMDL and other implementation projects by sharing in their cost and proactively seeking grant funds.

Goal F.3.

- Operate a public education and outreach program that meets the NPDES Phase II education requirements for the member cities.

Goal F.5.

- Maintain rules and standards for development and redevelopment that are consistent with local and regional TMDLs, federal guidelines, source water and wellhead protection requirements, sustainable water yields, nondegradation, and ecosystem management goals.

Goal F.6.

- Serve as a technical resource for member cities.

Proposed Action:

- Annually review the budget and Capital Improvement Program.
- Maintain an Education and Public Outreach Committee (EPOC) that is charged with developing and implementing an annual education and outreach plan.
- Prepare and implement an annual monitoring plan and summarize the results in an annual water quality report.
- According to the schedules set forth in TMDL Implementation Plans, every five years evaluate progress toward meeting TMDL water quality goals, and adjust the Implementation Plans as necessary to achieve progress.
- Every five years or as necessary review the development rules and standards for adequacy and make revisions as necessary.
- Continue research projects on innovative and cost-effective stormwater management practices and technologies.

- Coordinate water resources management between the Commissions and the member cities.

2.3 LOCAL ISSUES

Trunk System Capacity

The main cause for flooding instances in Osseo is an overall lack of capacity in the trunk storm sewer system. Some trunk sewer lines in Osseo are not at the currently recommended design standard for urban storm sewer in a 10-year (4.3 inches in 24 hours) storm. Indications of system deficiencies include frequent ponded water on streets and private property due to surcharged storm sewers.

Issue:
Multisite ponding. As a developed community, Osseo is faced with the need to evaluate redevelopment proposals one site at a time. This process tends to promote on-site detention and water quality facilities which are less effective, more costly, and more difficult to maintain than multisite facilities. Osseo should promote multisite ponding at every opportunity.

Proposed Action:

- Evaluate multisite potential of all on-site facility proposals.
- Continue to review and update the ponding/water quality opportunity map as new opportunities develop.
- Develop policies to coordinate development of multisite facilities, including provisions for assessing and collecting financial contributions from benefitting properties.

Major Storm Water Projects

The City of Osseo identified several major storm water-related capital improvement and planning projects in its' previous Stormwater Management Plan (2008). The following is a list of projects in that plan that were completed:

- Pipe capacity issues - Storm sewer trunk line upgrades were made in the northeast area of Osseo from 1st Avenue East to 6th Avenue East in 2011.
- A storm sewer inventory and system model of the city was completed in 2010.
- Severe flooding – Upgrades were made to the street low point on 1st Avenue NW between 3rd and 4th Streets NW in 2010.

It is the City of Osseo's goal to develop and implement a comprehensive 5-year capital improvements plan (CIP) based on completed infrastructure inventories and master plans along with an effective long term financial plan. While this comprehensive CIP is being developed, the City annually identifies priority projects over a one to two year planning period and budgets for them accordingly.

2.4 WEST MISSISSIPPI WATERSHED

The City of Osseo is divided into three water drainage districts: North, South and Central with each containing interior subdistricts. The districts are based on topographic information and data on the existing storm water system. The delineation between the West Mississippi and Shingle Creek Watershed districts is shown in Figure 1.

The West Mississippi Watershed has identified two drainage subdistricts that are within Osseo. The subdistricts are identified as N-1, N-2, N-3 and N-4.

The WMWMC requirements that apply to the two districts are summarized below:

Demonstrate that for a 100 year event, the regulating outflow rates specified in the WMC plan are or will be accommodated by an outlet of appropriate size or suitable ponding, or overflow is provided.

Description

The Osseo portion which drains to the West Mississippi watershed is 184 acres in size. This area is entirely developed and the existing zoning is R-1 (one and two family residential) and R-2 (multiple family residential). The land use of the two areas is the high school campus of Independent School District No. 279, Osseo Elementary School, St. Vincent de Paul Cemetery, single family housing, multi-family housing and commercial activity.

WEST MISSISSIPPI WATERSHED: SUBDISTRICT N-1

Location

The N-1 drainage district occupies the northwest section of Osseo. It is bound by the northern and western borders of Osseo, from Second Avenue West and Seventh Street to Second Avenue West and Third Street North, from Second Avenue West and Third Street North to the western border.

Description

N-1 is a 52 acre drainage district located within Osseo. The land use in the district is predominantly public land (school district) and a small portion of one to three unit residential. Surface flow is directed to the northeast. The district has limited storm water sewer service, consisting of a ditch running north to the city limits which is located west of Fourth Avenue West and twelve inch storm sewers constructed along Third Avenue West which runs north to Seventh Street then travels west and ultimately into the Edinbrook Creek.

Capacity Evaluation and Improvements

The area is satisfactory at this time. In the event redevelopment occurs or a new land use designation is placed in the area, the district should be re-evaluated to assess the area for storm water capacity.

Ponding Opportunities

There is ample storm water storage capacity in the drainage district, both for providing water quality and flood control potential.

Water Quality

There are several ponding areas that appear to have adequate size to provide adequate storm water treatment. Data is not available at this time to assess the water quality of this treatment.

Global Issues

Since N-1 borders Maple Grove on two sides and the output of N-1 travels through Edinbrook Creek, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

WEST MISSISSIPPI WATERSHED: SUBDISTRICT N-2

Location

The N-2 drainage district occupies a portion of the northern area of Osseo. It is bordered from Second Avenue West and Seventh Street to Central Avenue and Seventh Street, from Central Avenue and Seventh Street diagonally to First Avenue West and Sixth Street North, from First Avenue West and Sixth Street North to First Avenue West and Fifth Street North, from First Avenue West and Fifth Street North to Second Avenue North, back to the beginning.

Description

N-2 is a 10 acre drainage district located within Osseo. The land use in the area is predominantly one to three unit residential with a senior center in the northeast corner of the district. The district has limited storm water service, a single line crossing Seventh Street to the north to connect into the Edinbrook Creek. Surface flow occurs in the gutter system east and north within the subdistrict.

Capacity Evaluation and Improvements

In 1991, the city determined no additional storm sewers were necessary for the existing land use. In the event redevelopment within the district occurs, the areas storm water system should be reassessed for capacity.

Ponding Opportunities

The area is fully developed which limits the ponding opportunities within this district.

Water Quality

There is limited ponding opportunity in the district and the data is not available at this time to assess the water quality of this treatment.

Global Issues

Since N-2 borders Maple Grove on the north side and the output of N-2 travels through Edinbrook Creek, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

WEST MISSISSIPPI WATERSHED: SUBDISTRICT N-3

Location
The N-3 drainage district occupies the north central section of Osseo. The district is irregular shaped bounded by subdistricts N-2, N-4, S-2 and S-4.

Description
N-3 is a 15 acre drainage district located within Osseo. The area has a mixed land use of one to three residential units, four or more residential units, commercial and public. The predominant land use is commercial in this subdistrict. The surface flow travels towards Central Avenue and flows north.

Capacity Evaluation and Improvements
The area's capacity is adequate at this time. In the event redevelopment occurs or a new land use designation is placed in the area, the district should be re-evaluated to assess the area for storm water capacity.

Ponding Opportunities
The area is fully developed which limits the ponding opportunities within this district.

Water Quality
There is limited ponding opportunity in the district and there is data is not available at this time to assess the water quality of this treatment.

Global Issues
Since N-3 borders Maple Grove to the north and travels through Edinbrook Creek, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

WEST MISSISSIPPI WATERSHED: N-4 SUBDISTRICT

Location
The N-4 drainage district occupies the northeastern section of Osseo. It is bordered by the north and east borders of Osseo, and the subdistricts of N-3 and C-1.

Description
N-4 is a 107 acre drainage district located within Osseo. The area has mixed land use, one to two residential units, four or more residential units, public and semi-public. The area is predominantly one and two unit residential. There was a pre-existing storm sewer system between First and Sixth Avenues, which was insufficient for the area. The drainage system flows into the ditch system at the intersection of Sixth Avenue East and Seventh Street.

The ditch flows along Seventh Street in Maple Grove eastward to Sixth Avenue East, at which point crosses under Seventh Street into Osseo. The ditch flows along the border of the St. Vincent De Paul Cemetery, through the wetlands and into Brooklyn Park. In 2007, the capacity of this ditch through the cemetery was increased through a sediment removal project completed by the City and a culvert replacement project completed by St. Vincent De Paul Church. A ditch was constructed during the 1991 construction project from Ninth Avenue North into the ditch system which ultimately flows into Edinbrook Creek.

Capacity Evaluation and Improvements
The district is adequate at this time.

Ponding Opportunities
The area is fully developed which limits the ponding opportunities within this district.

Water Quality
There are several ponding areas that appear to have adequate size to provide adequate storm water treatment. Data is not available at this time to assess the water quality of this treatment.

Global Issues
Since N-4 borders Brooklyn Park on two sides and the output of N-4 travels through Edinbrook Creek, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove and Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

WEST MISSISSIPPI WATERSHED OVERVIEW

Wetlands

Wetlands have been identified in subdistrict N-4, the wetlands have been identified on the National Wetland Inventory map. See Appendix D. Additionally, the ditch going through these wetlands in this area is a public waters watercourse.

Edinbrook Channel

The Edinbrook Channel subdistrict is located south of TH 610 and north of 85th Avenue. The channel flows through local district N-4. The channel carries water from Maple Grove, through Osseo and portions of Brooklyn Park to discharge into the Mississippi River. (See Appendix D)

Capacity Evaluation and Improvements

There are known drainage problems within the N-4 district, including flooding. Inadequate pipe capacity and overland flow in the district probably is the cause of a number of drainage problems.

Ponding Opportunities

There are no storm water detention facilities in the subdistricts. For optimum detention performance, ponding could be considered on the St. Vincent De Paul cemetery property. The pond would function primarily to reduce the peak outflow, provide storm water treatment, and minimize the water quality impact on Edinbrook Channel which runs into the Mississippi River.

Water Quality

Water quality treatment from this district could be provided by building one large pond or a series of small ponds. The pond design(s) would need to remove the nutrients and pollutants to meet the NURP (national urban runoff practices) standards.

Global Issues

The impact of untreated storm water into the Mississippi River is an issue that must be addressed by a regional approach including the WMWMC and the municipalities upstream and downstream of Osseo.

The local drainage district N-4 suffers capacity problems. A solution applicable to the district should be considered.

Strategies

1. The system capacity should be increased to accommodate 10 year runoff flows.
2. The improvements of lateral pipes must be coordinated with capacity increases in the trunk lines.

2.5 SHINGLE CREEK WATERSHED

The Shingle Creek District encompasses the central and southern districts of Osseo. In Osseo, the watershed extends across the southern two-thirds of the city and includes nine subwatershed districts.

The nine watershed subdistricts are bounded within the city limits. These subwatershed districts are identified as C-1, C-2, C-3, S-1, S-2, S-3, S-4, S-5 and S-6. A description of the portions of each drainage district is provided in the following sections.

In the Shingle Creek West Mississippi Watershed (SCWMC), limits have been established for peak flows that are directly discharged into Shingle Creek and ultimately into the Mississippi River. Because the subdistricts are wholly within Osseo, control of peak discharge into Shingle Creek is the responsibility of Osseo. The SCWMC requirements which apply to the nine subdistricts are summarized below:

1. Maximum allowable peak discharge rates are established at the discharge point for each district.
2. Demonstrate that for a 100-year return frequency rainfall event of critical duration the outflow from a particular drainage district does not exceed the rate identified by the SCWMC.

SHINGLE CREEK WATERSHED: SUBDISTRICT C-1

Location
The C-1 drainage district occupies the central section of Osseo. It is bounded by the eastern city limit, C-2, S-4, S-5, N-3, and N-4.

Description
C-1 is a 133 acre drainage district located within Osseo. The area land use is one and two residential units, four and more residential units, public, and highway commercial. The area is predominately single family dwellings.

Capacity Evaluation and Improvements
The area is adequate at this time. Osseo should consider placing this system on a schedule for regular evaluation, as determined by the city engineer to ensure appropriate improvements are made to the system.

Ponding Opportunities
The district has limited storm water storage capacity in the drainage district for ponding, water quality and flood control potential.

Water Quality
There is limited ponding opportunity in the district, and data is not available at this time to assess the water quality of this treatment.

Global Issues
Since C-1 borders Brooklyn Park on the east and the output of C-1 travels into Brooklyn Park, storm water related issues must be addressed through inter-municipal cooperation with Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10,100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.
4. Add subdistrict to the capital improvement program.

SHINGLE CREEK WATERSHED: SUBDISTRICT C-2

Location
The C-2 drainage district occupies the southern section of Osseo. It is bounded by the eastern city limit, C-1, and C-3.

Description
C-2 is an 11 acre drainage district located within Osseo. The land use is predominately one and two residential units. The surface water flows to the east and concentrates at the intersection of Third Street South and Eight Avenue East.

Capacity Evaluation and Improvements
The area is adequate at this time. Osseo should consider placing this system on a schedule for regular evaluation, as determined by the city engineer, to ensure appropriate improvements are made to the system.

Ponding Opportunities
The district has limited storm water storage capacity in the drainage district for ponding, water quality and flood control potential.

Water Quality
There is limited ponding opportunity in the district, and data is not available at this time to assess the water quality of this treatment.

Global Issues
Since C-2 borders Brooklyn Park on the east and the output of C-2 travels into Brooklyn Park, storm water related issues must be addressed through inter-municipal cooperation with Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10,100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.
4. Add subdistrict to the capital improvement program.

SHINGLE CREEK WATERSHED: SUBDISTRICT C-3

Location
The C-3 drainage district occupies the southern section of Osseo. It is bounded by the eastern and southern city limit, C-2, and S-5.

Description
C-3 is a 15 acre drainage district located within Osseo. The area is predominately one and two residential units with limited highway commercial located on the western end of the subdistrict. The surface flows to the south and concentrates at the intersection of Fourth Street South and Eight Avenue East.

Capacity Evaluation and Improvements
The area is adequate at this time. Osseo should consider placing this system on a schedule for regular evaluation, to ensure appropriate improvements are made to the system.

Ponding Opportunities
The district has limited storm water storage capacity in the drainage district for ponding, water quality and flood control potential.

Water Quality
There is limited ponding opportunity in the district, and data is not available at this time to assess the water quality of this treatment.

Global Issues
Since C-3 borders Brooklyn Park on the east and south and the output of C-3 travels into Brooklyn Park, storm water related issues must be addressed through inter-municipal cooperation with Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.
4. Add subdistrict to the capital improvement program.

SHINGLE CREEK WATERSHED: SUBDISTRICT S-1

Location
The S-1 drainage district occupies the western section of Osseo. It is bounded by the right-of-way limits of CSAH 81 to the western boundary of the City.

Description
S-1 is a 27 acre drainage district located within Osseo. The area is predominately right-of-way property. The district has wide ditch areas flowing in a southeasterly direction.

Capacity Evaluation and Improvements
The area is adequate at this time. Osseo should consider placing this system on a schedule for regular evaluation, to ensure appropriate improvements are made to the system.

Ponding Opportunities
The district has limited storm water storage capacity in the drainage district for ponding, water quality and flood control potential.

Water Quality
There is limited ponding opportunity in the district, and data is not available at this time to assess the water quality of this treatment.

Global Issues
Since S-1 borders Maple Grove on two sides and the output of S-1 travels through the right-of-way limits, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove.

Strategies

1. Determine flood capacity of existing system (2, 10,100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.
4. Add subdistrict to the capital improvement program.

SHINGLE CREEK WATERSHED: SUBDISTRICT S-2

Location
The S-2 drainage district occupies the north central section of Osseo. It is bound by the subdistricts N-1, N-2, N-3, S-3 and S-4.

Description
S-2 is a 9 acre drainage district located within Osseo. The land use is made up of business and four or more units residential. The surface flow concentrates at a low point in First Avenue West.

Capacity Evaluation and Improvements
Historically water flowed to the south in the existing storm sewer system. The low point area in First Avenue West would periodically flood during high intensity storm events. In 2010 additional storm sewer was added to this low area as part of the Central Avenue improvement. This new storm sewer added two catch basins to the low point that were carried by a storm sewer system that ran north on 1st Avenue NW to 4th Street NW, then east to where it connected into the Central Avenue trunk storm sewer. In 2013, to further reduce the chance of flooding in this low point, a backflow preventer valve was installed in the storm sewer line that flows to the south.

Ponding Opportunities
The area is fully developed which limits the ponding opportunities within this district.

Global Issues
Since S-2 is completely within Osseo, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove and Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

SHINGLE CREEK WATERSHED: SUBDISTRICT S-3

Location
The S-3 drainage district occupies the central section of Osseo. It is bound by the subdistricts S-1, S-2, S-4, and S-5.

Description
S-3 is a 7 acre drainage district located within Osseo. The land use is highway commercial, four or more residential units, and business.

Capacity Evaluation and Improvements
The area is adequate at this time. In the event redevelopment within the district occurs, the area's storm water system should be reassessed for capacity relating to the S-2 district.

Ponding Opportunities
The area is fully developed, limiting the ponding opportunities within this district.

Water Quality
There is limited ponding opportunity in the district and the data is not available at this time to assess the water quality of this treatment.

Global Issues
Since S-3 is completely within Osseo, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove and Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

SHINGLE CREEK WATERSHED: SUBDISTRICT S-4

Location
The S-4 drainage district occupies the central section of Osseo. It is bound by subdistricts C-1, N-3, S-2, S-3, andS-5.

Description
S-4 is a 7 acre drainage district located within Osseo. The land use in the subdistrict is business. The surface flows to Central Avenue and then flows south.

Capacity Evaluation and Improvements
The area's capacity is adequate at this time. In the event redevelopment occurs or a new land use designation is placed in the area, the district should be re-evaluated to assess the area for storm water capacity.

Ponding Opportunities
The area is fully developed which limits the ponding opportunities within this district.

Water Quality
There is limited ponding opportunity in the district and there is data is not available at this time to assess the water quality of this treatment.

Global Issues
S-4 flows south into the storm drainage system along CSAH 81, all storm water related issues must be addressed through inter-municipal cooperation with Maple Grove and Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

SHINGLE CREEK WATERSHED: SUBDISTRICT S-5

Location
The S-5 drainage district dissects the central section of Osseo from the south to northwestern borders of the city. It is bound by the subdistricts C-1, C-3, S-1, S-3, S-4, and S-6.

Description
S-5 is a 42 acre drainage district located within Osseo. The land use in the subdistrict is industrial, highway commercial, and business. The surface flows to the south.

Capacity Evaluation and Improvements
The area's capacity is adequate at this time. In the event redevelopment occurs or a new land use designation is placed in the area, the district should be re-evaluated to assess the area for storm water capacity.

Ponding Opportunities
There are limited ponding opportunities within this district.

Water Quality
There are limited ponding areas that appear to have adequate size to provide adequate storm water treatment. Data is not available at this time to assess the water quality of this treatment.

Global Issues
Since S-5 borders Maple Grove and Brooklyn Park and the output of S-5 travels to Shingle Creek, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove and Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year).
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

SHINGLE CREEK WATERSHED: SUBDISTRICT S-6

Location
The S-6 drainage district is in the southwestern section of Osseo. It is bound from the northeast by subdistrict S-5.

Description
S-6 is a 48 acre drainage district located within Osseo. The land use in this subdistrict is industrial.

Capacity Evaluation and Improvements
The area is adequate at this time. In the event redevelopment within the district occurs, the area's storm water system should be reassessed for capacity.

Ponding Opportunities
The area is fully developed, severely limiting the ponding opportunities within this district.

Water Quality
There are limited ponding areas that appear to have adequate size to provide adequate storm water treatment. Data is not available at this time to assess the water quality of this treatment.

Global Issues
Since S-6 borders Maple Grove, the stormwater of S-6 travels to Shingle Creek, storm water related issues must be addressed through inter-municipal cooperation with Maple Grove and Brooklyn Park.

Strategies

1. Determine flood capacity of existing system (2, 10, 100 year)
2. Assess opportunities for future redevelopment within the subdistrict.
3. Establish open communication with other municipalities when reviewing and assessing district.

Chapter 3

Water Resources Management

3.1 INTRODUCTION

This chapter addresses the specific water management goals in Chapter 1 and applicable rules by the Watershed Management Organizations (WMO). The issues are summarized in the following table, along with a notation concerning Osseo's current or expected compliance with the requirement.

Table 3.1

Issue Area	Compliance	Strategy for Achieving Compliance
1. Runoff Management (Water Quantity)	Systematic study and improvement program in place; some additional data necessary.	Continue performing in-depth studies as needed to document peak outflows and adequate storage capacity.
2. Water Quality	Being implemented.	Facilitate MS-4 Requirements.
3. Erosion and Sediment Control	Complies.	Adopt applicable ordinance(s). Facilitate NPDES Phase II – MS4 Requirements.
4. Wetland Management	WMO serves as the LGU.	Identify wetland restoration possibilities and construct or encourage the construction of restoration projects.
5. Groundwater Management	Not Currently.	Review Hennepin County Groundwater Plan; adopt if satisfactory or develop own.
6. Floodplain Management	Not applicable.	Follow floodplain ordinance.
7. Education	Complies	Facilitate MS4 requirements.

Osseo will continue to have the WMO serve as the LGU for both the Shingle Creek and West Mississippi Watersheds Districts. The WMO will be responsible for the review of single family residential detached developments in excess of 15 acres; all other types of development and redevelopment in excess of 5 acres; any development including, adjacent to, or impacting floodplain or wetlands; and any other project that is so requested to be reviewed.

3.2 RUNOFF MANAGEMENT

Water Quantity

Overall storm water management is necessary to reduce the public expenditures necessary to construct and repair conveyance systems and downstream facilities capable of accommodating storm water runoff generated in upstream areas. Chapter 2 contains the results of the assessment of the existing storm sewer system capacities. Osseo is fully developed city, so it is not expected that existing storm water flows will increase. Most of the activity relating to runoff management will be monitoring and managing existing flow. Osseo actively encourages a regional approach to managing existing flow, such as identifying regional ponding opportunities, or providing private developers with compensation to upsize a ponding opportunity to accommodate additional flow from the public drainage system.

Allowable peak outflow rates from each of the management sectors within Osseo are identified in Chapter 2. These allowable outflow rates and the characteristics of existing storage areas will be reviewed in detail as each subdistrict is studied in preparation for Neighborhood Street and Utility Program improvement projects. Where outflow is excessive, storage alternate options will be identified for construction.

In addition to the public storm drainage system, Osseo requires private developers meeting certain characteristics to meet runoff management standards. These characteristics are the same as those adopted by the Shingle Creek and West Mississippi Watershed Management Organizations. Osseo has adopted the standards generally referred to as "NURP" standards for storm water detention and treatment. Management standards prescribed by the WMOs are presented in Appendix B.

3.3 WATER QUALITY

The United States Environmental Protection Agency considers urban runoff to be non-point source pollution contributing to over 50 percent of the total receiving water quality problems. Street refuse often contains significant amounts of organics, heavy metals, pesticides, and bacteria.

Water quality is often directly related to the level of nutrients in the 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 generally the limiting factor to plant growth. An increase in phosphorous will cause the plant species dominating the lakeshore, open water, or marsh to shift in favor those plants that can best take advantage of the increased supply of the nutrient.

Controlling nutrients through housekeeping practices are a way for City residents to make a difference. According to the Minneapolis Chain of Lakes Clean Water Partnership, many people do not realize that organic materials like leaves, grass clippings, fertilizers, pesticides, and pet waste can disrupt the fragile ecosystem of a lake or creek.

Leaves and grass clippings that make their way into lakes and creeks are doing more damage than fertilizers, pesticides, or motor oils, according to the Minneapolis Chain of Lakes Clean Water Partnership. Once in the lakes and creeks, these organic materials decay, and subsequently release nutrients. The excess nutrients increase algae growth, which inhibits the growth of other aquatic plants and animals. When algae die and decay, they exert a biological oxygen demand on the lake, depleting available oxygen for fish. Algae growth due to nutrient loading can damage or even kill a lake's ecosystem.

Shingle Creek was the first stream in Minnesota to be designated an Impaired Water for excess chloride. The high levels of chloride were discovered by the US Geological Survey during a special, intensive study of Shingle Creek as part of the National Assessment of Water Quality (NAWQA) program. Chloride was not routinely monitored in Minnesota streams, but since this discovery in Shingle Creek, elevated levels of chloride have been found in many streams. These levels are not harmful to humans but, at their extreme, they can be harmful to fish and other aquatic life as well as aquatic vegetation.

The Final Shingle Creek Chloride TMDL study found that most of the chloride in Shingle Creek comes from road salt applied to icy roads. It is estimated about 85 percent of the chloride in Shingle Creek originates from road authorities including cities, Hennepin County, and Mn/DOT. The balance comes from groundwater and small commercial applicators. The TMDL report concluded that it will take a 71 percent decrease in the amount of salt applied in the watershed to meet state and federal water quality standards in Shingle Creek. Also, dissolved oxygen and biotic integrity TMDLs are currently underway within Shingle Creek that may require additional stormwater management activities to be adopted and added to the City's SWPPP.

The City's SWPPP identifies an implementation schedule for the control measures identified. The implementation priorities will closely follow those specified in the SWPPP. For management components that are not identified in the SWPPP they will be addressed largely through the rules that will enforce this plan.

The surface waters near Osseo provide water-based recreational opportunities for residents, provide significant storage for flood waters, and provide a valuable habitat for fish and wildlife. The presence of physical or chemical impurities or excessive biological activity can adversely affect those attributes, making water quality protection an important component of the water management plan. A review of runoff treatment needs for each drainage sub-district is presented in Chapter 2. Runoff treatment needs and options will be reviewed in detail as each sub-district is studied in preparation for Neighborhood Street and Utility Program improvement projects.

For public street and utility improvement projects, it is Osseo's policy to provide runoff treatment where it is feasible, practical, and cost effective. As described in the section on Surface Water Quality above, Osseo requires developers of certain properties to meet the "NURP" storm water detention and treatment standards.

System Maintenance

The City is a mandatory MS4 (Stormwater Program for Municipal Separate Storm Sewer Systems). The Environmental Protection Agency developed a program called the National Pollution Discharge Elimination System (NPDES). Under Phase II of this program, small MS4s are required to get a permit for their storm water management system. As a condition of the permit the City was required to prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP identifies a maintenance program to be implemented by the City while conducting maintenance procedures. The following table represents the typical components of the Osseo SWPPP.

STORMWATER IMPROVEMENTS AND BMP PROGRAM
PROJECT DESCRIPTION
• UPDATE STORM SEWER MODEL
• INSPECT 20% OF ALL OUTFALLS 24" AND LARGER
• INSPECT EROSION CONTROL BMP'S ON ALL CONSTRUCTION SITES
• STREET SWEEPING @2 TIMES PER YEAR
• IMPLEMENT TMDL REQUIREMENTS FOR SHINGLE CREEK
• DEVELOP & DISTRIBUTE INFORMATION FLIERS ON PRE/POST CONSTRUCTION BMP'S
• MAINTAIN CITY WEBSITE WITH STORMWATER MANAGEMENT ISSUES
• UPDATE STORM SEWER SYSTEM MAP
• REVIEW STORMWATER UTILITY FEE FOR SUFFICIENT OPERATING FUNDS

Water Quality Ponds

Currently, the City of Osseo does not own or maintain any public stormwater ponds. As of the date of this report, however, there exist two privately owned ponds as well as one additional proposed private infiltration basin. This section identifies important maintenace issues associated with stormwater ponds that the City should encourage private pond owners to recognize.

The maintenance of the water quality ponds can be difficult since the ponds are typically full of water and the banks can be soggy near the normal water level. However, proper maintenance of both public-owned and private treatment ponds is vital to maintaining their effectiveness.

The growth of aquatic vegetation including algae can become a nuisance depending on the secondary uses of the pond and its visibility. Controlling algae growth is a difficult task since the pond is designed to trap nutrients on which the algae thrive. The use of chemicals to kill the algae is not recommended since the chemicals can easily be transported downstream to the water bodies that they are protecting. The use of chemicals such as alum or iron to remove the nutrients in the water column that are supporting the algae is a possible alternative in high profile areas. It must be recognized that this is a temporary solution as the next rain storm will bring more nutrients. The associated costs and benefits must be examined carefully before implementing this treatment.

Harvesting aquatic weeds is somewhat costly but also will serve to remove nutrients from the pond as long as the nutrient-rich plant material is disposed of off-site. Harvesting also should be reserved for high profile areas. In many cases it may be desirable to leave emergent vegetation around the periphery of the pond for aesthetic purposes as well as preventing public access to the pond.

Since water quality ponds are designed to trap sediments, periodic dredging is necessary to preserve treatment effectiveness. With the dead storage recommended in the Water Management Plan, it is anticipated that the medium-sized ponds will need dredging in 10 to 15 years. Smaller ponds may need dredging sooner. The most accurate means to determine when ponds need to be dredged is to conduct periodic depth sampling on representative ponds in different regions within Osseo. Failure to dredge the ponds will lower their nutrient removal efficiency.

Most of the water quality ponds built as a result of this plan will require that skimmers be installed on the outlet structures. Skimmers are important for removing floating debris, greases, and oils. Greases and oils are common contaminants in urban storm water and can have harmful effects on water quality. To assure that the skimmers prevent movement of floating materials downstream, the materials must be removed routinely from the skimmers' basin.

Cleaning inlet and outlet structures is an important activity for water quality ponds to assure the expected removal efficiencies are maintained. Ideally, inlets and outlets should be cleaned after each large storm, in early spring, and in late fall. With large numbers of ponds, ponds can be prioritized so that large ponds and those that may cause damage to structures if they do not drain properly can be checked after major storms. The remainder of the ponds should be checked periodically during the year as time allows. All pond outlets and inlets should be checked as early in spring as possible and in the fall after the majority of the leaves have fallen from the trees.

A systematic pond inspection and maintenance program is required. These procedures should be followed:

1. Inspect all detention and treatment ponds, both public and private, at least biannually.
2. Clean skimmers and inlet/outlet structures regularly throughout the year, with special emphasis on cleaning after large storms and in early spring and late fall. Repair structures as necessary.
3. Develop a program of regular depth sampling and dredging.
4. Notify owners of private ponds of necessary cleaning and repairs. If necessary complete work and assess cost to owners.

Piping System

The storm sewer infrastructure constitutes a multimillion dollar investment for Osseo. A comprehensive maintenance program is required to maximize the life of the facilities and capital expenditures. To accomplish this, the following periodic inspection and maintenance procedures are required:

1. Inspect catch basin and manhole castings, clean and replace as necessary.
2. Inspect catch basin and manhole rings and replace and/or reroute as necessary.

3. Inspect catch basin and manhole structures and repair or replace as needed.
   Check pipe inverts, "doghouses", benches, steps (verify integrity for safety) and walls. Cracked, deteriorated and spalled areas need to be grouted, patched, or replaced.
4. Inspect storm sewer piping either manually or by television to assess pipe condition. Items to look for include root damage, deteriorated joints, leaky joints, excessive spalling, and sediment buildup. The piping system should then be programmed for either cleaning, repair, or replacement as needed to ensure the integrity of the system.

3.4 EROSION AND SEDIMENT CONTROL

The City is a Mandatory MS4 (Stormwater Program for Municipal Separate Storm Sewer Systems). The Environmental Protection Agency developed a program called the National Pollution Discharge Elimination System (NPDES). Under Phase II of this program, small MS4s are required to get a permit for their storm water management system. As a condition of the permit the City was required to prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP identifies structural and non-structural controls that will be put into place to minimize negative impacts caused by storm water discharges to the environment. Additionally, Osseo enforces an erosion control ordinance in § 153.051 LAND ALTERATION; EROSION CONTROL of its city code.

Redevelopment work of existing properties is the single most important short-term source of sediments and pollutants reaching lakes, Shingle Creek, and the Mississippi River. To respond to this problem, Osseo will adopt the policies and practices outlined in the State Stormwater Manual to regulate construction and reconstruction activity involving land disturbances, land fill, soil storage, and erosion and sedimentation. This manual provides specific objectives, design considerations, plan requirements, and implementation strategy to:

1. Reduce sedimentation in storm sewer systems and streams.
2. Protect the quality of water resources.
3. Preserve and protect wildlife habitat.
4. Provide uniform techniques and programs for erosion and sediment control.

In order to maximize the implementation of erosion and sediment control measures, each new construction or reconstruction activity will be required to submit an erosion and sediment control plan (SWPPP) to Osseo. The erosion and sediment control plan should include items in Appendix C – Requirements of Redevelopment. Finally all erosion control practices will need to be consistent with NPDES construction permit requirements.

For erosion and sediment control in existing developments, the degree of fill compaction, the type of soils and grading will determine the potential for erosion. These areas will require special attention during future projects where the soil surface will be exposed.

3.5 WETLAND MANAGEMENT

In 1991, the Minnesota State Legislature adopted the Wetland Conservation Act (WCA). This Act establishes a program for protecting, preserving, and altering wetlands as identified within the Act. In order to ensure uniform administration of the WCA in Osseo, the appropriate Watershed Management Organization will take on the responsibility as the Local Governmental Unit (LGU) and implement wetland conservation strategies as required by the WCA. Furthermore, the adoption of wetland management strategies is also required by the Metropolitan Surface Water Management Act.

The Watershed Management Organization will have responsibilities for all wetland alteration activities. It should be noted that persons applying for wetland alteration permits are still responsible for obtaining the necessary permits from the DNR, MPCA, and/or the U.S. Army Corps of Engineers Regulatory Branch.

The National Wetland Inventory (NWI) wetlands in Osseo are shown in Appendix C.

Cowardin Classification

The Cowardin Classification system is used on the NWI maps and shown below in Table 3.5. The Cowardin Classification breaks wetland characteristics down into system, subsystem, class, subclass, and modifiers. A system refers to a complex of wetlands and deep-water habitats that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors. The following list summarizes the main systems, classes and modifiers currently present in the Osseo wetlands.

Table 3.5 Cowardin Wetland Classification of Osseo Wetlands

	CLASSIFICATION	***DESCRIPTION***
SYSTEM	Riverine	rivers, channels
	Lacustrine	lakes
	Palustrine	shallow freshwater
CLASS	Forested	woody vegetation 18 ft. or taller
	Scrub shrub	shrubs, young trees 18 ft. or less
	Aquatic bed	plants that normally grow on or below water surface
	Emergent	erect, rooted herbaceous plants
	Moss - lichen	moss or lichens on the surface
	Unconsolidated bottom	
WATER REGIME	Temporary flooded	
	Saturated	
	Seasonally flooded	
	Semipermanently flooded	
	Intermittently exposed	
MODIFIERS	Drained	
	Excavation	

Circular 39 Classification

The most widely used classification system in the United States is the U.S. Fish and Wildlife Service Circular 39 (Shaw and Fredine, 1956). The Circular 39 scheme is a fairly simple classification method. The distinctions between the eight types of wetlands are based primarily on the present hydrologic regime. The various hydrologic conditions usually result in different plant communities. The hydrologic conditions used for the different classes range from depth of water or periodic inundations. Descriptions of each class are offered on the following page.

Type 1 - Seasonally Flooded Basins and Flats: These areas are usually dry during much of the growing season. The surrounding land is often farmed extensively. On uncultivated herbaceous Type 1 wetlands, the vegetation is generally grasses and "weeds" such as cockleburs, ragweed, smarted and beggar ticks. On wooded Type 1 wetlands, the forest is typically cottonwood, black willow, silver maple and green ash in the over story, with nettles, poison ivy, wild grape and Virginia creeper on the ground layer.

Type 2 - Inland Fresh Meadow: Meadows usually have standing water in the spring, but are used as pasture during the summer. After heavy rains, standing water may accumulate to a few inches. The soil is usually saturated within a few inches of the surface throughout the growing season. Wild hay is often cut from these areas. Typical vegetation includes sedges, rushes, and a variety of grasses.

Type 3 - Inland Shallow Fresh Marshes: The soil is usually saturated during the growing season. Often it is covered with a few inches of water. Type 3 wetlands are often found bordering deep fresh marshes (Wetland Type 4) or as seed areas on irrigated lands. Common vegetation includes cattails, sedges, rushes, arrowhead, bur reed and smarted.

Type 4 - Inland Deep Fresh Marshes: The soil is covered with 6 inches to 3 feet or more of water during the growing season. These wetlands may border open water areas or completely fill shallow lake basins or sloughs. Vegetation includes cattails, wild rice, reeds, arrowhead and bulrushes. In open areas, submergent or floating-leaved aquatic plants such as pondweeds, duckweeds, coontail, or waterlilies may occur.

Type 5 - Inland Fresh Open Water: Shallow ponds and reservoirs. Water is usually less than 10 feet deep and is fringed by a border of emergent vegetation. Vegetation (mainly at depths of less than 6 feet) includes pondweeds, naiads, wild celery, water milfoils, muskgrasses, waterlilies, and coontail, and may sustain permanent populations of fish. Used extensively by waterfowl for feeding and resting during migration.

Type 6 - Shrub Swamps: The soil is usually saturated during the growing season. These wetlands often occur along sluggish streams and floodplains, but many are isolated. Vegetation includes alders, willows, dogwood, and buttonbush, as well as some herbaceous growths. These areas are valuable as food and cover for many forms of wildlife.

Type 7 - Wooded Swamp: The soil is saturated to within at least a few inches of the surface during the growing season, and is sometimes covered with water. These wetlands occur along sluggish streams and on floodplains. Northern conifer swamps can contain tamarack, white cedar, black spruce and balsam fir, with some broad-leaved species such as white birch and black ash. These areas serve as valuable deer yards in the winter. Understory types can include red-osier dogwood, alder, labrador tea, and other heath family shrubs and ground pines. Many types of protected orchids are found in these wetlands.

Type 8 - Bogs: The soil is usually saturated and supports a spongy covering of moss. Typical vegetation consists of heath shrubs, sphagnum moss, cranberries, sedges and cotton grass. Stunted black spruce and tamarack are often found in bogs. Surrounding vegetation is often upland forest.

Project proposers shall be required to field delineate wetland boundaries and coordinate with agencies responsible for administering wetland protection and permitting programs. Depending on the type and extent of the activity proposed, a substantial number of resource and review agencies could become involved. For most activities, however, the following list of wetland review authorities will be sufficient:

TABLE 3.5.1

Program	Review and Permitting Authority
Wetland Conservation Act of 1991	Board of Water and Soil Resources (BWSR): administer Wetland Conservation Act (WCA) regulations DNR: enforce the WCA Local Government Unit (LGU): implement the WCA
DNR Protected Waters Program	Minnesota DNR Metro Waters
Section 404, Clean Water Act	U.S. Army Corps of Engineers

Design of encroachments into a wetland or protected water, when permitted, shall provide compensatory volumes of equal or greater volume than that removed by the encroachment and compensatory areas to offset the elimination of vegetation which provides the biological treatment of storm water runoff and wildlife habitat. Osseo's policy is that there shall be no overall net loss of wetland area or volume.

3.6 GROUNDWATER MANAGEMENT

The groundwater under Osseo exists in two separate flow regimes: the glacial drift and the Jordan Aquifer. The water table in the glacial drift is approximately at an elevation of 848 ft., while the water table in the Jordan aquifer is approximately at an elevation of 840 ft. At this location, the river removed some of the glacial drift and deposited sand and gravel sediments forming the river terrace. While Osseo does not draw its own water directly from these aquifers, the City is located well within the wellhead protection areas of both the City of Maple Grove and the City of Brooklyn Park.

Groundwater contours across Osseo are flat because the underlying material is generally uniform sand which allows the groundwater to flow freely. In the western portion of the Shingle Creek Watershed, the scattered clay material retards the movement of groundwater and enables water in some locations to remain perched above the water table.

The City of Osseo currently does not own or operate any municipal wells. Previous municipal wells have been decommissioned and sealed in accordance to Well Head Protection standards. The City of Maple Grove supplies the entire drinking water supply. However, the City of Osseo recognizes the importance of protecting the groundwater supply within the City and surrounding communities.

Cooperation with the Hennepin County Environmental Services, Minnesota Department of Health, and the Minnesota Geological Survey will identify the groundwater quality, and the extent of the Contamination risk in relation to the existing land use and zoning.

3.7 FLOODPLAIN MANAGEMENT

The Flood Insurance Rate Map (FIRM) for the City of Osseo and the metropolitan urban service area (MUSA) that is identified as the City Limits indicates the community, as a whole, is classified as having no special flood hazard areas (SFHA). The effective date of such community classification from the FIRM Map is September 2, 2004.

At this time, no floodplain is defined in Osseo, in the event a floodplain is identified, floodplain regulations as adopted by the WMO shall be incorporated.

1. There shall be no encroachment upon the floodway area of the 100-year floodplain as defined in this plan. Alterations of the floodway may be proposed subject to approval of the SCWM Commission and the Minnesota Department of Natural Resources.

2. Encroachment shall be allowed in the floodway fringe area of the 100-year flood plain (as defined in the Shingle Creek and West Mississippi Watershed Management Plan) only if both of the following conditions are met:

    A. Compensatory storage is provided in the 100-year floodplain of equal or greater volume than that removed by the encroachment upon the floodway fringe.

    B. The encroachment does not create hazardous velocities.

3. Buildings within or adjacent to the 100-year floodplain shall be constructed so that the elevation of the top of the lowest floor is a minimum of 1.0 foot above the 100-year flood elevation as defined in this plan. The 1.0 foot of required freeboard is intended to allow for the increase of flood elevations as a result of future development and to provide a factor of safety for wind and wave action.

4. All site areas below the 100-year floodplain elevation after approval of allowable encroachments shall be preserved and dedicated for flood storage by means of granting an appropriate easement to the respective community.

3.8 EDUCATION

The successful implementation of the Water Management Plan will require Osseo Staff, City residents and developers to have a clear understanding of the objectives of the management policies. Informing the public of the Plan components is the goal of the education program. Since all City residents, staff, elected officials, developers and consulting firms will be impacted by the Plan, all of them need to be informed of the pertinent Plan policies.

The target audiences for the education program can be broken into four main groups:

1. City staff.
2. City Residents.
3. Development Community.
4. Outside Agencies having input into environmental decisions.

Each of these groups needs a thorough understanding of the major objectives and policies of the Plan. In addition, each group will require extensive training in specific aspects of the Plan pertaining to the manner in which they impact water quality. Several Citywide newsletter articles on various aspects of storm water quality were distributed during the planning process. These articles discussed the negative impacts of excessive fertilizing, improper disposal of hazardous waste materials and misuse of pesticides. They also provided some general guidelines for good housekeeping practices. The guidelines included mulching your grass, composting yard waste, avoiding the use of salts and deicers and avoiding chemical spills.

City Staff
City Staff will have a wide range of plan implementation responsibilities. Some examples might include:

1. Data collection and analysis.
2. Maintaining nutrient detention basin efficiencies.
3. Implementing a spill response program.
4. Enforcing Plan policies and recommendations.
5. Responding to public inquires about the Plan policies.
6. Developing annual budgets to implement the Plan.
7. Planning coordination and delivery of education programs to the public, school groups and other organizations.

In addition, City Staff will have overall Plan management responsibilities. It is important, therefore, that all City Staff members acquire a basic understanding of the Water Management Plan goals and policies. In-house training sessions at staff meetings should be adequate to provide the necessary information. In addition, various City Departments need to be trained in their particular areas of responsibility.

Training needs to be provided on proper sample collection, handling and storage. Emphasis should be placed on consistency in sampling procedures and sample location. An understanding of basic sampling and design necessary to collect usable data also should be provided to Staff.

Training should be provided on the proper methods of containing, neutralizing and disposing of the ills of oil, gasoline, pesticides, and other hazardous material. The crucial factor to emphasize is that spilled materials should not be washed into the storm sewer system. Oil absorbent materials should be available for use in spill containment and clean-up. Instructions for the proper use of these materials can be provided by the manufacturer.

Table 3.8 lists some major tasks, responsible Departments, the information needed to be disseminated, and likely sources and methods of training.

Table 3.8 Guide for Training Program

Task	Responsible Department	Source of Information
Data Collection and Analysis	Planning Engineering	MPCA Analytical lab NALMS publications
Spill Response Program	Public Works Fire Department Police Department	OSHA MPCA State Fire Marshall Equipment Manufactures (MSDS) League of Minnesota Cities

City Residents

In order to obtain the necessary political and economic support for successful Plan implementation, it will be vital to inform City residents about basic water quality concepts, the policies and recommendations in the Plan, the progress of water quality improvements in Osseo, and their role in improving water quality.

Initial education efforts should focus on explaining the causes of water quality degradation and the manner in which the Plan addresses these problems. Particular emphasis should be placed on the classification system, management criteria, and Plan policies. The management of resident expectations for the quality of a given waterbody will be important in maintaining public support for the Plan. This initial information can be presented to the public during the public hearing process, Osseo newsletter, and press releases to local papers.

Periodic updates on water quality trends in Osseo, the progress of Plan implementation, and information on specific improvement projects also should be provided to the public. Again, the Osseo newsletter and press releases to local papers are good methods to disseminate this information. In addition, City Staff should take advantage of the opportunities provided by local service clubs and church groups to speak at meetings. Finally, special efforts should be made to coordinate educational and environmental awareness programs with the school districts. These programs should focus on K through 12 science curricula, as well as adult community education.

Development Community

The Osseo Stormwater Management Plan will have a major impact on the future redevelopment of the community, therefore, informing developers and their consultants of the Plan requirements will be an important component of the education program. Much of the necessary information can be disseminated to the developers in an information packet during the preliminary plat stage. The information packet should contain the pertinent policies impacting development and basic information on the use of the NURP Design in determining the necessary pond design information.

Chapter 4

Implementation

4.1 INTRODUCTION

Chapter 4 addresses the primary goals, and policies identified in Chapter 1, and provides a more focused and detailed presentation of the strategies and actions described in Chapters 2 and 3. The seven Goals identified in Chapter 1 have been condensed into four implementation Objectives. Discussion of each Objective includes specific implementation strategies.

Objective	Action
Objective A: Reduce to the Greatest Practical Extent, the Public Capital Expenditures Necessary to Control Excessive Volumes, Rates of Runoff, and Flooding	City Council will address this matter and incorporate projects into the capital improvement program once modeled and developed.
Objective B: Improve Water Quality	
Objective C: Reduce Erosion and Sedimentation From Surface Flows.	
Objective D: Promote Groundwater Recharge	

In general, the implementation of this plan will be in three parts: completion and upgrade of Osseo-wide storm drainage system; construction of larger-scale projects to provide for subwatershed quantity and quality improvements; and private property improvements.

The first of these parts will be accomplished primarily through the Neighborhood Utility Upgrade Program which is financed through a variety of sources. Through this comprehensive, systematic street and utility reconstruction program, the northern and southern subdistricts will be reconstructed or rehabilitated, and the associated utilities installed, repaired, replaced, or upgraded as necessary. Most of the storm drainage improvements will be funded through this program. The storm drainage improvements are financed through a combination of Storm Drainage Utility funding and special assessments.

Consideration is required for Osseo when implementing the Neighborhood Utility Upgrade Program because of the fact that local drainage district, C-1, already has an established taxing district to upgrade the storm sewer system within the district.

Larger-scale projects such as regional water quality ponds will be constructed as a part of the neighborhood program above, as redevelopment provides an opportunity, or as other factors provide. These improvements will be financed primarily through the Storm Drainage Utility, but also may include special assessments or other financing.

Future Hennepin County CSAH 81 improvements may also provide opportunities for the City of Osseo to retrofit stormwater BMPs. In general, the City of Osseo will look for partnering opportunities with the County and neighboring municipalities to implement stormwater management enhancements.

Finally, where possible, Osseo encourages private developers to consolidate quantity and quality improvements with other regional improvements to avoid proliferations of ponds and other structures to be maintained, but where that is impractical or infeasible, individual developers are responsible for meeting water management standards on their private property. Private developments are also reviewed to determine if it is possible for Osseo to "piggyback" on private developments by financing the up-sizing of private improvements to accommodate other regional needs.

The discussion of the four implementation objectives is organized as outlined below:

1. Objective
2. Issue
3. Relevant Goals and Policies
4. Watershed Management Plan Requirements
5. Discussion
6. Implementation

4.2. OBJECTIVE A: REDUCE TO THE GREATEST PRACTICAL EXTENT, THE PUBLIC CAPITAL EXPENDITURES NECESSARY TO CONTROL EXCESSIVE VOLUMES, RATES OF RUNOFF, AND FLOODING

ISSUE:

Control of excessive rates of runoff often results in the need to construct capital improvement projects that require significant amounts of funding. In order to adequately address runoff rates and improvements, specific improvement solutions and associated costs must be identified and prioritized. Specific cost versus benefit comparisons must be analyzed and studied for various improvement proposals. Ideally, it would be desirable to construct and implement all capital improvements needed to meet all issues and problems identified in this plan. However, funding for such improvements exists, in finite amounts, and careful planning and prioritization must be administered in order to provide the most prudent use of funds and benefit to the taxpayers and community at large.

RELEVANT GOALS: 1, 2, 3

Applicable Policies: 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2

WMC REQUIREMENTS:

Osseo will be responsible for administering runoff management requirements as described in Rule D of the SCSWMP and WMSWMP plans, as follows:

1. Subwatershed delineations.
2. Identifying existing and proposed physical environments and land use.
3. Determinations of specific runoff and discharge rates for rainfall events in the existing and future year development conditions.
4. Storage volume determinations and allocation of storage.
5. Measures to be employed to protect wetlands, ditches, drainage ways and storm water storage areas.
6. Implementation measures as identified in a Capital Improvements Program.

In addition, specific studies and capital improvements are further identified in this section and shall be implemented in accordance with the WMC's plan.

DISCUSSION:

While present hydrologic information provided in Chapter 2 identifies critical needs for the establishment of capital improvements, further hydrologic analysis is generally required for each individual subwatershed to provide more detailed capital strategies. These further analyses and studies are intended to coincide with Osseo's annual neighborhood street reconstruction program.

Individual neighborhood improvement projects will provide the most opportune time to implement many individual surface water improvements. In addition to specific capital expenditure improvement projects, other means and methods shall be utilized to the greatest extent possible to limit the amount of excess volumes and rates of runoff. These are further identified below.

MANAGEMENT STANDARDS

Osseo's Management Standards adopt those of the Watershed Management Commissions as reproduced here, except the City adopts the detention pond design standards commonly known as the "NURP" standards.

Detention Basin Standards

Detention basins, whether on site or regional, shall be designed to incorporate NURP standards, including the following guidelines.

To protect downstream channels from erosion and enhance water quality, additional flood control criteria is also required for the basic basin design: A flood pool (live storage) above the normal outlet adequate to retain runoff volumes required to limit peak discharge rates for the 2-year, 10-year and 100-year, 24 hour rainfall events to pre-project levels.

IMPLEMENTATION:

1. Through detailed hydrologic modeling, identify and prioritize specific problem areas, solutions, and capital improvement costs. Hydraulic modeling and discharge rates are identified in Chapter 2 of this plan.

2. Provide hydrologic modeling on a more detailed basis, as needed, for each subwatershed within Osseo. Additional hydrologic modeling shall be conducted annually for certain areas of Osseo that are scheduled for improvements under the street reconstruction program. Additional hydrologic modeling shall be performed within the frame work of the modeling presented in Chapter 2 of this Plan. The modeling shall explore, in greater detail, the specific sizing and location of certain improvements and shall utilize a 10-year design event for conveyance systems. Storm water quantity and runoff control recommendations for individual subwatersheds are further described within the context of Chapter 2 for each watershed.

3. Capital Improvements - Prioritize and manage expenditures cost-effectively by considering implementation with other projects/programs and joint programming with other agencies. Improvements shall incorporate water quality issues as well as water quantity needs as much as is feasibly possible.

4. Encourage promotion of pervious (green space) surfaces and enforce existing green space development ordinances, to reduce runoff.

5. Enforce all building code requirements, including the requirement that all habitable structures are protected from flooding during a 100 year rainfall event.

6. Other Strategies:

   A. Acquire property for ponding and storage needs as much as feasibly possible. Ponding facilities shall be designed, constructed, and prioritized in accordance with water quality and quantity needs, as well as feasibility on a case-by-case basis. Ponding shall incorporate NURP design guidelines in order to achieve water quality treatment.

   B. Maintain the existing conveyance system capacity as much as possible through annual inspection, maintenance, and rehabilitation, as required. Identify specific maintenance needs and include those needs within the existing annual maintenance program.

   C. Preserve existing wetlands, green space, and natural drainage enhancement facilities as much as possible.

   D. Evaluate the goals of infiltration and volume management as opportunities arise.

4.3. OBJECTIVE B: IMPROVE WATER QUALITY

ISSUE:

The EPA considers urban runoff to be non-point source pollution constituting over 50% of the total receiving water quality problem. Street refuse often contains significant amounts of organism, heavy metals, pesticides and bacteria.

RELEVANT GOALS: 2

Applicable policies: 2.1 – 2.9

WMC REQUIREMENTS:

Osseo will be responsible for addressing water quality protection as described in the WMC Rule D.

DISCUSSION:

In addition to specific capital expenditure improvement projects, other management means and methods shall be utilized to the greatest extent possible to limit the amount of excess volume and rates of runoff. Consideration of the water quality issues as identified in Section 3.3 shall be included in establishing these implementation measures. These are further identified below in the Implementation section.

IMPLEMENTATION:

1. Through detailed hydrologic modeling and surveying, identify and prioritize specific problem areas, solutions, and capital improvement costs. Additional modeling that considers water discharge rates and water quantity control measures also should include measures to address water quality.

2. Prioritize and manage expenditures cost-effectively by considering implementation of water quality treatment measures with other projects, programs, and joint programming with other agencies.

3. The construction of storm water treatment ponds, conforming to NURP guidelines. Cost of treatment facilities shall be compared to actual benefits to determine feasibility. Conformance with requirements of the WMC addressing water treatment facility requirements for, developments/redevelopments over 5 acres shall be addressed. Facilities to accommodate regional and/or multiple watershed areas shall be considered when possible.

4. The construction of outlet treatment containment structures (grit chambers, skimmers, sumps, special control structures, etc.) wherever feasible and practical.

5. Conformance and adherence to BMPs at all times in accordance with guidelines established in the Minnesota Stormwater Manual (http://stormwater.pca.state.mn.us/index.php/Main_Page). BMP measures shall be established for all construction activity throughout Osseo at all times.

6. Consideration of treatment facilities in conjunction with water quantity improvement measures.

7. Aggressive enforcement of BMP practices and site erosion and runoff control for all site, construction, and building activity within Osseo.

8. Establishment of a Public Awareness and Education Program targeting individual citizens to promote responsibility and awareness regarding their role in water quality. The program administered by mailings and other appropriate media will address the proper use of lawn fertilizer, disposal of wastes, and other information as appropriate.

9. Facilitate NPDES Phase II –MS 4 permit requirements.

10. Consideration of chloride TMDL strategies such as the WMC Salt Management Plan.

11. Incorporation of strategies identified in the TMDL Implementation Plan to increase dissolved oxygen and the biotic integrity of Shingle Creek.

4.3. OBJECTIVE C: REDUCE EROSION AND SEDIMENT FROM SURFACE FLOWS.

ISSUE:

New construction work is the most important short-term source of sediments and pollutants reaching water bodies. In addition, excessive erosion and sedimentation incurs significant maintenance costs to Osseo for street sweeping, catch basin and storm sewer maintenance, dust control, and general property upkeep.

RELEVANT GOALS: 3

Policies: 3.1, 3.2, 3.3

WMC REQUIREMENT:

It is the policy of the WMC to control runoff and erosion and to retain or control sediment on land during land disturbing activities by requiring the preparation and implementation of erosion and sediment control plans.

DISCUSSION:

Many of the implementation measures and requirements of the WMC historically have been enforced by Osseo, however, stricter enforcement of existing rules and policies, as well as, further implementation measures, are desired.

IMPLEMENTATION:

1. Monitor development compliance with NPDES construction permit requirements and enforce the City's erosion control ordinance. Maximize natural cover as much as possible to reduce erosion.
2. Support the efforts and regulations of the WMC in addressing soil and sediment stabilization.
3. Require all developments and site improvement plans to submit an erosion and sedimentation control plan as part of the overall plan approval by Osseo, in accordance with the requirements.
4. Identify areas sensitive to erosion. Include improvements, as appropriate, within Osseo's Capital improvement Program.
5. Facilitate NPDES Phase II – MS4 minimum requirements

4.4. OBJECTIVE D: PROMOTE GROUNDWATER RECHARGE

ISSUE:

Because Osseo receives its entire potable water supply from groundwater supplies, contamination of the water supply source by surface leaching is the most important groundwater issue.

RELEVANT GOALS: 5

Policies: 5.1, 5.2, 5.3

WMC REQUIREMENT:

Osseo will be responsible for addressing groundwater recharge as described in the WMC's Rules and Standards, Rule D.

DISCUSSION:

The WMC encourages designs using surface drainage, vegetation and infiltration rather than buried pipes and man-made materials and facilities. The WMC has established specific requirements for those project meeting their design review criteria. In addition to the requirements of the WMC, Osseo will implement appropriate measures to maintain ground water quality. This is of particular interest to Osseo since all potable water is supplied from groundwater supplies.

Osseo's comprehensive plan and zoning ordinance serves as a guide to regulate land use activity:

1. The land use documents are intended to guide and control specific land use activities within the city.
2. The zoning ordinance regulates the specific types of land use within specific zoning districts of the city.
3. With the land use regulations in place, Osseo is able to better promote groundwater recharge.
4. With new development and redevelopment opportunities, Osseo will look for opportunities to implement the goals of infiltration and volume management.

IMPLEMENTATION:

The following is an implementation process list of the recommended actions, timing, responsible party, and the cost or funding sources which are presented for the City Council's consideration based upon the data compiled in this report. Actions are listed in order of priority, from highest to lowest.

Action	Timing	Responsible Party	Funding Source
Maintain and implement Capital Improvement Program	On-going, updated on a 5 year period	City of Osseo	Storm water area charge, utility fee and project specific engineering budgets
Storm water maintenance program to ensure the successful operation of the drainage system.	On-going	City of Osseo	Storm water area charge, utility fee and annual engineering and maintenance budgets
Corrective actions for storm water problems be developed and implemented.	On-going, as problems are brought to the attention of Staff	City of Osseo	Storm water area charge, assessments and project specific engineering budgets
Enforcement of the erosion and sedimentation control ordinance for new developments.	On-going, as development projects are submitted to the City for approval	City of Osseo	Funding by developer's fees, building permits and fines collected for non-compliance
Encourage low impact development and better site design components for new development projects.	On-going, as development projects are submitted to the City for approval	City of Osseo	Funding by developer's fees and project specific engineering budgets

Action	Timing	Responsible Party	Funding Source
Established modeled ponding areas and maximum flow rates and volumes as referenced during initial phases of development projects.	On-going, as developments are submitted to the City for approval	City of Osseo	Funding by developer's fees and annual engineering budget
Review procedures to be established to ensure all Construction projects within the City are in compliance with erosion control ordinance.	On-going	City of Osseo	Funding by developer's fees and annual engineering budget
Update the City detailed hydrologic analysis during final design of all ponding areas.	Currently in place. Update as necessary.	City of Osseo	Funding by developer's fees and project specific engineering budgets
High water elevations governing building finish floor elevations adjacent to ponding areas and floodplains be established per this Plan, Rules, and Ordinance.	On-going, as development projects are submitted to the City for approval	City of Osseo	Funding by developer's fees and building permits.
Emergency overflow routes be established and maintained to provide stabilized relief during extreme storm conditions, which exceed design conditions.	On-going, as development projects are submitted to the City for approval	City of Osseo	Funding by developer's fees and project specific engineering budgets

Action	Timing	Responsible Party	Funding Source
An education program for City residents, staff, and development community developed and implemented.	On-going	City of Osseo	City of Osseo with assistance from the WMO, DNR & U of M Extension Service
Amendments to the SWMP be adopted and implemented and the SWMP be updated.	As warranted by future standards or regulations	City of Osseo	Storm water area charge and annual engineering budget
Encourage landowners to retain areas of native vegetation, and to plant species native to the area, to protect and improve wildlife habitat and maintain the historic ecological role.	On-going, as developments are submitted to the City for approval	City of Osseo	Funding by developer's fees, storm water utility and project specific engineering budgets
Develop a Salt Management Plan for Shingle Creek chloride TMDL.	On-going	City of Osseo, WMO	MPCA, WMO, BWSR, DNR, City of Osseo, etc.

4.6 FINANCING

The City of Osseo completed an inventory of the existing storm sewer system and also completed and updated a storm sewer model for its entire system. This will serve as the basis for a CIP for the surface water management plan.

The information gathered in the inventory can be used to identify storm sewer system deficiencies that may require improvement. Improvements will then be implemented into the development of a City CIP.

System deficiencies may require multiple funding sources from different manners of mechanisms to make future system improvements. The cost of implementing the Surface Water Management Plan will be supported by several revenue sources. The following are several of the sources that will be used to implement the plan, where applicable. As redevelopment occurs within the City; the amount of impervious cover typically increases. This places additional burden on the existing storm sewer infrastructure by increasing the volume of storm water runoff, which also increases the amount of pollutants transferred downstream to the receiving waters. To minimize these impacts, reconstruction and redevelopment shall implement these standards and associated rules.

Potential Funding Source	Revenue Produced
• City's Storm Water Utility Fee The City has implemented a storm water utility fee that is charge to property owners on a monthly basis. The funds generated from this fee are used to finance a storm water management program.	• Approximately $50K per year
• Special Assessments The idea behind this assessment method is that generally the benefited properties pay in relation to the benefits received. The benefit would be realized by an increase in market value of the property that resulted from the improvement.	• Variable depending on the projects undertaken.
• Grants State and Federal grants are available for surface water management and non-point source pollution. Grants can be a good way to help fund special projects that meet grant eligibility criteria, but are not a good finance source to depend upon for an annual income source.	• Variable depending on the projects undertaken.
• Land Development Fees As redevelopment occurs within the City, the developer pays a storm sewer trunk fee based upon the net acreage of the property, exclusive of road right-of-way and public ponding areas. If the development includes oversizing of trunk facilities, a credit for oversizing will be given to the developer. If the City determines that a development is premature, the developer will pay for oversizing.	• Variable depending upon the amount of development that occurs on an annual basis.

The City of Osseo's storm water utility fee was adopted by the City Council in 2007. Implementation of this fee generates approximately $50K in new revenues for the City which are dedicated to storm water management. It is clear, however, that these fees, alone, cannot fully fund the identified and unidentified storm water needs of the City. There are no current plans to increase the storm water utility rate structure, however the utility fee will be evaluated on an annual basis and adjusted at the discretion of the City Council. The City of Osseo does not currently have a formal assessment policy it utilizes for public improvement projects. Assessments of recently completed projects have been determined on a project-by-project basis.

4.8 AMENDMENTS TO THIS PLAN

As adopted, the plan is valid until such time as Osseo is required to, or finds it necessary to, review and amend the Comprehensive Plan in its entirety.

Amendments to the Local Water Management Plan shall be considered in the same manner as amendments to the Comprehensive Plan, except that they shall be reviewed and approved by the appropriate Watershed Management Organization(s) and Metropolitan Council Environmental Services prior to adoption by Osseo.

APPENDIX A

EXHIBITS

FIGURE 1
FIGURE 2
FIGURE 3
WETLAND INVENTORY
STORM SEWER LAYOUT

CITY OF OSSEO

COMPREHENSIVE STORMWATER MANAGEMENT PLAN

SHINGLE CREEK & WEST MISSISSIPPI WATERSHEDS

Legend

- OSSEO CITY LIMITS
- WATERSHED BOUNDARIES
- PONDS (PRIVATE)
- INFILTRATION BASIN (PRIVATE)

N

0 600 1200

SCALE IN FEET

FIGURE NO. 1
APRIL 2015

H:\OSSE\T16107753\SWMP\Figure 1 - WMO Watersheds.dwg 4/17/15 6:28 am

CITY OF OSSEO

COMPREHENSIVE STORMWATER MANAGEMENT PLAN

CITY OF OSSEO
SUBWATERSHEDS

WEST MISSISSIPPI WATERSHED

N-1

N-3

N-4

S-1

S-2

S-3

S-4

S-5

S-6

C-1

C-2

C-3

SOUTH DISTRICT

CENTRAL DISTRICT

OSSEO CITY LIMITS
MUSA BOUNDARY

CITY OF MAPLE GROVE

SHINGLE CREEK WATERSHED

5TH ST NW
4TH ST NW
3RD ST NW
2ND ST NW
BROADWAY ST W
1ST ST NE
2ND ST SE
3RD ST SE
1ST AVE NW
2ND AVE NW
CENTRAL AVE
1ST AVE NE
JEFFERSON HWY N
COUNTY RD NO 81

Legend

- OSSEO CITY LIMITS
- WATERSHED BOUNDARIES
- SUB–WATERSHED DISTRICT

N

0 600 1200

SCALE IN FEET

FIGURE NO. 2
APRIL 2015

H:\OSSE\T16107753\SWMP\Figure 2 - Subwatersheds.dwg 4/17/15 6:30 am

CITY OF OSSEO

COMPREHENSIVE STORMWATER MANAGEMENT PLAN

OSSEO STORM SEWER NETWORK

WEST MISSISSIPPI WATERSHED

SHINGLE CREEK WATERSHED

OSSEO CITY LIMITS
MUSA BOUNDARY

CITY OF MAPLE GROVE

CITY OF BROOKLYN PARK

COUNTY RD NO 30

COUNTY RD NO 81

STATE HWY NO 169

93RD AVE N

6TH ST NW

5TH ST NW

4TH ST NW

3RD ST NW

2ND ST NW

BROADWAY ST W

BROADWAY ST E

2ND ST SE

BRIDGE ST

86TH AVE N

Legend

- OSSEO CITY LIMITS
- STORM PIPING NETWORK (DIAMETERS VARY)
- STORM DITCH

N

0 600 1200

SCALE IN FEET

FIGURE NO. 3
APRIL, 2015

H:\OSSE\T16107753\SWMP\ExistingStorm Map.dwg 4/15/15 3:45 pm

APPENDIX B

WMC RULES AND STANDARDS

Shingle Creek
And
West Mississippi

Watershed Management Commissions

Rules and Standards

April 2013

Revisions Effective April 11, 2013
Amended July 11, 2013

SHINGLE CREEK/WEST MISSISSIPPI
WATERSHED MANAGEMENT COMMISSIONS
RULES AND STANDARDS

POLICY STATEMENT

The Shingle Creek and West Mississippi Watershed Management Commissions are Joint Powers Associations of the State under the Minnesota Watershed Act, and watershed management organizations as defined in the Metropolitan Surface Water Management Act. These acts provide the Commissions with power to accomplish their statutory purpose: the conservation, protection, and management of water resources in the boundaries of the watersheds through sound scientific principles.

The Commissions have adopted a water resources management plan pursuant to the Acts. These Rules implement the plan's principles and objectives.

Land alteration and utilization can affect the rate and volume and degrade the quality of surface water runoff within the watersheds. Sedimentation from ongoing erosion and construction activities will reduce hydraulic capacity of waterbodies and degrade water quality. Water quality problems already exist in many waterbodies in the watershed. Several of the waterbodies have been designated by the State of Minnesota as Impaired Waters, and do not meet state water quality standards.

Activities that increase the rate or volume of stormwater runoff will aggravate existing flooding problems and contribute to new ones. Activities that degrade runoff quality will cause quality problems in receiving water. Activities that fill floodplain or wetland areas will reduce flood storage and hydraulic capacity of waterbodies, and will degrade water quality by eliminating the filtering capacity of such areas.

These Rules and Standards protect the public health, welfare, and natural resources of the watershed by regulating the improvement or alteration of land and waters in the watershed to 1) reduce the severity and frequency of high water, 2) preserve floodplain and wetland storage capacity, 3) improve the chemical and physical quality of surface waters, 4) reduce sedimentation, 5) preserve the hydraulic and navigational capacities of waterbodies, 6) promote and preserve natural infiltration areas, and 7) preserve natural shoreline features. In addition to protecting natural resources, these Rules and Standards are intended to minimize future public expenditures on problems caused by the improvement or land and water alterations.

RELATIONSHIP WITH MUNICIPALITIES AND COUNTY

The Commissions recognize that the control and determination of appropriate land use is the responsibility of the municipalities and the county. The Commissions will review projects involving land-disturbing activities as requested by the local municipalities. The Commissions intend to be active in the regulatory process to ensure that water resources are managed in accordance with its goals and policies. The Commissions will require a project review for developments and improvements in the watershed that meet the thresholds specified in the Rules.

The Commissions desire to provide technical advice to the municipalities in the preparation of local stormwater management plans and the review of projects that may affect water resources prior to investment of significant public or private funds.

RULE A - DEFINITIONS

For the purposes of these Rules, unless the context otherwise requires, the following words and terms shall have the meanings set forth below. References in these Rules to specific sections of the Minnesota Statutes or Rules include amendments, revisions or recodifications of such sections. The words "shall" and "must" are mandatory; the word "may" is permissive.

Abstraction. Removal of stormwater from runoff, by such methods as infiltration, evaporation, transpiration by vegetation, and capture and reuse, such as capturing runoff for use as irrigation water.

Agricultural Activity. The use of land for the production of agronomic, horticultural or silvicultural crops, including nursery stock, sod, fruits, vegetables, flowers, cover crops, grains, Christmas trees, and grazing.

Alteration or Alter. When used in connection with public waters or wetlands, any activity that will change or diminish the course, current, or cross-section of public waters or wetlands.

Applicant. Any person or political subdivision that submits an application to the Commissions for a project review under these Rules.

Best Management Practices (BMPs). Techniques proven to be effective in controlling runoff, erosion and sedimentation including those documented in the Minnesota Construction Site Erosion and Sediment Control Planning Handbook (BWSR 1988), Protecting Water Quality in Urban Areas (MPCA 2000), and the Minnesota Stormwater Manual (MPCA 2005) as revised.

Biofiltration. Using living material to capture and/or biologically degrade or process pollutants prior to discharging stormwater, such as directing runoff through a vegetated buffer or to a rain garden or vegetated basin with an underdrain.

Bioretention. A terrestrial-based (upland, as opposed to wetland) water quality and water quantity control process. Bioretention employs a simplistic, site-integrated design that provides opportunity for runoff infiltration, filtration, storage and water uptake by vegetation.

Buffer Strip. An area of natural, unmaintained, vegetated ground cover abutting or surrounding a watercourse or wetland.

BWSR. The Minnesota Board of Water and Soil Resources.

Commission. The Shingle Creek or West Mississippi Watershed Management Commission, as applicable.

Commissioners. The Board of Commissioners of the Shingle Creek or West Mississippi Watershed Management Commissions.

Compensatory Storage. Excavated volume of material below the floodplain elevation required to offset floodplain fill.

County. Hennepin County, Minnesota.

Dead Storage. The permanent pool volume of a water basin or the volume below the runout elevation of a water basin.

Detention Basin. Any natural or manmade depression for the temporary storage of runoff.

Development. The construction of any structure on or the subdivision of land.

Drain or Drainage. Any method for removing or diverting water from waterbodies, including excavation of an open ditch, installation of subsurface drainage tile, filling, diking, or pumping.

Erosion. The wearing away of the ground surface as a result of wind, flowing water, ice movement, or land disturbing activities.

Erosion and Sediment Control Plan. A plan of BMPs or equivalent measures designed to control runoff and erosion and to retain or control sediment on land during the period of land disturbing activities in accordance with the standards set forth in these Rules.

Excavation. The artificial removal of soil or other earth material.

Fill. The deposit of soil or other material by artificial means.

Filtration. A process by which stormwater runoff is captured, temporarily stored, and routed through a filter bed to improve water quality and slow down stormwater runoff.

Floodplain. The area adjacent to a waterbody that is inundated during a 100-year flood.

HCD. The Hennepin Conservation District.

Impaired Water. A waterbody that does not meet state water quality standards and that has been included on the MPCA Section 303(d) list of Impaired Waters of the state.

Impervious Surface. A surface compacted or covered with material so as to be highly resistant to infiltration by runoff. Impervious surface shall include roads, driveways and parking areas, whether or not paved, sidewalks greater than 3 feet wide, patios, tennis and basketball courts, swimming pools, covered decks and other structures. Open decks with joints at least ¼ inch

wide, areas beneath overhangs less than 2 feet wide, and sidewalks 3 feet or less wide shall not constitute impervious surfaces under these Rules.

Infiltration. The passage of water into the ground through the soil.

Infiltration Area. Natural or constructed depression located in permeable soils that capture, store and infiltrate the volume of stormwater runoff associated with a particular design event.

Interested Party. A person or political subdivision with an interest in the pending subject matter.

Land Disturbing Activity. Any change of the land surface to include removing vegetative cover, excavation, fill, grading, and the construction of any structure that may cause or contribute to erosion or the movement of sediment into waterbodies. The use of land for agricultural activities shall not constitute a land disturbing activity under these Rules.

Landlocked Basin. A basin that is 1 acre or more in size and does not have a natural outlet at or below the 100-year flood elevation as determined by the 100-year, 10-day runoff event.

Low Floor. The finished surface of the lowest floor of a structure.

Member City. Any city wholly or partly within the Commission's boundary that has executed the Joint Powers Agreement.

MnDOT. The Minnesota Department of Transportation.

MPCA. The Minnesota Pollution Control Agency.

Municipality. Any city wholly or partly within the Commission's boundary.

NPDES. National Pollutant Discharge Elimination System.

NRCS. The Natural Resource Conservation Service.

NURP. The Nationwide Urban Runoff Program developed by the Environmental Protection Agency to study stormwater runoff from urban development.

Ordinary High Water Level (OHW). The boundary of waterbodies and shall be an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the OHW level is the elevation of the top of the bank of the channel. For reservoirs and flowages, the OHW level is the operating elevation of the normal summer pool.

Owner. The owner of a parcel of land or the purchaser under a contract for deed.

Parcel. A parcel of land designated by plat, metes, and bounds, registered land survey, auditor's subdivision, or other accepted means and separated from other parcels or portions by its designation.

Person. Any individual, trustee, partnership, unincorporated association, limited liability company or corporation.

Political Subdivision. A municipality, county or other political division, agency or subdivision of the state.

Project. A space, parcel, or parcels of real property owned by one or more than one person which is being or is capable of being developed or redeveloped as a single project.

Public Health and General Welfare. Defined in Minnesota Statutes, Section 103D.011, Subdivisions 23 and 24.

Public Waters. Any waters as defined in Minnesota Statutes, Section 103G.005, Subdivision 15.

Public Waters Wetland. Any wetland as defined in Minnesota Statutes, Section 103G.005, Subdivision 15a.

Redevelopment. The rebuilding, repair, or alteration of a structure, land surface, or facility for which over 50% of the parcel involved is disturbed by a land-disturbing activity.

Runoff. Rainfall, snowmelt or irrigation water flowing over the ground surface.

Sediment. Soil or other surficial material transported by surface water as a product of erosion.

Sedimentation. The process or action of depositing sediment.

Shoreland Protection Zone. Land located within a floodplain or within 1,000 feet of the OHW of a public water or public waters wetland.

Site. A space, parcel, or parcels of real property owned by one or more than one person which is being or is capable of being developed or redeveloped as a single project.

Standard. A required level of quantity, quality, or value.

Stormwater Management Plan. A plan for the permanent management and control of runoff prepared and implemented in accordance with the standards set forth in these Rules.

Structure. Anything manufactured, constructed or erected which is normally attached to or positioned on land, including portable structures, earthen structures, roads, water and storage systems, drainage facilities and parking lots.

Subdivision or Subdivide. The separation of a parcel of land into two or more parcels.

TMDL. The Total Maximum Daily Load is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. "TMDL" can also refer to a study that calculates that load, or to the allocation of that allowable load to its various sources. An Implementation Plan may be part of the TMDL study or it may be a separate document that sets forth the steps that will be taken to achieve the TMDL.

Volume Management. The retention and abstraction of a certain volume of stormwater runoff onsite through techniques such as infiltration, evapotranspiration, and capture and reuse.

Water Basin. An enclosed natural depression with definable banks capable of containing water that may be partly filled with public waters.

Waterbody. All water basins, watercourses and wetlands as defined in these Rules.

Watercourse. Any natural or improved stream, river, creek, ditch, channel, culvert, drain, gully, swale, or wash in which waters flow continuously or intermittently in a definite direction.

Water Resources Management Plan. The watershed management plan for the Commission adopted and implemented in accordance with Minnesota Statutes, Section 103B.231.

Watershed. Region draining to a specific watercourse or water basin.

Wetland. Land transitional between terrestrial and aquatic systems as defined in Minnesota Statutes, Section 103G.005, Subdivision 19.

Wetland Conservation Act (WCA). Minnesota Wetland Conservation Act of 1991 as amended.

RULE B - PROCEDURAL REQUIREMENTS

1. **APPLICATION REQUIRED**. Any person, or political subdivision, undertaking an activity for which a project review is required by these Rules shall first submit to the applicable Commission a project review application, design data, plans, specifications, fees, and such other information and exhibits as may be required by these Rules. Project review applications shall be signed by the owner, or the owner's authorized agent, except for activities of a political subdivision which may be signed by either the owner or the general contractor. All project review applications must be authorized by the municipality where the proposed project is located.

2. **FORMS**. Project review applications shall be submitted on forms provided by the Commission. Forms are available at the Commission office or Internet Web site.

3. **ACTION BY COMMISSION**. The Commission shall act within 60 days after receipt of a complete application, including all required information, exhibits and fees. If a state or federal law or court order requires a process to occur before the Commission acts on an application, or if an application requires prior approval of a state or federal agency, the deadline for the Commission to act is extended to 60 days after completion of the required process or the required prior approval is granted. The Commission may extend the initial 60-day period by providing written notice of the extension to the applicant. The extension may not exceed 60 days unless approved by the applicant.

4. **SUBMITTAL**. A complete project review application with all required information and exhibits shall be filed with the Commission at least 14 calendar days prior to the scheduled meeting date of the Commission. Late or incomplete submittals will be scheduled to a subsequent meeting date.

5. **NOTIFICATION**. The Commission shall mail notice of the project review application to the owners of land located adjacent to the described activity, adjacent defined as located within the radius for which notice is required by the member city for review by its Planning Commission of site plan submittals, to a maximum of 300 feet (or 300 feet if the municipality does not require mailed notice of plan reviews), and to the member city or county with jurisdiction over the activity, at least 7 days prior to the scheduled meeting date of the Commission at which the application will be considered. The names and addresses of the owners to be notified shall be obtained by the applicant from the Hennepin County Office of Taxpayer Services and furnished to the Commission on mailing labels or electronic file with the project review application. The project review application will not be processed until the list of owners has been submitted. Notice may be waived by the member city if such a notification has been made as a part of the Planning Commission review process. Neither the failure to give mailed notice to any owner nor any defect in the notice shall invalidate an action by the Commission on a project review application.

6. **CONDITIONS**. A project review may be approved subject to reasonable conditions to assure compliance with these Rules. The conditions may include a requirement that the applicant and owner enter into an agreement with the member city in a form acceptable to the Commission to a) specify responsibility for the construction and future maintenance of approved structures or facilities, b) document other continuing obligations of the applicant or owner, c) grant reasonable access to the proper authorities for inspection, monitoring and enforcement purposes, d) affirm that the Commission or other political subdivisions can require or perform necessary repairs or reconstruction of such structures or facilities, e) require indemnification of the Commission for claims arising from issuance of the approved project review or construction and use of the approved structures or facilities, and f) reimburse the reasonable costs incurred to enforce the agreement. Project reviews and agreements may be filed for record to provide notice of the conditions and continuing obligations.

7. **ISSUANCE OF PROJECT REVIEWS**. The Commission will issue a project review approval only after the applicant has satisfied all requirements of these Rules and paid all required fees.

8. **VALIDITY**. Issuance of a project review approval based on plans, specifications, or other data shall not prevent the Commission from thereafter requiring the correction of errors in the approved plans, specifications and data, or from preventing any activity being carried on thereunder in violation of these Rules.

9. **MODIFICATIONS**. The applicant shall not modify the approved activity or plans and specifications on file with the Commission without the prior approval of the Commission.

10. **INSPECTION AND MONITORING**. After issuance of a project review approval, the Commission may perform such field inspections and monitoring of the approved activity as the Commission deems necessary to determine compliance with the conditions of the project review and these Rules. Any portion of the activity not in compliance shall be promptly corrected. In applying for a project review, the applicant consents to entry upon the land for field inspections and monitoring, or for performing any work necessary to bring the activity into compliance.

11. **SUSPENSION OR REVOCATION**. The Commission may suspend or revoke an approved project review issued under these Rules whenever the project review approval is issued in error or on the basis of incorrect information supplied, or in violation of any provision of these Rules, or if the preliminary and final project approvals received from the municipality or county are not consistent with the conditions of the approved project review.

12. **REGULAR MEETINGS**. Regular meetings of the Commission are held on the second Thursday of each month at 12:45 p.m., unless notice of a different date or time is given.

13. **SEVERABILITY**. If any provision of these Rules is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of these Rules shall not be affected thereby.

RULE C - GENERAL STANDARDS

1. **POLICY**. It is the policy of the Commission to protect the water resources of the watershed by requiring that all activities within the watershed comply with minimum standards for the protection of water quality and the environment.

2. **REGULATION.**

(a) All land disturbing activities, whether requiring a project review under these Rules or otherwise, shall be undertaken in conformance with BMPs and in compliance with the standards and criteria in these Rules.

(b) Project reviews are required of any land disturbing activity meeting the review thresholds set forth in Rule D Section 2.

(c) In areas that drain to Impaired Waters, TMDL Implementation Plans may include site-specific requirements for any land-disturbing activities that are in addition to these rules and standards.

(d) No person shall conduct land-disturbing activities without protecting adjacent property and waterbodies from erosion, sedimentation, flooding, or other damage.

(e) Development shall be planned and conducted to minimize the extent of disturbed area, runoff velocities, and erosion potential, and to reduce and delay runoff volumes. Disturbed areas shall be stabilized and protected as soon as possible and facilities or methods used to retain sediment on-site.

(f) When possible, existing natural watercourses and vegetated soil surfaces shall be used to convey, store, filter, and retain runoff before discharge into public waters or a stormwater conveyance system.

(g) When possible, runoff from roof gutter systems shall discharge onto lawns or other pervious surfaces to promote infiltration.

(h) Use of fertilizers and pesticides in the shoreland protection zone shall be so done as to minimize runoff into public waters by the use of earth material, vegetation, or both. No phosphorus fertilizer shall be used unless a soil nutrient analysis shows a need for phosphorus or in the establishment of new turf.

(i) When development density, topographic features, and soil and vegetation conditions are not sufficient to adequately handle runoff using natural features and vegetation, various types of constructed facilities such as diversions, settling basins, skimming devices, dikes, waterways, and ponds may be used. The Commission encourages designs using surface drainage, vegetation and infiltration rather than buried pipes and man-made materials and facilities.

(j) Whenever the Commission determines that any land disturbing activity has become a hazard to any person or endangers the property of another, adversely affects water quality or any waterbody, increases flooding, or otherwise violates these Rules, the Commission shall notify the member city where the problem occurs and the member city shall require the owner of the land upon which the land disturbing activity is located, or other person or agent in control of such land, to repair or eliminate such condition within the time period specified therein. The owner of the land upon which a land disturbing activity is located shall be responsible for the cleanup and any damages from sediment that has eroded from such land. The Commission may require the owner to submit a project review application under these Rules before undertaking any repairs or restoration.

RULE D - STORMWATER MANAGEMENT

1. **POLICY**. It is the policy of the Commission to control excessive rates and volumes of runoff by:

(a) Requiring that peak runoff rates not exceed existing conditions or the capacity of downstream conveyance facilities or contribute to flooding.

(b) Managing subwatershed discharge rates and flood storage volumes to be consistent with the goals of the Commission's water resources management plan and the local water resources management plans.

(c) Controlling runoff rates by the use of regional or on-site detention or infiltration facilities where feasible.

(d) Reviewing stormwater management structures based on the 100-year critical storm event for the drainage area.

(e) Routing runoff to water treatment ponds or other acceptable facilities before discharging into waterbodies.

(f) Promoting the use of natural resources for storing runoff and improving water quality and other amenities where appropriate.

(g) Promoting natural infiltration of runoff.

2. **REGULATION**. No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for the following types of projects without first submitting to and obtaining approval of a project review from the Commission or the city in which the project is located that incorporates a stormwater management plan for the activity, development or redevelopment:

(a) Plans of any land development or site development as set forth in Tables 2.1 and 2.2 below:

Table 2.1 Project review site size thresholds for all land uses except detached single-family residential.

<table>
<tr><th colspan="4">All Land Uses Except Detached Single-Family Residential</th></tr>
<tr><th colspan="3">City Project Review</th><th>Commission Project Review</th></tr>
<tr><th>0.5 acres to < 1 acre</th><th colspan="2">≥ 1 acre to < 5 acres</th><th>≥5 acres</th></tr>
<tr><td>Development projects</td><td colspan="2">Development projects</td><td>Development projects</td></tr>
<tr><td>Abstract 1" runoff from all impervious surface</td><td colspan="2">Meet Commission rate, quality, and volume requirements for the entire site</td><td>Meet Commission rate, quality, and volume requirements for the entire site</td></tr>
<tr><td>Redevelopment projects</td><td colspan="2">Redevelopment projects</td><td>Redevelopment projects</td></tr>
<tr><td rowspan="2">Incorporate permanent water quality BMPs</td><td><50% disturbed</td><td>Meet Commission rate, quality, and volume requirements for the disturbed area</td><td rowspan="2">Meet Commission rate, quality, and volume requirements for the entire site</td></tr>
<tr><td>≥50% disturbed</td><td>Meet Commission rate, quality, and volume requirements for the entire site</td></tr>
</table>

Table 2.2 Project review site size thresholds for detached single-family residential developments.

Detached Single-Family Residential Land Uses		
City Project Review		**Commission Project Review**
≥ 1 acre to < 15 acres		**≥15 acres**
Development projects		*Development*
Meet Commission rate, quality, and volume requirements for the entire site		Meet Commission rate, quality, and volume requirements for the entire site
Redevelopment projects		*Redevelopment projects*
<50% disturbed	Meet Commission rate, quality, and volume requirements for the disturbed area	Meet Commission rate, quality, and volume requirements for the entire site
≥50% disturbed	Meet Commission rate, quality, and volume requirements for the entire site	

(b) Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the net new impervious surface. Such projects will be reviewed by the commission or commissions in which the project is located.

(c) Plans of any land development or individual site development adjacent to or within a lake, wetland, or a natural or altered watercourse as listed in the final inventory of Protected Waters and Wetlands for Hennepin County, as prepared by the DNR. Projects impacting wetlands where the Commission acts as LGU for Wetland Conservation Act administration must be reviewed by the respective Commission regardless of size.

(d) Plans for any land development or site development within the 100-year floodplain as defined by the Flood Insurance Study for the member city.

(e) Plans of any land development or site development regardless of size, if such review is requested by a member city.

(f) Single family developments of more than 15 acres that drain to more than one watershed, for that portion of the site draining into the Shingle Creek or West Mississippi Watershed.

3. CRITERIA. Stormwater management plans shall comply with the following criteria regarding runoff rate restrictions, landlocked basin requirements, detention pond design criteria, water quality requirements, and volume control requirements:

(a) A hydrograph method based on sound hydrologic theory will be used to analyze runoff for the design or analysis of flows and water levels.

(b) Runoff rates for the proposed activity shall not exceed existing runoff rates for the 2-year, 10-year, and 100-year critical storm events for the project location as set forth in NOAA Atlas 14 Volume 8, published June 2013, or its successor, using the online NOAA Precipitation Frequency Data Server or a similar data source. Applicant must document the location and event depths used.. If an approved local water management plan requires more restrictive rate control, then the more restrictive rate shall govern. Runoff rates may be restricted to less than the existing rates when

necessary for the public health and general welfare of the watershed. Member cities and project review applicants shall not exceed discharge rates at City boundaries as determined in the Commission's hydrologic model.

(c) Regional detention basins shall be utilized to manage peak flow rates and meet water quality objectives when feasible.

(d) Analysis of flood levels, storage volumes and flow rates for waterbodies and detention basins shall be based on the range of rainfall and snow melt duration producing the critical flood levels and discharges.

(e) Landlocked water basins may be provided with outlets that:

(1) Retain a hydrologic regime complying with floodplain and wetland alterations.
(2) Provide sufficient storage below the outlet run-out elevation to retain back-to-back 100-year, 24-hour rainfalls and runoff above the highest anticipated groundwater elevation and prevent damage to property adjacent to the basin.
(3) Do not create adverse downstream flooding or water quality conditions.

(f) If detention basins are used to control rate of runoff they shall be designed to provide:

(1) An outlet structure to control the 2-year, 10-year, and 100-year critical storm events to predevelopment runoff rates. Said outlet structure will be required to control critical storm events to less than predevelopment runoff rates if downstream facilities have insufficient capacity to handle the increased flow.

(2) Alternative to (1), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required rate control. This means that no rate control may be required for an individual development provided there is a regional facility designed and constructed to accommodate the flow from this property.

(3) An identified overflow spillway sufficiently stabilized to convey a 100-year critical storm event.

(4) A normal water elevation above the OHW of adjacent waterbodies.

(5) Access for future maintenance.

(6) An outlet skimmer to prevent migration of floatables and oils for at least the two year storm event. Baffled weirs and wooden skimmers are not allowed.

(7) The member city's ordinance prescribing a minimum low floor elevation above the pond's high water level shall govern.

(g) Stormwater must be treated prior to discharge to remove 60 percent of phosphorus and 85 percent of total suspended solids. Treatment may be provided by one or more permanent sedimentation and water quality ponds or a combination of BMPs that together will meet removal requirements.

(1) If permanent sedimentation and water quality ponds are used they shall be designed to the Wet Pond Design Standards set forth on Appendix A to these Rules and provide:

(i) Water quality features consistent with NURP criteria and best management practices.

(ii) A permanent wet pool with dead storage of at least the runoff from a 2.5-inch storm event.

(2) Alternative to (1), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required treatment. This means that no treatment may be required for an individual development provided there is a regional facility designed and constructed to accommodate the flow from this property.

(3) Alternative to (1) or (2), applicant may meet both the treatment requirement and the volume requirement set forth in D.3 (h) below by infiltrating all site runoff from a 1.3 inch rain event. using the same criteria set forth in D.3 (h).

(h) Volume control BMPs must be incorporated into the site design to minimize the creation of new impervious surface and reduce existing impervious surfaces, minimize the amount of directly connected impervious surface, preserve the infiltration capacity of the soil, and limit increases in runoff volume exiting the site to the extent feasible considering site-specific conditions.

(1) Examples of BMPs that preserve pervious areas and reduce runoff volume can be found in "Protecting Water Quality in Urban Areas" (MPCA, 2000, as amended); the "Minnesota Urban Small Sites BMP Manual" (Metropolitan Council 2001, as amended); the "Minnesota Stormwater Manual" (MPCA, 2005, as amended) and other BMP guidance manuals.

(2) Stormwater runoff volume abstraction shall be provided onsite in the amount equivalent to one inch of runoff generated from impervious surface in accordance with Tables 2.1 and 2.2.

(i) When using infiltration for volume reduction, runoff must be infiltrated within 48 hours using accepted BMPs for infiltration, such as infiltration trenches, rainwater gardens, or infiltration basins. Infiltration volumes and facility sizes shall be calculated based on the measured infiltration rate determined by a double-ring infiltrometer test(s) conducted to the requirements of ASTM Standard D3385 at the proposed bottom elevation of the infiltration area. Other testing methods may be used with the approval of the Commission's Engineer. The measured infiltration rate shall be divided by the appropriate correction factor selected from the Minnesota

Stormwater Manual. This site investigation must be conducted by a licensed soil scientist or engineer.

(ii) A post-construction percolation test must be performed on each infiltration practice and must demonstrate that the constructed infiltration rate meets or exceeds the design infiltration rate prior to project acceptance by the city.

(iii) Infiltration areas will be limited to the horizontal areas subject to prolonged wetting.

(iv) Areas of permanent pools tend to lose infiltration capacity over time and will not be accepted as an infiltration practice.

(v) Stormwater runoff must be pretreated to remove solids before discharging to infiltration areas to maintain the long term viability of the infiltration areas. Examples of pretreatment BMPs can be found in "Protecting Water Quality in Urban Areas" (MPCA, 2000, as amended); the "Minnesota Urban Small Sites BMP Manual" (Metropolitan Council 2001, as amended); the "Minnesota Stormwater Manual" (MPCA, 2005, as amended) and other BMP guidance manuals.

(vi) Design and placement of infiltration BMPs shall be done in accordance with the Minnesota Department of Health guidance "Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas," as amended.

(vii) Constructed bioretention and infiltration practices such as rain gardens, infiltration trenches, and infiltration benches shall not be used in:

(a) Fueling and vehicle maintenance areas;

(b) Areas with less than 3 feet separation from the bottom of the infiltration system to the elevation of seasonal high groundwater;

(c) Areas with runoff from industrial, commercial and institutional parking lots and roads and residential arterial roads with less than 5 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater;

(d) Areas within 400 feet of a community water well, within 100 feet of a private well, or within a delineated 1-year time of travel zone in a wellhead protection area;

(e) Sites containing contaminated soils or groundwater.

(viii) Where infiltration is not advisable or infeasible due to site conditions, biofiltration must be provided for that part of the abstraction volume that is not abstracted by other BMPs. Where biofiltration is infeasible, at a minimum filtration through a medium that incorporates organic material, iron fillings, or other material to reduce soluble phosphorus must be provided.

(ix) Alternative to (2), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required volume management. This means that no volume management may be required for an individual development provided there is a regional facility designed and constructed to accommodate the volume from this property

(x) Credit towards compliance with the abstraction requirement in (2) may be achieved by meeting post construction soil quality and amendment depth requirements. Areas that will be subjected to clearing, grading, or compaction that will not be covered by impervious surface, incorporated into a drainage facility, or engineered as structural fill or slope may be included in the credit calculation if they meet post construction soil quality and amendment depth requirements. The applicant may compute a credit of 0.5 inches over the soil amendment area and apply that toward the abstraction volume requirement.

(a) A minimum 8-inch depth of compost amended soil or imported topsoil shall be placed in all areas of the project site being considered for the abstraction credit. Before the soil is placed, the subsoil must be scarified (loosened) at least 4 inches deep, with some incorporation of the amended soil into the existing subsoil to avoid stratified layers.

(b) Soil amendment may be achieved by either mixing 2 inches of approved compost into the 8 inches of soil depth, or by mixing a custom-calculated amount of compost to achieve 8 inches of compacted soil depth with a minimum organic content of five percent.

(c) The amended areas must pass a 12-inch probe test during the site final inspection. Once amended, soil areas must be protected from recompaction,

4. WAIVERS.

(a) The Commission may waive the on-site runoff rate, volume and water quality control design criteria as noted above, if a municipality has an off-site stormwater facility that provides equivalent control and treatment of runoff that conforms to Commission standards.

(b) The design criteria for infiltration may be waived for sites with total impervious surface of less than one acre if infiltration BMPs have been incorporated to the maximum extent possible.

5. EXHIBITS. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):

(a) Property lines and delineation of lands under ownership of the applicant.

(b) Delineation of the subwatershed contributing runoff from off-site, proposed and existing subwatersheds on-site, emergency overflows and watercourses.

(c) Proposed and existing stormwater facilities location, alignment and elevation.

(d) Delineation of existing on-site wetland, marsh, shoreland and floodplain areas.

(e) For applications proposing infiltration or filtration as a stormwater management practice, identification, description, results of double-ring infiltrometer tests, and permeability and approximate delineation of site soils in both existing and proposed as-developed condition.

(f) Existing and proposed ordinary high and 100-year water elevations on-site.

(g) Existing and proposed site contour elevations at 2-foot intervals, referenced to NGVD (1929 datum).

(h) Construction plans and specifications of all proposed stormwater management facilities, including design details for outlet controls.

(i) Runoff volume and rate analysis for the 2-year, 10-year, and 100-year critical storm events, existing and proposed.

(j) All hydrologic, water quality and hydraulic computations made in designing the proposed stormwater management facilities.

(k) Narrative addressing incorporation of volume management BMPs.

(l) Applications requesting an abstraction credit must include a Soil Management Plan (SMP) that shall include an 11" x 17" or larger site map indicating areas where soils will be amended, and calculations for soil volumes to be stockpiled and amounts and specifications of amendment or topsoil to be imported to achieve specified minimum organic matter content.

(m) Delineation of any ponding, flowage or drainage easements, or other property interests, to be dedicated for stormwater management purposes.

6. **MAINTENANCE**. All stormwater management structures and facilities shall be maintained in perpetuity to assure that the structures and facilities function as originally designed. The owner of any water quality treatment device if not a governmental unit shall provide to the member city, in a form acceptable to the Commission, a recordable agreement detailing an operations and maintenance plan that assures that the structure(s) will be operated and maintained as designed.

7. **EASEMENTS**. The member city shall obtain from the applicant, in form acceptable to the Commission, recordable temporary and perpetual easements for ponding, flowage and drainage purposes over hydrologic features such as waterbodies and stormwater basins. The easements shall include the right of reasonable access for inspection, monitoring, maintenance and enforcement purposes.

8. **COVENANTS**. The Commission may require as a condition of project review approval that the member city shall require that the land be subjected to restrictive covenants or a conservation easement, in form acceptable to the Commission, to prevent the future expansion of impervious surface and the loss of infiltration capacity.

RULE E - EROSION AND SEDIMENT CONTROL

1. **POLICY**. It is the policy of the Commission to control runoff and erosion and to retain or control sediment on land during land disturbing activities by requiring the preparation and implementation of erosion and sediment control plans.

2. **REGULATION**. No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for which a project review is required under Rule D without first submitting to and obtaining approval of a project review from the Commission that incorporates an erosion and sediment control plan for the activity, development or redevelopment.

3. **CRITERIA**. Erosion and sediment control plans shall comply with the following criteria:

(a) Erosion and sediment control measures shall be consistent with best management practices as demonstrated in the most current version of the MPCA manual "Protecting Water Quality in Urban Areas," and shall be sufficient to retain sediment on-site.

(b) Erosion and sediment controls 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 Permit MN R100001 (NPDES General Construction Permit) issued by the Minnesota Pollution Control Agency, except where more specific requirements are required.

(c) All erosion and sediment controls shall be installed before commencing the land disturbing activity, and shall not be removed until completion.

(d) The activity shall be phased when possible to minimize disturbed areas subject to erosion at any one time.

4. **EXHIBITS**. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):

(a) An existing and proposed topographic map showing contours on and adjacent to the land, property lines, all hydrologic features, the proposed land disturbing activities, and the locations of all runoff, erosion and sediment controls and soil stabilization measures.

(b) Plans and specifications for all proposed runoff, erosion and sediment controls, and temporary and permanent soil stabilization measures.

(c) Detailed schedules for implementation of the land disturbing activity, the erosion and sediment controls, and soil stabilization measures.

(d) Detailed description of the methods to be employed for monitoring, maintaining and removing the erosion and sediment controls, and soil stabilization measures.

(e) Soil borings if requested by the Commission.

5. **MAINTENANCE**. The project review applicant shall be responsible for proper operation and maintenance of all erosion and sediment controls and soil stabilization measures, in conformance with best management practices and the NPDES permit. The project review applicant shall, at a minimum, inspect and maintain all erosion and sediment controls and soil stabilization measures daily during construction, weekly thereafter, and after every rainfall event exceeding 0.5 inches, until vegetative cover is established.

RULE F - FLOODPLAIN ALTERATION

1. **POLICY**. It is the policy of the Commission to prevent and control flooding damage by:

(a) Preserving existing water storage capacity below the 100-year critical flood elevation on all waterbodies in the watershed to minimize the frequency and severity of high water.

(b) Minimizing development in the floodplain that will unduly restrict flood flows or aggravate known high water problems.

(c) Requiring compensatory storage for floodplain fill.

2. **REGULATION**. No person or political subdivision shall alter or fill land below the 100-year critical flood elevation of any public waters, public waters wetland or other wetland without first obtaining an approved project review from the Commission.

3. **CRITERIA**.

(a) Floodplain alteration or filling shall not cause a net decrease in flood storage capacity below the projected 100-year critical flood elevation unless it is shown that the proposed alteration or filling, together with the alteration or filling of all other land on the affected reach of the waterbody to the same degree of encroachment as proposed by the applicant, will not cause high water or aggravate flooding on other land and will not unduly restrict flood flows.

(b) All new structures shall be constructed with the low floor at the elevation required in the municipality's ordinance.

4. **EXHIBITS**. The following exhibits shall accompany the project review` application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):

(a) Site plan showing boundary lines, delineation and existing elevation contours of the work area, ordinary high water level, and 100-year critical flood elevation. All elevations shall be referenced to NGVD (1929 datum).

(b) Grading plan showing any proposed elevation changes.

(c) Preliminary plat of any proposed subdivision.

(d) Determination by a registered professional engineer of the 100-year critical flood elevation before and after the proposed activity.

(e) Computation of the change in flood storage capacity as a result of the proposed alteration or fill.

(f) Erosion control and sediment plan which complies with these Rules.

(g) Soil boring logs and report if available.

5. **EXCEPTIONS**. If a municipality or county has adopted a floodplain ordinance that prescribes an allowable degree of floodplain encroachment, the applicable ordinance shall govern the allowable degree of encroachment and no project review will be required under this Floodplain Alteration Rule.

RULE G - WETLAND ALTERATION

1. **POLICY**. It is the policy of the Commission to preserve and protect wetlands for their water quality, stormwater storage, habitat, aesthetic, and other attributes by:

(a) Achieving no net loss in the quantity, quality and biological diversity of wetlands in the watershed.

(b) Increasing the quantity, quality and biological diversity of wetlands in the watershed by restoring or enhancing diminished or drained wetlands.

(c) Avoiding direct or indirect impacts from activities that destroy or diminish the quantity, quality and biological diversity of watershed wetlands.

(d) Replacing affected wetlands where avoidance is not feasible and prudent.

2. **REGULATION**. No person or political subdivision shall drain, fill, excavate or otherwise alter a wetland without first obtaining the approval of a wetland replacement plan from the local government unit with jurisdiction over the activity. Mitigation of wetland impacts will be considered in the following sequence: 1) mitigated by enhancing the impacted wetland; 2) mitigated within the subcatchment of the impacted wetland; 3)

mitigated in the drainage area of the impacted wetland; 4) mitigated in the watershed of the impacted wetland; 5) mitigated through purchase of wetland bank credits.

3. CRITERIA.

(a) Any drainage, filling, excavation or other alteration of a wetland shall be conducted in compliance with Minnesota Statutes, section 103G.245, the wetland conservation act, and regulations adopted thereunder.

(b) A wetland may be used for stormwater storage and treatment only if the use will not adversely affect the function and public value of the wetland as determined by the local government unit.

(c) Other activities which would change the character of a wetland shall not diminish the quantity, quality or biological diversity of the wetland.

4. LOCAL GOVERNMENT UNIT. The Commission intends to serve as the local government unit for administration of the Wetland Conservation Act for those cities that have designated the Commission to serve in that capacity, as noted in the Commission's annual report.

RULE H - BRIDGE AND CULVERT CROSSINGS

1. POLICY. It is the policy of the Commission to maintain channel profile stability and conveyance capacity by regulating crossings of watercourses for driveways, roads and utilities.

2. REGULATION. No person or political subdivision shall construct or improve a road or utility crossing across Shingle Creek or any watercourse with a tributary area in excess of 100 acres without first submitting to the Commission and receiving approval of a project review.

3. CRITERIA. Crossings shall:

(a) Retain adequate hydraulic capacity, which for any crossing over Shingle Creek shall be based on the hydraulic model for the creek.

(b) Not adversely affect water quality.

(c) Represent the "minimal impact" solution to a specific need with respect to all reasonable alternatives.

(d) Allow for future erosion, scour, and sedimentation maintenance considerations.

4. EXHIBITS. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):

(a) Construction plans and specifications.

(b) Analysis prepared by a registered professional engineer showing the effect of the project on hydraulic capacity and water quality.

(c) An erosion and sediment control plan that complies with these Rules.

5. MAINTENANCE.

(a) The maintenance, reconstruction and stabilization of any public crossing shall be the responsibility of the political subdivision with jurisdiction over the crossing.

(b) The maintenance, reconstruction and stabilization of any private crossing shall be the responsibility of the owner of the crossing.

(c) If a crossing over the Shingle Creek is determined by the Commission to be causing significant erosion, the Commission may notify the member city where said crossing is located and the member city may order the owner of the crossing to make necessary repairs or modifications to the crossing and outlet channel.

RULE I - BUFFER STRIPS

1. POLICY. It is the policy of the Commission to maintain the water quality and ecological functions provided by watercourses and wetlands by requiring the development of vegetated buffers around watercourses and wetlands where development and redevelopment occurs, and to encourage the installation of vegetated buffers around all watercourses and wetlands. Vegetative buffers reduce the impact of surrounding development and land use on watercourse and wetland functions by stabilizing soil to prevent erosion, filtering sediment from runoff, and moderating water level fluctuations during storms. Buffers provide essential habitat for wildlife. Requiring buffers recognizes that watercourse and wetland quality and function are related to the surrounding upland.

2. REGULATION. No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for: any single family detached housing project 15 acres or larger in size; projects in any other land use such as commercial/ industrial/institutional 5 acres or larger in size; or any land disturbing activity requested by a member city to be reviewed regardless of project size; on land that contains or is adjacent to a watercourse or wetland without first submitting to and obtaining approval of a project review from the Commission that incorporates a vegetated buffer strip between the development or redevelopment and the watercourse or wetland.

3. GENERAL PROVISIONS.

(a) This Rule shall apply to all lands containing or abutting watercourses or wetlands and lands within the buffer strips required by this Rule that are subject to a project review

under these Rules. Watercourses and wetlands shall be subject to the requirements established herein, and other applicable federal, state and local ordinances and regulations. If a municipality has a buffer strip requirement that has been reviewed and approved by the Commission, the municipal regulation shall have precedence over the Commission's Rules.

(b) An applicant shall determine whether any watercourse or wetland exists on land or within the applicable buffer strip on adjacent land, and shall delineate the boundary for any wetland on the land. An applicant shall not be required to delineate wetlands on adjacent property, but must review available information to estimate the wetland boundary.

(c) Documentation identifying the presence of any watercourse or wetland on the applicant's land, including wetland delineation and buffer strip vegetation evaluation, must be provided to the Commission with a project review application.

(d) Wetland and buffer strip identifications and delineations shall be prepared in accordance with state and federal regulations.

4. CRITERIA. The following standards apply to all lands that contain or abut a watercourse or wetland:

(a) BMPs shall be followed to avoid erosion and sedimentation during land disturbing activities.

(b) When a buffer strip is required the applicant shall, as a condition to issuance of an approved project review:

(1) Submit to the member city, in a form acceptable to the Commission, a recordable conservation easement for protection of approved buffer strips. The easement shall describe the boundaries of the watercourse or wetland and buffer strips, identify the monuments and monument locations, and prohibit any of the alterations set forth in Paragraph 6(e) below and the removal of the buffer strip monuments within the buffer strip or the watercourse or wetland.

(2) Install the wetland monumentation required by Paragraph 8 below.

(c) All open areas within the buffer strip shall be seeded or planted in accordance with Paragraph 9 below. All seeding or planting shall be completed prior to removal of any erosion and sediment control measures. If construction is completed after the end of the growing season, erosion and sediment control measures shall be left in place and all disturbed areas shall be mulched for protection over the winter season.

5. BUFFER STRIPS.

(a) For any project review submitted after January 1, 2003, a buffer strip shall be maintained around the perimeter of all watercourses or wetlands. The buffer strip provisions of this Rule shall not apply to any parcel of record as of the date of this Rule

until such parcel is developed or redeveloped. The Commission does, however, strongly encourage the installation of buffer strips on all parcels in the watershed.

(b) Buffer strips shall be a minimum of 20 feet wide with an average width of 30 feet, measured from the ordinary high water level of the watercourse or wetland.

(c) Buffer strips shall apply whether or not the watercourse or wetland is on the same parcel as a proposed development.

(d) Buffer strip vegetation shall be established and maintained in accordance with Paragraph 9 below. Buffer strips shall be identified within each parcel by permanent monumentation in accordance with Paragraph 8 below.

(e) Subject to Paragraph 5(f) below, alterations including building, storage, paving, mowing, plowing, introduction of noxious vegetation, cutting, dredging, filling, mining, dumping, grazing livestock, agricultural production, yard waste disposal or fertilizer application, are prohibited within any buffer strip. Noxious vegetation may be removed as long as the buffer strip is maintained to the standards required by the Commission. Alterations would not include plantings that enhance the natural vegetation or selective clearing or pruning of trees or vegetation that are dead, diseased or pose similar hazards.

(f) The following activities shall be permitted within any buffer strip, and shall not constitute prohibited alterations under Paragraph 5(e) above:

(1) Use and maintenance of an unimproved access strip through the buffer, not more than 20 feet in width, for recreational access to the watercourse or wetland and the exercise of riparian rights.

(2) Placement, maintenance, repair or replacement of utility and drainage systems that exist on creation of the buffer strip or are required to comply with any subdivision approval or building permit obtained from the municipality or county, so long as any adverse impacts of utility or drainage systems on the function of the buffer strip have been avoided or minimized to the extent possible.

(3) Construction, maintenance, repair, reconstruction, or replacement of existing and future public roads crossing the buffer strip, so long as any adverse impacts of the road on the function of the buffer strip have been avoided or minimized to the extent possible.

6. ALTERNATE BUFFER STRIPS.

(a) Because of unique physical characteristics of a specific parcel, narrower buffer strips may be necessary to allow a reasonable use of the parcel, based on an assessment of:

(1) The size of the parcel.

(2) Existing roads and utilities on the parcel.

(3) The percentage of the parcel covered by watercourses or wetlands.

(4) The configuration of the watercourses or wetlands on the parcel.

(5) The quality of the affected watercourses and wetlands.

(6) Any undue hardship that would arise from not allowing the alternative buffer strip.

(b) The use of alternative buffer strips will be evaluated as part of the review of a stormwater management plan under these Rules. Where alternative buffer strip standards are approved, the width of the buffer strips shall be established by the Commission based on a minimum width of 10 feet. Alternative buffer strips must be in keeping with the spirit and intent of this Rule.

7. MONUMENTATION. A monument shall be required at each parcel line where it crosses a buffer strip and shall have a maximum spacing of 200 feet along the edge of the buffer strip. Additional monuments shall be placed as necessary to accurately define the edge of the buffer strip. A monument shall consist of a post and a buffer strip sign. The signs shall include warnings about disturbing or developing the buffer strip.

8. VEGETATION.

(a) Where acceptable natural vegetation exists in buffer strip areas, the retention of such vegetation in an undisturbed state is required unless an applicant receives approval to replace such vegetation. A buffer strip has acceptable natural vegetation if it:

(1) Has a continuous, dense layer of perennial grasses that has been uncultivated or unbroken for at least 5 consecutive years; or

(2) Has an overstory of trees and/or shrubs that has been uncultivated or unbroken for at least 5 consecutive years; or

(3) Contains a mixture of the plant communities described in Subparagraphs 9(a)(1) and (2) above that has been uncultivated or unbroken for at least 5 years.

(b) Notwithstanding the performance standards set forth in Paragraph 9(a), the Commission may determine existing buffer strip vegetation to be unacceptable if:

(1) It is composed of undesirable plant species including but not limited to common buckthorn, reed canary grass, or species on the Minnesota State Noxious Weeds List; or

(2) It has topography that tends to channelize the flow of runoff; or

(3) For some other reason it is unlikely to retain nutrients and sediment.

(4) Where buffer strips are not vegetated or have been cultivated or otherwise disturbed within 5 years of the project review application, such areas shall be replanted and maintained with native vegetation. The buffer strip plantings must be identified on the project review application. Acceptable buffer strip design and

planting methods are detailed in the reference documents "Restoring and & Managing Native Wetland and Upland Vegetation" (Jacobson 2006, prepared for BWSR and MnDOT).

(c) Buffer strip vegetation shall be established and maintained in accordance with the requirements found in this Paragraph. During the first two full growing seasons, the owner must replant any buffer strip vegetation that does not survive. The owner shall be responsible for reseeding and/or replanting if the buffer strip changes at any time through human intervention or activities. At a minimum the buffer strip must be maintained as a "no mow" area.

9. ENCROACHMENT.

(a) Buffer strips must be kept free of all materials, equipment and structures, including fences and play equipment. Buffer strips must not be grazed, cropped, logged or mown except as approved by the Commission. The topography of the buffer strips shall not be altered by any means, including paving, plowing, cutting, dredging, filling, mining, or dumping.

(b) Variances.

(1) Only variances meeting the standards and criteria set forth in Rule K shall be granted.

(2) Variances shall not be granted that would circumvent the intent and purposes of this Rule.

RULE J - FEES

1. POLICY. The Commission finds that it is in the public interest to require applicants to pay the cost of administering and reviewing project review applications, and inspecting approved activities to assure compliance with these Rules, rather than using the Commission's annual administrative levy for such purposes. The Commission shall by resolution establish a schedule of fees that may be amended from time to time to reflect the cost of providing each service.

2. APPLICATION. Each application for the issuance, transfer or renewal of a project review recommendation under these Rules shall be accompanied by an application fee to defray the cost of processing the application.

3. REVIEW. A project review applicant under these Rules shall pay a fee for the cost of the review and analysis of the proposed activity, including services of engineering, legal, and other consultants. The review fee shall be payable upon the submission of the project review application.

4. **VARIANCE**. A project review applicant requesting a variance from these rules shall pay a deposit for the cost of analyzing the request, including services of engineering, legal, and other consultants. The variance deposit shall be payable upon the submission of the project review application. Should the cost of said variance review exceed the amount on deposit, the application shall deposit such additional sums as are needed to pay such costs. Failure to pay such costs is grounds to deny the application or suspend review. Funds not used shall be returned to the applicant.

5. **WETLAND MITIGATION PLAN**. A project review applicant under these rules shall pay a deposit for the cost of the review and analysis of a proposed activity involving a wetland mitigation plan in a municipality where the Commission is the LGU. The deposit is to cover the costs of engineering, legal, and other consultants. The wetland mitigation deposit shall be payable upon the submission of the project review application. Should the cost of said wetland mitigation plan review exceed the amount on deposit, the application shall deposit such additional sums as are needed to pay such costs. Failure to pay such costs is grounds to deny the application or suspend review. Funds not used shall be returned to the applicant.

6. **WETLAND MITIGATION PLAN MONITORING**. A project review applicant under these rules in a municipality where the Commission is the LGU shall deposit an escrow to cover the cost of Commission monitoring and annual monitoring plan review for the five-year period. The applicant may apply to the Commission to provide the field monitoring services and to supply to the Commission the annual monitoring report. In the event the applicant does not do the field monitoring the Commission will undertake the data collection. If the escrow amount is insufficient to cover the costs the Commission may require additional funds from the applicant.

7. **WETLAND MITIGATION SECURITY DEPOSIT**. A project review applicant under these rules in a municipality where the Commission is the LGU shall provide a security to assure that the replacement plan is followed. The amount of the security shall be calculated on a case-by-case basis based on the estimated cost of construction, follow up and contingency. The security may also include an amount determined by the Commission to be sufficient to protect the public in the event the replacement plan does not succeed.

8. **DEPOSITS**. The Commission will maintain an accounting for all deposits made under this Rule. No interest will be paid to applicants for funds held in deposit.

RULE K - VARIANCES

1. **WHEN AUTHORIZED**. The Commission may grant variances from the literal provisions of these Rules. A variance shall only be granted when in harmony with the general purpose and intent of the Rules in cases where strict enforcement of the Rules will cause practical

difficulties or particular hardship, and when the terms of the variance are consistent with the Commission's water resources management plan and Minnesota Statutes, chapter 103D.

2. **HARDSHIP**. "Hardship" as used in connection with the granting of a variance means the land in question cannot be put to a reasonable use if used under the conditions allowed by these Rules; the plight of the applicant is due to circumstances unique to the land and not created by the applicant; and the variance, if granted, will not adversely affect the essential character of the locality and other adjacent land. Economic considerations alone shall not constitute a hardship if a reasonable use for the land exists under the terms of these Rules. Conditions may be imposed in the granting of a variance to insure compliance and to protect adjacent land and the public health and general welfare of the Commission.

3. **PROCEDURE**. An application for a variance shall describe the practical difficulty or particular hardship claimed as the basis for the variance. The application shall be accompanied with such surveys, plans, data and other information as may be required by the Commission to consider the application.

4. **VIOLATION**. A violation of any condition imposed in the granting of a variance shall be a violation of these Rules and shall automatically terminate the variance.

RULE L - ENFORCEMENT

1. **ADMINISTRATION**. These Rules shall be administered by the Commission. The Commission shall consider applications required under these Rules and determine whether such applications should be approved, approved with conditions, or denied. Such determination shall be communicated to the member city in which the project lies and to the applicant.

2. **IMPLEMENTATION BY MEMBER CITIES**. It shall be the duty of each city to enforce and implement such determinations by the Commission under the various permitting processes and regulations of the city. Each city shall make such amendments to its official controls, regulations, and permitting processes as are necessary to provide it with the authority to enforce and implement the determinations of the Commission.

3. **FAILURE BY CITY TO IMPLEMENT**. Upon a determination by the Commission that a city has not enforced or implemented a decision of the Commission in the administration of these Rules, the Commission shall notify the city of such determination and direct that appropriate action be taken by the city. If the city does not take such action, the Commission may take such legal steps as are available to it to effect such enforcement or implementation.

RULE M – AMENDMENT OF THESE RULES

1. **AMENDMENT.** These rules may be amended from time to time by the Commission. Proposed amendments shall be reviewed by the member cities prior to adoption unless the Commission determines that said amendment is of a minor or technical nature. Minor or technical amendments include recodifying or streamlining the rules, clarifying policies, or other actions that do not adversely affect a member city or impact the Commission's or member cities' ability to meet their water management plan goals.

2. **PROCEDURE.** Proposed major amendments to these rules shall be first considered by the Commission and then forwarded to the member cities for a 45-day comment period. Following that comment period, the Commission shall consider the proposed amendment and the comments received for approval. All amendments shall be made by resolution.

SHINGLE CREEK/WEST MISSISSIPPI
WATERSHED MANAGEMENT COMMISSIONS

RULES
APPENDIX A
WET POND DESIGN STANDARDS

Permanent Pool Depth	4 to 10 feet
Permanent Pond Surface Area	Greater of 2% of watershed's impervious area and 1% of the watershed
Permanent Pool Length to Width Ratio	3:1 or greater with an irregularly shaped shoreline
Side Slopes	10:1 for 10-foot bench centered on the normal water elevation and between 3:1 and 20:1 elsewhere
Side Slope Stabilization	Native seed with mix 33-261 (MnDOT 310), 34-271 (BWSR W2) or equivalent between NWL and HWL, provide 10' buffer where possible with mix 35-221 (MnDOT 330 (dry)) or mix 35-241 (MnDOT 350 (mesic))
Floatable Removal	Skimming device discharging at no greater than 0.5 fps during the 1-year event or a submerged outlet with a minimum 0.5 feet from the normal water level to the crown of the outlet pipe
Sediment Accumulation Area	Provide maintenance pads to remove sediment deltas at inlets
Permanent Pool Volume	A 4-foot mean depth and equal to 2.5-inch rain over the watershed
Source	Protecting Water Quality in Urban Areas (MPCA 2000)

Shingle Creek/West Mississippi Watershed Management Commissions
Management Rules and Standards*

	Standard	Purpose	Applicability
Project Reviews Required	A Stormwater Management Plan consistent with all applicable management rules and standards* must be reviewed and approved prior to commencement of land disturbing activities. Generally, the Commission reviews single family projects larger than 15 acres and all other land uses larger than 5 acres; linear projects; and projects with wetland impacts where the Commission is LGU for WCA. Cities generally review all other projects.	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes; improve water quality; protect water resources; and promote natural infiltration of runoff.	All development or redevelopment projects of the following types: • Single family detached housing project 1 acre or larger in size • Projects in any other land use 0.5 acres or larger in size • Projects within the 100-year floodplain • Projects adjacent to or within a lake, wetland, or watercourse • Any land disturbing activity requested by a member city to be reviewed regardless of project size • Linear projects creating more than one acre of new impervious surface
Rate Control	Peak runoff rates may not exceed existing rates for the 2-year, 10-year, and 100-year critical storm event; or the capacity of downstream conveyance facilities; or contribute to flooding	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes	All projects on more than one acre requiring a project review. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Volume Manage-ment	One inch of impervious surface runoff must be abstracted on site for at least 48 hours	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes; and promote natural infiltration of runoff.	All projects on more than one acre requiring a project review. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Erosion and Sediment Control	Erosion control plan using Best Management Practices (BMPs) and consistent with the NPDES General Construction Permit is required	To control erosion and sediment so as to protect conveyance systems and water quality	All projects requiring a project review
Floodplain Alteration	Compensating storage is required to mitigate floodplain fill	To prevent and control flooding damage	All development or redevelopment projects within the 100-year floodplain regardless of project size
Water Quality	Removal of 60% of TP and 85% of TSS, using either permanent sedimentation and water quality ponds consistent with NURP design standards, providing a permanent wet pool with dead storage of at least the runoff from a 2.5 inch event, or a combination of BMPs providing those removals	To protect water quality	All projects on more than one acre requiring a project review. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Buffer Strips	Vegetated buffer strips of a minimum 20 foot, average 30 foot width are required adjacent to wetlands and watercourses	To protect water quality; reduce erosion and sedimentation; reduce pollutants from runoff and debris; and provide habitat	All projects requiring a project review that contain or abut a wetland or watercourse
Wetland	Wetlands may not be drained, filled, excavated, or otherwise altered without an approved wetland replacement plan from the local government unit (LGU) with jurisdiction	To preserve and protect wetlands for their water quality, stormwater storage, habitat, aesthetic, and other attributes	All land disturbing activity impacting a wetland as defined by the Wetland Conservation Act (WCA)

*Important Note: Approved TMDL Implementation Plans may have additional site-specific requirements.

The Shingle Creek and West Mississippi Commissions approved two regional treatment systems that are incorporated into these Rules and Standards.

SC2010-04 Gravel Mining Area (GMA) Arbor Lakes Infiltration Credit: Maple Grove

The Gravel Mining Area (GMA) at Arbor Lakes in Maple Grove is developing in accordance with a Stormwater Master Plan reviewed and approved by the Shingle Creek Commission. This Master Plan was developed in accordance with the Commission's runoff rate and water quality rules and standards, but before an infiltration requirement was added. There is a large area of the GMA yet to be developed where regional ponds have already been built according to the pre-infiltration requirement. In 2010 the Commission reviewed and approved a plan by the City of Maple Grove to obtain infiltration credits for this new development by constructing biofiltration basins adjacent to four existing regional stormwater ponds. Stormwater from areas that developed prior to the infiltration rule is directed to these new basins. The Commission agreed that these new infiltration basins are adequate to provide regional infiltration for the 553 acres of undeveloped area shown on the attached infiltration credit map. New development in that area will not be required to meet the infiltration standard on site.

WM2007-02 Brooklyn Center Regional Treatment

In 2007 the City of Brooklyn Center constructed a regional treatment system for a large part of the area that is drained by the 65th Avenue trunk storm sewer that outlets to the Mississippi River. This drainage area has little or no treatment. The area is expected to redevelop in the future, and the regional underground treatment system was proposed to provide regional TSS treatment. The treatment device was sized to provide treatment for the equivalent of the runoff from 360 acres. The West Mississippi Commission agreed that future development within that area would not need to provide on-site TSS treatment, and that the TP requirement could be met by infiltrating 0.75 inches of runoff from impervious area. Within the ten year time-of-travel area infiltration is not required, but filtration of the equivalent volume is required if allowed by the Wellhead Protection Plan. Projects will still need to meet rate control, erosion control, and other Commission requirements.

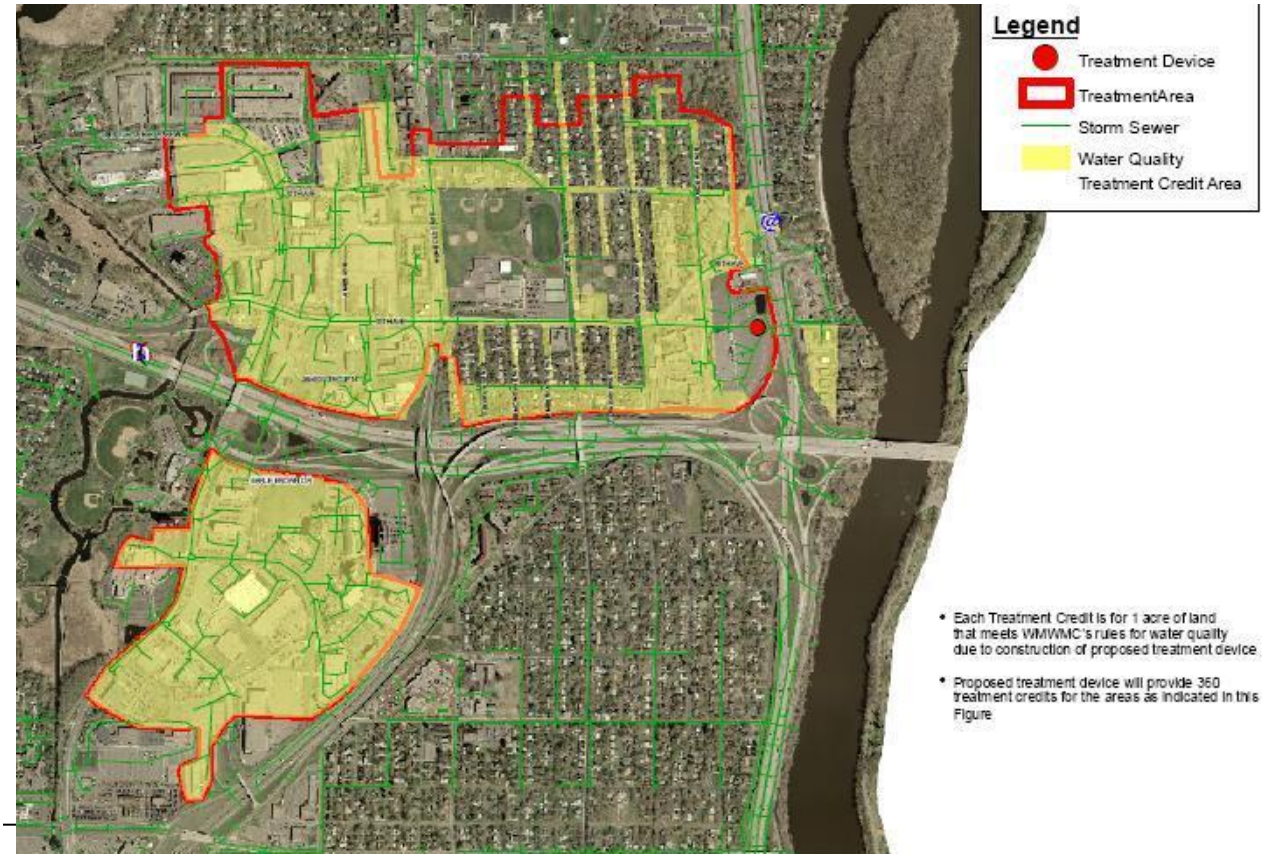
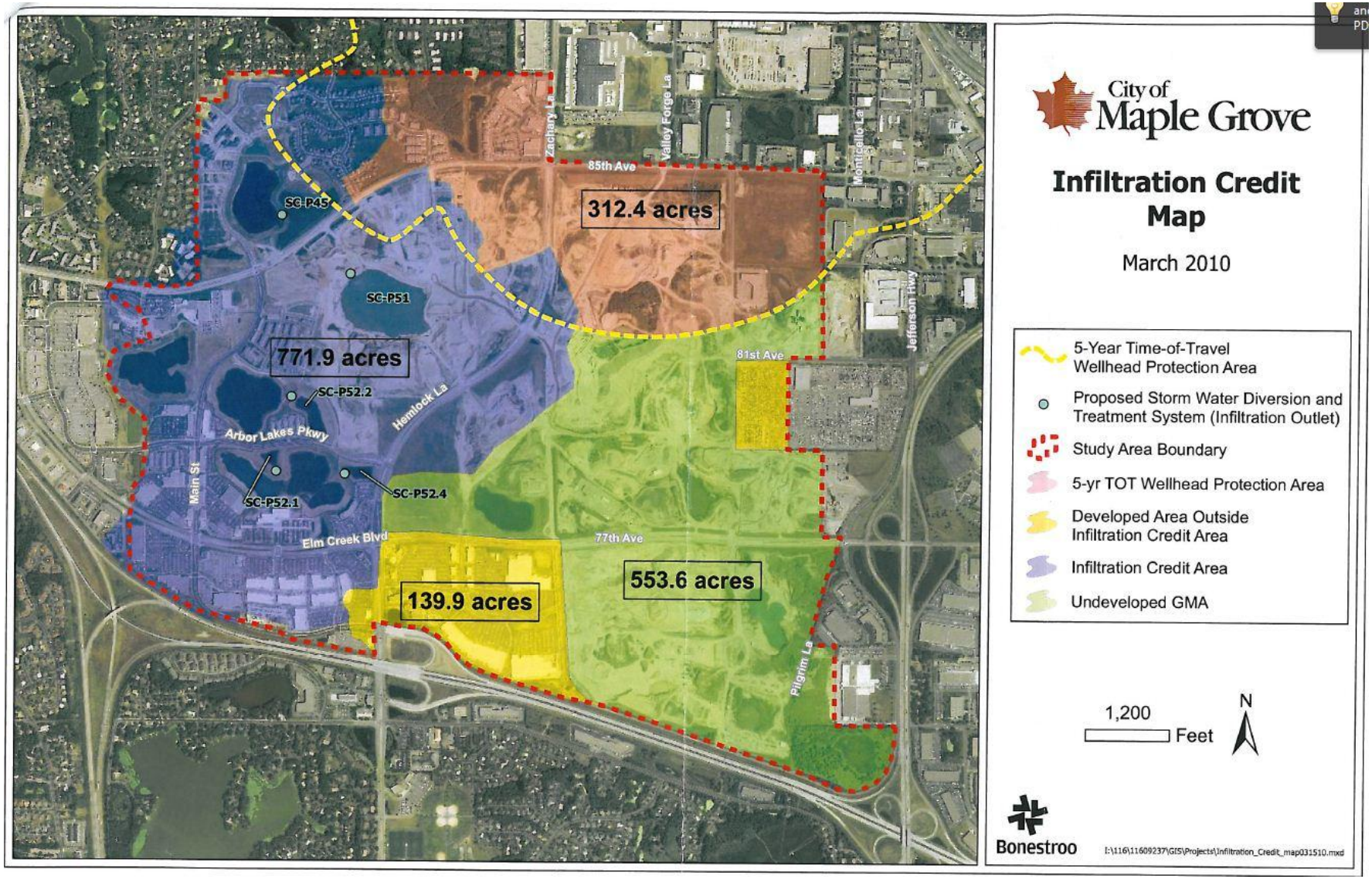


Figure 2. Brooklyn Center Regional Treatment area.


City of Maple Grove
Infiltration Credit Map
March 2010
312.4 acres
771.9 acres
139.9 acres
553.6 acres
SC-P45
SC-P51
SC-P52.2
SC-P52.1
SC-P52.4
Zachary La
Valley Forge La
Montecello La
Jefferson Hwy
85th Ave
81st Ave
77th Ave
Hemlock La
Arbor Lakes Pkwy
Main St
Elm Creek Blvd
Pilgrim La
5-Year Time-of-Travel Wellhead Protection Area
Proposed Storm Water Diversion and Treatment System (Infiltration Outlet)
Study Area Boundary
5-yr TOT Wellhead Protection Area
Developed Area Outside Infiltration Credit Area
Infiltration Credit Area
Undeveloped GMA
1,200
Feet
N
Bonestroo
I:\116\11609237\GIS\Projects\Infiltration_Credit_map031510.mxd

APPENDIX C

REQUIREMENTS OF REDEVELOPMENT

REQUIREMENTS OF RE-DEVELOPMENT

A. GENERAL

Premise

The land use change that accompanies development causes an increase in nutrient load to area waterbodies. The increase in impervious area coupled with the expanded storm sewer system provides conditions for the delivery of pollutants to these waterbodies. In addition, inappropriate development practices and sedimentation encourage pollution and require the expenditure of public funds to correct damages and deficiencies.

Goals

Osseo recognizes it is essential to promote, preserve, and enhance the quality of the City's water resources and to protect those resources from adverse effects caused by changes in land use. To promote water quality in Osseo, the requirements of new developments are intended to minimize the need for future wetland restoration programs and promote the reduction of phosphorus loading in the City's waterbodies.

Position

To minimize the impacts of pollution on Osseo's waterbodies, the owners of future developments will be responsible for reducing or maintaining phosphorus exports of undeveloped conditions resulting from a shift in land use and public improvements associated with the new development. Regional treatment will be the primary measure to treat stormwater. This position is supported by Minnesota Statutes 462.358.

Intent

This section of the plan will establish the procedures by which developments and subdivisions will be reviewed in order to minimize environmental drainage and protect Osseo from incurring high maintenance and capital costs resulting from the need to correct water quality problems. Two activities are central to achieving this goal:

1) Erosion and sediment control on developments, and

2) Post-development phosphorous controls.

Scope and Application to Development

All new construction, subdivision or development will be required to submit an erosion and sediment control plan. Exceptions will include isolated individual single family dwellings; and extensions,

enlargements, additions, changes or alterations to existing single family dwellings. Single family erosion control at time of building permit will be administrated in accordance with the city code.

B. EROSION AND SEDIMENT CONTROL

Every development whose subdivision is referred to the City Council shall be required to submit an erosion and sediment control plan. Sedimentation ponds shall be designed and constructed as detailed in chapter 2 (sized to retain 6" of runoff during mass grading operations, 2 inches of runoff after turf establishment, and SSWMP standards after 75% of the development has been built).

In addition to those requirements existing in the city code, the erosion and sediment control plan shall include:

1. The property boundary and lot lines.

2. Two foot contours extending 200 feet beyond the property lines.

3. A drainage plan of the site delineating the direction and rate stormwater is conveyed from the site. The drainage plan shall show directional site and drainage arrows, identity the location water quality treatment ponds and areas in which stormwater will collect.

4. A delineation of wetlands and waterbodies and watercourses located on and within 200 feet of the development, noting the normal and high water levels for ponds, wetlands, and lakes.

5. Percent of grade and elevations for streets and parking areas.

6. Basement floor elevations.

7. Utility plans in the in area proposed development.

8. Identification and design of sedimentation ponding areas to meet the City requirements as outlined in the erosion and sediment control ordinance.

9. The limits of clearing and grading.

10. A site map that identifies vegetative and structural erosion and sediment control measures to be installed, including temporally and permanent sediment and nutrient basins designed according to the procedure below for assessing pre-development phosphorus export and post-development export of phosphorous.

11. A narrative that describes the project site and erosion and sediment control measures. The narrative must include the sequence of grading and sequence of installation, maintenance and disposition of erosion and sediment control measures, and the construction of permanent and temporary sediment and nutrient basins.

C. POLLUTANTS & NUTRIENTS CONTROL

Treatment ponds should be provided to trap heavy metals, toxic materials, and sediments rich in phosphorus, nitrogen, and oxygen consuming bacteria. Generally, a ponding designed for nutrient removal will also remove heavy metals and other pollutants. Phosphorous is the main nutrient that affects the quality of waterbodies and the primary target of the water quality program.

Modeling procedures and requirements should be used to assess pre-development phosphorous export and post-development export.

Review Procedure

Site plans meeting the above requirements shall be submitted for review in accordance with the following plan approval standards.

A plan may be approved subject to conditions necessary to insure compliance with the goals of this plan. Such conditions may limit the size, kind or character of the proposed development, require the construction of structures (such as weirs or dikes), storage or treatment basins, or require a site plan alteration to ensure buffering from waterbodies. Osseo will use a modeling program to calculate pre- and post-development phosphorous export.

Plan Approval Standards

Plans must meet the following standards to be approved:

1. Satisfaction of the erosion and sediment control criteria.
2. Sizing and design of the modeling. Nutrient ponds shall meet design parameters described in post-development phosphorus control section described in the post phosphorous control section of this chapter.
3. No development shall be allowed which will result in unusual maintenance costs due to sedimentation of roads and parking areas.
4. Existing wetlands and waterbodies shall NOT be used for primary sedimentation traps or nutrient removal during development.
5. The developer shall provide information required for the design of the pond (e.g. percent impervious area, runoff coefficients, district areas, etc.).

D. DEDICATION REQUIREMENTS

All redevelopment shall be required, at Osseo's option, to provide land and construct a nutrient detention pond for the purpose of treating increased phosphorus runoff generated by the subject development, in accordance with Minnesota Statutes 462.358. The standards and guidelines are for all hydrologic resources

within property easements designated for hydrologic features, i.e., wetlands, floodplain, conveyance facilities, etc. All physical improvements shall be designed to the treat phosphorus runoff from the site.

In addition to providing proper ponding, development shall also be required to provide mitigation measures if the development results in an increase in the phosphorus concentration of downstream recreational classified waterbodies.

An agreement to construct the required treatment basins or ponding areas and the declaration of such property or easement shall be executed prior to the approval of the site plan.

Ponding and Land Dedication

Acquisition of land, or easements for ponds and treatment basins, shall be based on modeling to calculate pond volume, surface size of the pond, and other pond dimensions for a given development. The model will calculate the necessary land to be dedicated for ponding.

Osseo may, as its own discretion, require the construction of one or more ponds even when such ponds cumulatively do not reduce phosphorus loading to pre-development levels. Osseo shall require said ponds when it is determined that they are necessary to maintain the integrity of water quality in downstream recreational water bodies.

Special Assessments

If an on-site pond is not feasible, the developing parcel shall be assessed for the costs associated with nutrient removal from regional treatment ponds located off site.

Hardship

Osseo may vary from the provisions of this Plan where the literal applications of the policies would result in a substantial inequitable hardship to the developer. In assessing hardship, Osseo shall balance the severity of the physical, social, and economic effects of the literal application against the interest of Osseo in pursuing its water quality objectives. Economic considerations alone shall not constitute a hardship if a reasonable use of the property remains.

Hardship shall be determined through one of the following conditions

1. The required on-site treatment basin is not sufficient to prevent an increase in phosphorus in a downstream lake or recreational waterbody. In this case the developer will be responsible for a cash dedication equal to the cost of land and pond volume needed for treatment of the remaining phosphorous loads.

2. On-site ponding is not feasible due to lot size or site limitations, or due to potential adverse environmental impact. In this case the developer will be responsible for a special assessment equal to the full cost of land and pond volume needed for treatment of the phosphorus load leaving the site.

Mitigation

New developments shall also be required to: reduce impervious area, provide additional treatment basin volume, provide treatment of stormwater discharge through other means, or a special assessment in lieu of as determined by Osseo. Special assessments shall be equal to the full cost of the land and pond value needed for treatment of the increased phosphorus loading in the affected recreational waterbodies.